The Predictive Utility of the Theory of Planned Behaviour for Physical Activity in a Malaysian Population: A Mixed Methods Approach

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ABSTRACT

Introduction : Participation in physical activity is a key component of a healthy lifestyle. To this extent, the Theory of Planned Behaviour (Ajzen, 1991) and self-efficacy (Bandura, 1995) have been used extensively to understand the determinants of participation in physical activity in order to outline the appropriate health promotion strategies. Participation in physical activity is also linked to the experience of well-being or improved in quality of life.

Aims : The objectives of this dissertation were to test the utility of predicting physical activity behaviour of the Theory of Planned Behaviour (TPB) as well as self-efficacy using a specifically devised questionnaire for a Malaysian population and the Exercise Self-Efficacy Scale (Bandura, 2006). It also aimed to examine the relationship between participating in physical activity and quality of life.

Methods : This study was carried out among the Non-Governmental Organizations (NGO) receiving support from the Ministry of Health Malaysia to run physical activity programmes. To fulfil the objectives, both quantitative and qualitative methods were employed in this research. The first study used qualitative methods to develop a Malaysian TPB questionnaire. This was then used in the main study where quantitative data were collected at four time points in a longitudinal study of engagement with physical activity programmes. In addition, to gather an in-depth understanding of beliefs, qualitative data was also collected via interviews with attendees and organisers of the NGOs, as well as senior officials in the Ministry of Health Malaysia.

Results : Findings from the main study provided support for the utility of the TPB in identifying the determinants of the physical activity behaviour. Attitude emerged as the strongest predictor of behavioural intention across all time points. However, perceived behavioural control was found to be a better predictor of future intention to perform physical activity and physical activity behaviour. The Exercise Self-Efficacy scale did not make a significant contribution to the prediction of intention to exercise. The study found a significant association between quality of life and physical activity, particularly of vigorous intensity. As for the qualitative thematic analyses, interviews revealed that the major reason participants continue to engage in physical activity could be classified into 'socio-economic', 'physical environment' and 'personal factors'.

Conclusion : TPB has been shown to be effective in predicting physical activity behaviour among the Malaysian population. This study provides support of the relationship between performing physical activity and quality of life especially among the Malaysian population. Future physical activity health promotion programmes should be targeting PBC and affective process to increase adherence.

DECLARATION

This thesis is submitted in fulfilment for the degree of Doctor of Philosophy at the Liverpool John Moores University, United Kingdom. I declare that this thesis is based on my original work except for the quotations and citations which have been duly acknowledged. I also declare that this thesis has not been previously or concurrently submitted, either in whole or in part, for any other qualification at the Liverpool John Moores University or other institutions.

Kheng Ban, Ng

2019

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I would also like to thank the Ministry of Health Malaysia for granting me the study leave and scholarship to pursue this study. Special thanks to the Health Promotion Board Malaysia and the Health Education Division for the unfailing support and kind cooperation.

This research would not have been completed without the unwavering support of my family members. Therefore, my gratitude goes to my wife, Siew and my children, Evelyn and Khai.

Chapter 1

1.0 INTRODUCTION

This chapter provides an overview of the thesis and is divided into two sections: Section 1.1 discusses the structure of the thesis while Section 1.2 highlights the relevance and the justification of the study.

1.1 Introduction to the Study

Briefly, this study is about testing the predictive utility of the Theory of Planned Behaviour (TPB; Ajzen, 1991) and the Self-Efficacy Scale (Bandura, 2006) among a Malaysian population who received support from the Health Promotion Board Malaysia to organise physical activity programmes. It also aims to examine the relationship between participating in physical activity and quality of life. This study was conducted to understand participants' beliefs and well-being in relation to maintenance of physical activity. The findings from this study will help the design of future physical activity health promotion programmes and add to the literature on the predictive power of TPB.

This thesis was organised into seven chapters and, as indicated, this introductory chapter describes the organisation and structure of the thesis and the relevance of the study. An extensive review of the existing literature is discussed in Chapter 2, including the theory that underpins the present study and the concepts of self-efficacy and quality of life in relation to physical activity. Drawing on the literature, the current research gaps and objectives of the study are also presented in Chapter 2. The methods employed in the present study are discussed in Chapter 3. The chapter starts with an introduction and justification for the mixed methods used and a brief overview of the quantitative and qualitative methods employed in data collection. The methods of each study are discussed in detail in this chapter too. The instrumentation used in the present study includes a TPB questionnaire, the

Exercise Self-Efficacy (ESE) scale and the World Health Organization Quality of Life (WHOQOL)-BREF questionnaire. These instruments are discussed in Chapter 4, which also gives details of the development process of the TPB questionnaire. Chapter 5 discusses the main research findings from the quantitative study which includes the TPB, ESE and the WHOQOL-BREF questionnaires. Chapter 6 discusses the findings from qualitative studies and comprises three studies: 1) "Views on physical activity: re-analysis of elicitation study data", 2) "Understanding participation and promotion of physical activity in Malaysia: analysis of heterogeneous viewpoints of NGOs and health officials" and 3) "Analysis of follow-up interviews of the NGOs' attendees". Finally, Chapter 7 summarises the main issues and findings presented in all the studies conducted in this thesis and provides a final conclusion, commentary on the limitations and suggestions for future research.

This study is part of my work as the Health Education Officer at the Health Education Division, Ministry of Health Malaysia. The Health Education Division in the Ministry of Health Malaysia is the department responsible for planning, carrying out and evaluating health promotion programmes in Malaysia. This PhD study was also fully funded by the Ministry of Health Malaysia.

1.2 Relevance and Justification for Study

1.2.1 Relevance of study

The present study is of importance and relevance because physical inactivity is the fifth leading cause of mortality in Malaysia (Ministry of Health Malaysia, 2016). There is established evidence that regular physical activity contributes to the primary and secondary prevention of several chronic conditions such as cardiovascular disease, obesity, diabetes, cancer and hypertension (Rhodes et al., 2014). The World Health Organization (WHO) published reports titled "Global Recommendation on Physical Activity for Health" (World Health Organization, 2010) and "Global Strategy on Diet, Physical Activity and Health" (World Health Organization, 2004) outlining that health is achieved via primary prevention of non-communicable diseases through physical activity at population level and the primary targets for these recommendations are policy-makers at national level. At the national level, the Malaysian government

through the Ministry of Health Malaysia carried out various programmes to promote physical activity among the community such as 10,000 Steps (Health Education, 2017a), *1NakSihat* (Get Healthy), Healthy Lifestyle (Health Education, 2017b) and Sweat Wednesday. However, despite these governmental interventions, there has been an increase in adult obesity levels (Omar, Samad, Daud, Hasan Nudin, & Yusoff, 2008; Poh et al., 2010) leading to the suggestion that the physical activity level among the Malaysian population is not commensurate with increasing dietary intakes (Poh et al., 2010). Thus, there is a need to understand the determinants of physical activity engagement in Malaysia.

1.2.2 Justification for study

This research contributes: 1) the improvement of health promotion and education interventions for physical activity and, 2) new knowledge to the literature as follows.

1.2.2.1 Improvement of health promotion and education interventions for physical activity

From a public health perspective, the results from this thesis will contribute to the development of intervention programmes with better reach and efficiency. Health promotion programmes promoting physical activity should not only stop at increasing and maintaining physical activity but also contribute to achieving a better quality of life. Consistent with that motivation, the present study not only investigates the predictive power of the TPB for physical activity but also links this with quality of life and self-efficacy.

The WHO in response to the recommendations of a United Nations high-level meeting on the prevention and control of non-communicable diseases held on 19–20 September 2011, set a target to reduce physical inactivity by 10% by the year 2025 (Ministry of Health Malaysia, 2016). In line with the WHO target, the Ministry of Health Malaysia developed the National Strategic Plan for Active Living (NASPAL) 2016–2025 to create a national culture that supports physically active lifestyles by increasing active living opportunities for individuals, families and communities (Ministry of Health Malaysia, 2016).

The present study was conducted in collaboration with the objectives of the Ministry of Health Malaysia to control the epidemic of non-communicable diseases. To this extent, the present study applied the TPB to describe the socio-cognitive determinants of physical activity behaviour. It will have both scientific and practical utility: from a scientific point of view, the findings will provide a significant contribution to knowledge about Malaysians' salient beliefs on physical activity; practically, future health promotion programmes could be improved by using the findings of the study to target salient beliefs.

1.2.2.2 Contribute new knowledge to the literature

Literature examining physical activity behaviour using TPB in Malaysia is limited and available studies mainly use cross-sectional methods. As behaviour change is a process that unfolds over time (Prochaska & Velicer, 1997), the present study adopted a repeated measures approach, which is relatively novel in TPB studies, particularly in Malaysia. If the theory is found to be relevant and applicable with enough explanatory power, the TPB could be used as the underlying theory in developing future health promotions on physical activity in Malaysia.

Similarly the existing literature on physical activity using the WHOQOL-BREF (WHO, 1996) questionnaire was limited. This research will add to the data on the utility of the WHOQOL-BREF (WHO, 1996) questionnaire, which could be adopted in future studies to determine the quality of life achieved by participants as a result of engaging in physical activity. The findings of the present study will be of valuable reference for future researchers studying the relationship between physical activity and quality of life.

Chapter 2

2.0 BACKGROUND AND LITERATURE REVIEW

2.1 Introduction

In examining the literature, this chapter discusses the concept of physical activity, which is followed by a discussion of the TPB, quality of life and self-efficacy in the context of physical activity. This chapter also details the gap in the literature that the present study attempts to address.

2.2 Definition of Physical Activity

This section discusses physical activity, the importance of physical activity to health and, physical activity in Malaysia; Section 2.3 provides an overview of general theories related to exercise behaviour.

Physical activity is defined as bodily movement produced by contraction of skeletal muscle that increases energy expenditure above the basal level (U.S Department of Health and Human Services, 1996). The concept was also defined more specifically as any bodily movement produced by the contraction of skeletal muscle that results in a substantial increase in caloric requirement over resting energy expenditure (Prescatello, Ross, Riebe, & Thompson, 2014). The WHO webpage on physical activity (World Health Organization, 2015) provided a more concise definition: any bodily movement produced by skeletal muscle that requires energy expenditure. The definitions of physical activity are broad and allow the inclusion of any kind of activity which involves movement that uses energy, not just sports or aerobic exercise. The International Physical Activity Questionnaire (IPAQ) used in the Malaysian National Health and Morbidity Survey (NHMS) 2011 covers activities undertaken for work, transportation, leisure time, domestic work and gardening (Teh et al., 2014).

The word “exercise” is used interchangeably with physical activity but the term is not synonymous. Exercise is a type of physical activity consisting of planned, structured and repetitive bodily movement to improve/or to maintain one or more components of physical fitness (Prescatello et al., 2014). Exercise is part of physical activity and training performed for the purpose of enhancing physical fitness (US Department of Health and Human Services, 1996). However, in this thesis both terms are used interchangeably as the respondents participated in the exercise programme organised by their respective non-governmental organisation (NGO). As such, the participants were performing physical activity in a stable, repetitive and consistent manner.

The definition of exercise introduces the term of physical fitness. Physical fitness refers to the ability to carry out daily tasks with vigour and alertness, without undue fatigue and with ample energy to enjoy leisure time pursuits and to meet unforeseen emergencies (U.S Department of Health and Human Services, 1996). Physical fitness is also defined as a set of attributes or characteristics individuals have or achieve that relates to their ability to perform physical activity, and is separated into health-related and skill-related components of physical fitness (Prescatello et al., 2014). The health-related components of physical fitness include cardiorespiratory and muscular endurance, body composition, muscular strength and flexibility; the skill-related components of physical fitness comprise agility, coordination, balance, power, reaction time and speed (Prescatello et al., 2014).

The opposite of being active is usually referred to as sedentary or inactive. Sedentary behaviour refers to activities that do not increase energy expenditure substantially above resting level, such as sleeping, sitting down, lying down or watching television (Pate, O’Neill, & Lobelo, 2008). The addition of the “in” prefix to the term “activity” suggests a lack of physical activity.

2.2.1 The importance of physical activity for health

Physical inactivity is associated with “disuse-syndrome” in humans which involves premature ageing, obesity, cardiovascular disease, musculoskeletal fragility and depression (Knight, 2012). Since these diseases and disorders occur in young adults as well as the elderly, age per se is not completely responsible for all these diseases and disorders (Knight, 2012). Physical activity is an important determinant of health and there is evidence supporting the inverse relationship between regular physical activity and the risk of developing cardiovascular disease, hypertension, stroke, type 2 diabetes, metabolic syndrome, obesity, colon cancer, breast cancer, depression and falls (Prescatello et al., 2014). Cardiovascular diseases, diabetes and cancer accounted for 50% of the global burden of disease and 80% of all non-communicable disease-related deaths in low and middle income countries (Teh et al., 2014). Some of the clinical conditions attributed to sedentary lifestyle were cardiovascular disease, metabolic syndrome, obesity, type 2 diabetes and cancer.

2.2.2 Physical activity in Malaysia

Malaysia is a developing country and the rapid pace of economic and industrial growth has led to an increase in sedentary lifestyles (Poh et al., 2010). To tackle the growing problem of obesity and physical inactivity, the Ministry of Health Malaysia has promoted physical activity through an annual Healthy Lifestyle campaign since 1991. Similarly, physical activity and related areas have attracted the interest of researchers in Malaysia. A selection of studies will be discussed below.

Findings from the NHMS 2015 (NHMS, 2015) showed that the prevalence of physical activity was at 66.5% (Institute for Public Health, 2015). Even though the prevalence of physical activity has improved from 64.3% during the NHMS 2011 (Cheah & Poh, 2014), the results from NHMS 2015 still indicate that at least one in three Malaysians are physically inactive (Jeevananthan, Lim, Chan, Omar, & Khoo, 2015). In addition, the prevalence of physical activity among Malaysians was lower than Singapore at 73.8% (Win et al., 2015).

The NHMS 2015 was conducted in 10,428 living quarters/homes and about 30,000 participants responded to the survey. Results showed that the rural population was

more physically active at 71.3% compared to the urban population at 65.0%. The prevalence of physical activity among participants in the age group 18–19 years was 61% and it increased steadily to 73.4% for the age group 40-44 years. The prevalence of physical activity remained fairly stable for the age group 45–54 years before declining at the age group 55 years and above. The finding of NHMS 2015 is comparable to the prevalence of physical activity among Singaporeans for age 40-59 years, which was 70% (Win et al., 2015). For adults in the age group 18–39 years, the level of physical activity was reported at 66.9% for urban population and 73.3% for rural population (Jeevananthan et al., 2015). The physical activity level for respondents in the age group of 40–59 years was at 68.69% for urban and 78.7% for rural populations (Jeevananthan et al., 2015). There was a reported decline in physical activity level for the age group 60 years and above with respondents from urban areas at 49.9% and rural areas at 54.6%.

A study on the physical activity pattern and energy expenditure of Malaysian adults (Poh et al., 2010) discovered the prevalence of adequate exercise was at 14%. Sufficiently active was defined as performing any moderate or vigorous-intensity exercise for more than three times a week with each bout lasting more than 20 minutes (Poh et al., 2010). The prevalence of adequate exercise was higher in urban areas at 15.7% compared to rural areas at 12%. When age was compared to the adequacy of exercise, the data showed that Malaysians are most active between the ages of 18 and 19 years followed by 50 to 59 years. Data on physical activity adequacy was lower during productive years, age 20 to 49 years. It was also found that about 75% of the Malaysian adults travelled to work using passive transportation, such as cars or motorcycles, and only 3% cycled and 18% walked to work. This cross-sectional study was carried out from 2002 to 2003 on 7,349 Malaysian adults aged between 18 and 59 years. The study also revealed that only 9% of respondents used public transportation. These findings also suggest that most Malaysians are inadequately active. The study did not explore reasons for respondents' choice of passive transportation but it illustrated the choice of transportation and its link to physical inactivity in Malaysia.

The determinants of participation in physical activity were examined by Cheah and Poh (2014) using data from the third NHMS 2006 of the Ministry of Health Malaysia

which consisted of 30,992 respondents. This study discovered older individuals were less likely to be physically active due to greater difficulty in performing such activity. The results also showed that those with higher income were less likely to be active. It was suggested that high-income earners tended to substitute leisure-time physical activity with working, which caused them to live a sedentary lifestyle. The study also found that well-educated individuals were less active as they were doing less physically demanding jobs in confined offices. Similar results were found for married respondents where family responsibilities had taken over their opportunities to exercise.

The level of physical activity among the Malaysian population reportedly increased to 64.3% in the NHMS 2011 (Teh et al., 2014). The study also found the pattern of decreasing physical activity with age where the prevalence of physical activity was at 60% for age category 16–24 years and its peak at 70.6% for age category 35–44 years. However, the prevalence of physical activity decreased to 64.0% for age category of 55–64 years. The study suggested that this situation occurred due to older people having less self-efficacy and perceiving less benefit from participating in physical activity (Teh et al., 2014). Interpretation and comparison of findings between the third NHMS 2006 and the NHMS 2011 should be made with caution as different measurement tools were used in both studies (Teh et al., 2014). The NHMS 2011 used IPAQ measures which cover a wider range of daily activities including household chores (Teh et al., 2014).

2.3 Overview of Theories on Exercise Behaviour

Many theories have been applied to understand human behaviour in relation to exercise or physical activity. Biddle (2008) categorised theories related to physical activity behaviour into five key frameworks as per Figure 1.

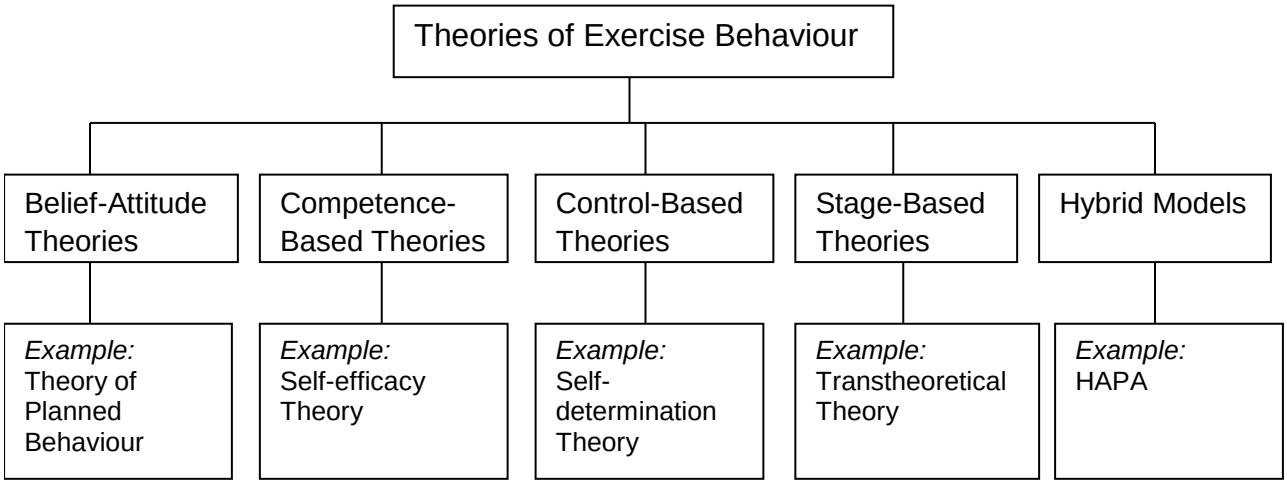

Figure 1: A Framework for classifying theories of physical activities. Adapted from: *Psychology of Physical Activity. Determinants, well-being and interventions* (p. 36), by S.J.H. Biddle & N. Mutrie, 2008, Oxon: Routledge. Copyright 2008 Stuart J.H. Biddle and Nanette Mutrie.

The most frequently used theories in the exercise domain are belief-attitude theories, control-based theories, competence-based theories and decision-making or stage-based theories (Downs, 2005). There is no clear-cut division of the theories above but the framework shown in Figure 1 may assist researchers to conduct studies on behaviour related to physical activity (Biddle & Mutrie, 2008) Among the theories, belief-attitude approaches have been the most influential in understanding physical activity behaviour (Hagger, 2000a). These approaches gained popularity in social psychology due to the premise that intention could predict behaviour (Biddle & Mutrie, 2008). Some examples of belief-attitude based theories are Theory of Reasoned Action (TRA; Fishbein & Ajzen, 1975) and (TPB; Ajzen, 1991).

The social cognitive perspective was favoured for studying individual motivation in exercising (Biddle, 2000a). The most widely studied theory under the competency-based framework was Self-Efficacy Theory (Biddle, 2000b). The research literature includes numerous references to the fact that changes in physical activity behaviour are thought to be associated with personal control of our lifestyles (Biddle, 2000a). Many countries are now suffering from lifestyle-related diseases and it is implicitly

indicated that each individual is responsible for their health and well-being (Biddle, 2000a).

Studies into physical activity using control-based theories considered that people are interested in achievements, such as goals and competence (Biddle & Mutrie, 2008). It is suggested that people who do not exercise lack motivation, for example they are not sufficiently interested or have other competing demands (Teixeira, et. al., 2012). An example of commonly used control-based approaches is Self-Determination Theory (Deci & Ryan, 1985).

The most well-known stage-based model is the Transtheoretical Model by Prochaska and DiClemente (1984). The Transtheoretical Model was developed to explain and help smoking addiction and drug abuse (Biddle, 2000). However, recently it was also used to understand readiness to begin physical activity (Biddle, 2000a). Recent research has combined stage-based models, such as the Transtheoretical Model, and continuous models, such as TPB. The Health-Action-Process-Approach (HAPA) is a model that explicitly integrates a continuous and a stage-based model and thereby produced a hybrid model.

The three most frequently used and cited theories in the exercise domain are TPB, Self-Efficacy Theory and the Transtheoretical Model (Biddle & Nigg, 2000). Furthermore, among the theories applied to understanding the multidimensional determinants of physical activity, TPB is one of the most comprehensive and validated theories in the exercise domain (Downs & Hausenblas, 2005b).

It is appreciated that a complex behaviour, such as physical activity, is a multifaceted phenomenon with multiple levels of influences (Buchan, Ollis, Thomas, & Baker, 2012). TPB is identified as an efficacious social cognitive theoretical framework that explains people's physical activity behaviour (Hagger, Chatzisarantis, & Biddle, 2002; Rhodes, Jones, & Courneya, 2002) and it has been used extensively to understand adoption, motivation and adherence to physical activity (Buchan et al., 2012). Meta-analyses and systematic reviews have consistently supported the predictive power and applicability of TPB in various health behaviours, particularly physical activity (Armitage & Conner, 2001; Downs & Hausenblas, 2005b; Godin, 1993; Godin & Kok, 1996; Hausenblas, Carron, & Mack, 1997; McEachan, Conner, Taylor, & Lawton,

2011). In addition, the TPB has been used in numerous populations and not only in Western countries (Mark Conner & Sparks, 2005; Plotnikoff, Lubans, Costigan, & McCargar, 2013).

In the exercise domain, there are many examples of studies using TPB conducted with mainly student or graduate populations (Blanchard et al., 2007; Bozionelos & Bennett, 1999; Brickell, 2006; Chatzisarantis, Frederick, Biddle, Hagger, & Smith, 2007; Hagger, Chatzisarantis, & Harris, 2006; McEachan et al., 2011; Rhodes & Courneya, 2005; Scott, Rhodes, & Downs, 2009), among adolescents or teenagers (Hagger et al., 2007; Hagger, Chatzisarantis, Biddle, Hagger, et al., 2001; Plotnikoff et al., 2013), or in adults with certain medical conditions, such as diabetes or obesity (Eng & Martin Ginis, 2007; Hardeman, Kinmonth, Michie, & Sutton, 2009; Hefferon, Murphy, McLeod, Mutrie, & Campbell, 2013; Plotnikoff et al., 2013). As for studies on community populations using longitudinal methods, only one study was identified; this examined the ability of TPB to explain the physical activity behaviour of a cohort of 1,427 Canadian adults between 1988 and 2003 (Plotnikoff, Lubans, Trinh, & Craig, 2012). The study found that both in 1988 and 2003, TPB measures accounted for 29% and 21% of the variance of intention as well as 9% and 22% of the variance of physical activity behaviour.

Focussing on Malaysia, literature review by the researcher showed only two published TPB studies on physical activity using the community as their population (Othman, Yap, & Wee, 2011; Yap & Sabaruddin, 2008). As such, little is known about the postulated socio-cognitive determinants of physical activity among the community who have received an intervention from the health authority.

The Ministry of Health Malaysia has carried out various physical activity programmes including Healthy Lifestyle campaign, Sweat Wednesday, 10,000 Steps, aerobics and fitballrobic. However, many in Malaysia still do not take up physical activity as shown in a study where only a third reported they had ever exercised and only 14% of the population had adequate exercise (Poh et al., 2010). A study using TPB on the population who had received support from a health authority would contribute to the improvement of future health promotion programmes.

2.4 The TPB

This section introduces and explains the TPB in detail. To aid understanding of the TPB, this section has three figures of the TPB model: Figure 2 depicting the basic TPB, Figure 3 with the addition of beliefs and Figure 4 with the addition of background factors. The section ends with a discussion on the literature of the TPB in physical activity settings and in Malaysia. The research gaps are identified at Section 2.4.4.

The TPB (Ajzen, 2005) is one of the most widely used and applied models of cognitive antecedents to understand behaviour change (Plotnikoff et al., 2013). This theory is based on the assumption that human beings usually behave in a sensible manner and that they take into account all available information to implicitly or explicitly consider the implications of their actions (Ajzen, 2005). According to this theory, intentions are a function of three basic determinants: attitude, which is personal in nature; subjective norms (SN) which are the reflection of social influence; and perceived behavioural control (PBC) which deals with the issue of control (Plotnikoff, Lubans, Trinh, & Craig, 2012).

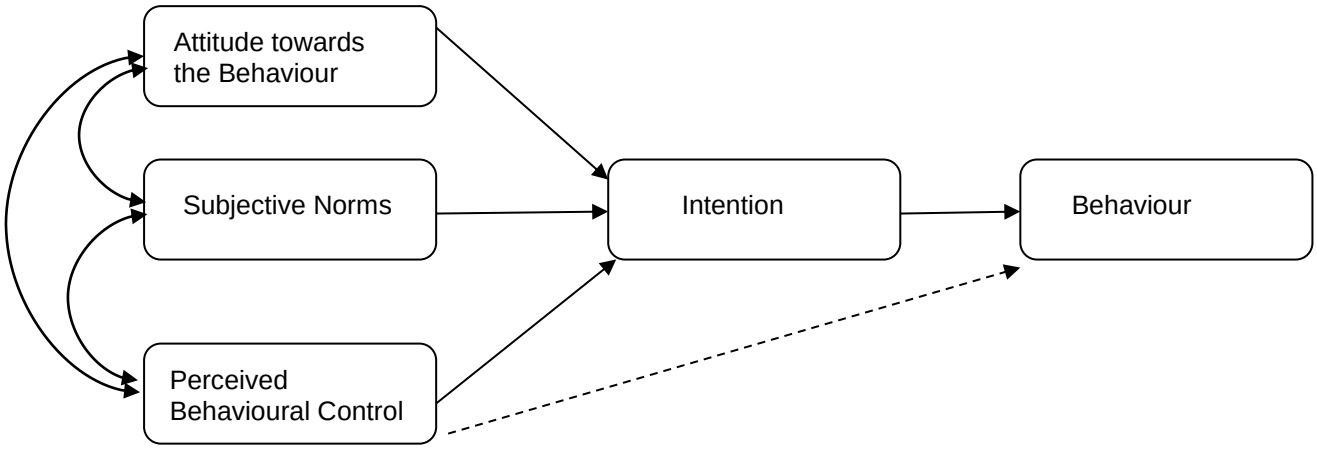

Figure 2: Theory of Planned Behavior. Adapted from: The Theory of Planned Behavior, by Ajzen, 1991, *Organizational Behavior dan Human Decision Processes*, *50*(2), p.179-211, Copyright 1991 by Academic Press Inc.

Attitude towards the behaviour is the individual's positive or negative evaluation of performing the behaviour of interest. The SN is the person's perception of social pressure to perform or not perform the behaviour under consideration (Ajzen, 2005). The third determinant, PBC, is the sense of self-efficacy or ability to perform the behaviour of interest (Ajzen, 2005).

2.4.1 Foundation of behaviour

2.4.1.1 Antecedents of attitudes towards the behaviour

According to TPB, attitude towards a behaviour is determined by accessible beliefs about the consequences of the behaviour, which are termed as behavioural beliefs. Each behavioural belief links the behaviour to a certain outcome or some attribute, such as the cost of performing the behaviour. For example, a person who intends to go on a low salt diet to lower their blood pressure would need to limit their future choice of food. The attitude towards this behaviour is determined by the person's evaluation of the outcomes associated with the behaviour and by the strength of these associations. In summary, a person who believes that performing this behaviour will lead to mostly positive outcomes will hold a favourable attitude towards performing the behaviour and vice versa.

2.4.1.2 Antecedents of SN

SN in TPB are assumed to be a function of beliefs to comply with the pressure of his or her significant others, such as a spouse, family, superior co-worker and so on. SN are assessed in a direct manner by asking a respondent to judge how likely it would be that a behaviour would be approved by people important to them.

2.4.1.3 Antecedents of PBC

PBC in TPB is also assumed to be a function of beliefs about the presence of factors that facilitate or impede performance of a behaviour (Ajzen, 2005). These beliefs may be based on past experience with the behaviour, on information

about the behaviour, observation of the experiences of acquaintances, and other factors that increase or decrease the perceived difficulty of performing the behaviour. The more resources and opportunities a person thinks he or she possesses, the greater the PBC over the behaviour (Ajzen, 2005). In TPB, these beliefs lead to the perception that one has or does not have the capacity to carry out the behaviour.

TPB traces the causes of behaviour to the person's accessible beliefs. Each step in this sequence from beliefs to behaviour provides a more comprehensive account of the factors that determine behaviour (Ajzen, 2005). The initial level of behaviour is assumed to be determined by intention and behavioural control. The second level is intention, which itself is determined by the attitude towards the behaviour, SN and PBC. The third level is the belief about the consequences of performing the behaviour, the normative expectation of important referents and the presence of any factors that facilitate or impede the performance of the behaviour. The TPB with the addition of beliefs is depicted in Figure 3.

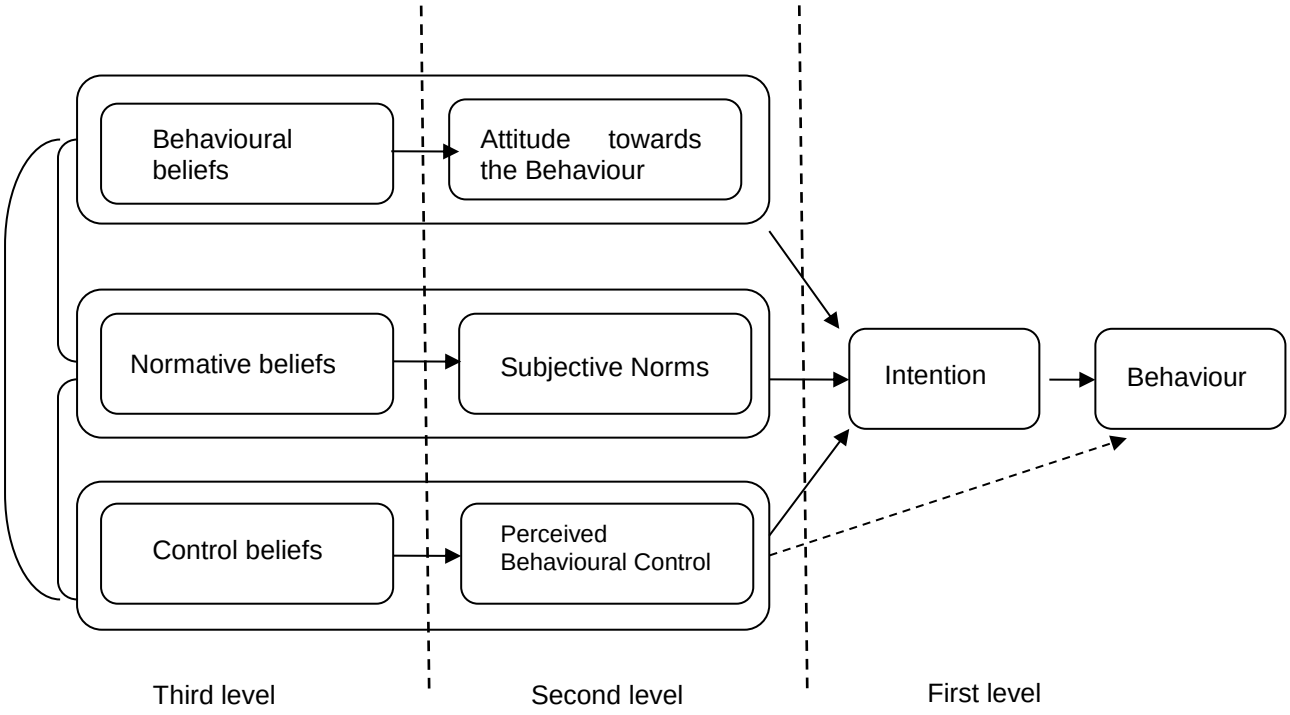

Figure 3: The theory of planned behaviour Adapted from: *Attitude and attitude change* (p. 301), by Icek Ajzen & Nicole Gilbert Cote, 2008, New York: Psychology Press. Copyright 2008 Taylor & Francis Group.

2.4.1.4 Background factors

In TPB, the determinants of intention and behaviour are from behavioural, normative and control beliefs. However, a multitude of variables may influence the beliefs people hold about something, including age, gender, ethnicity, socio-economic status, education, nationality, religion, personality, past experiences and exposure to information. People in different environments will acquire different information about a variety of issues and that information will form the basis for their beliefs about the consequence of a behaviour, the normative expectation of significant others and obstacles that impede them from performing a behaviour. All these factors can affect the behavioural, normative and control beliefs and result in intention and subsequent action. The TPB recognises these determinants and classifies these background factors into personal, social and informational categories. However, TPB states that although background factors may influence behavioural, normative and control beliefs, there is no necessary connection between background factors and beliefs.

Due to the vast number of potentially relevant background factors, they are not included in the TPB model but the theory recognises the influence they may have over a person’s beliefs. The role of background factors in relation to TPB is depicted in Figure 4.

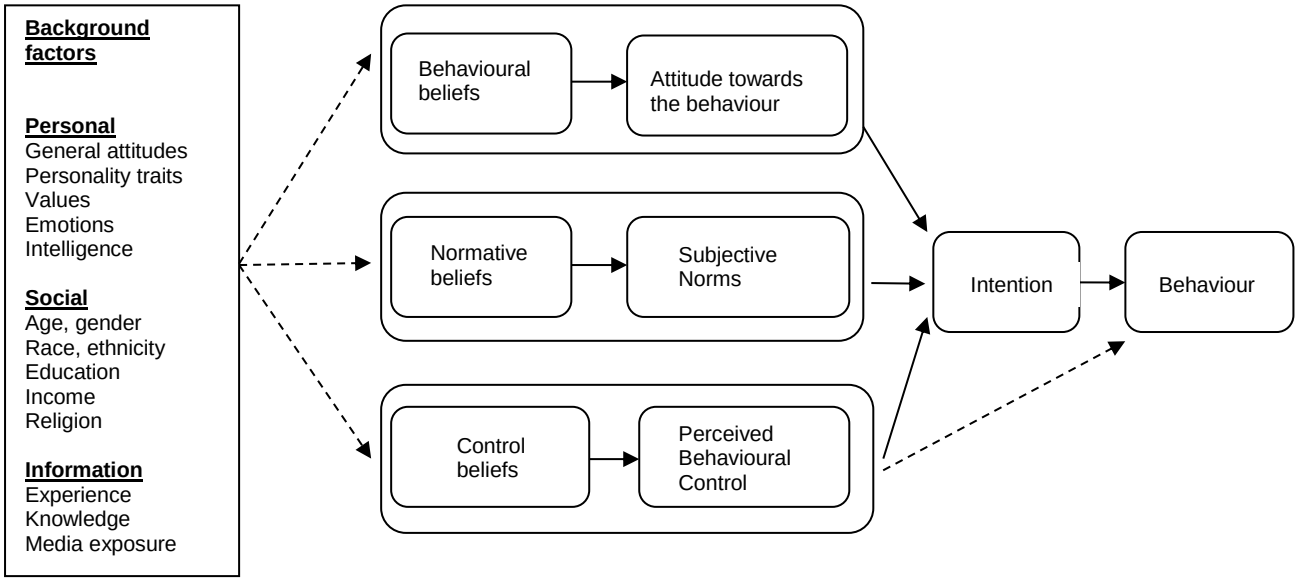

Figure 4: The background factors and the TPB. Adapted from: *The scope of social psychology: theories and application* (p.46), by Icek Ajzen & A.S.R. Manstead, 2007, New York: Psychology Press. Copyright 2007 Icek Azjen & A.S.R Manstead.

2.4.2 The constructs of the TPB

According to the TPB, human behaviour is influenced by three major factors, which are attitude, SN and PBC, and in combination these lead to the formation of behavioural intention (Ajzen & Manstead, 2007). The following section details each of these.

2.4.2.1 Intention

In the TPB, an individual's intentions are assumed to capture the motivational factors that influence a behaviour and they are an indication of how hard people are willing to try or the effort they are willing to exert in order to perform a behaviour (Ajzen, 2005).

Findings from several studies showed that intention is one of the strongest determinants of exercise behaviour and that attitude strongly influences intention (Blue, 1995; Downs & Hausenblas, 2005b; Godin, 1993; Hagger et al., 2002). Attitude, PBC and SN in combination predict exercise behaviour with attitude

and PBC providing stronger determinants. Findings from a meta-analytic study by Downs and Hausenblas (2005b) showed that the associations between; i) intention-behaviour, intention-PBC and intention-attitude were large and the association between SN-intention and PBC-behaviour was moderate. The study also found that the association between attitude-intention was larger than PBC-intention and SN-intention. Together, these findings suggest that intention is the strongest predictor of exercise behaviour.

2.4.2.2 Attitude

There is a general consensus that most social attitudes are not innate but acquired and that beliefs form the foundation of our attitudes as outlined by the expectancy-value model by Fishbein (1963). There are three basic features of attitudes outlined by Ajzen and Fishbein (1973) and Fishbein & Ajzen (1975): 1) that attitudes are learned, 2) that they predispose action and 3) that actions are consistently favourable or unfavourable towards the object. Strong attitudes are thought to have a number of interesting qualities including that they are relatively stable over time, resistant to persuasion and predict manifest behaviour (Ajzen 2001). It is these positive or negative qualities of certain objects that allow prediction of behaviour using TPB. Attitude towards behaviour is termed behavioural belief, which is a belief about the likely consequences of performing the behaviour (Ajzen 2005); that is, the subjective probability of the outcome of performing the said behaviour (Ajzen, 2008), such as regular exercising will improve physical fitness.

2.4.2.3 SN

SN in TPB are assumed to be a function of a person's belief that specific significant individuals or groups approve or disapprove of performing certain behaviours (Ajzen, 2005). The belief that underlies SN in TPB is termed normative belief (Ajzen, 2005). Examples of significant individuals or groups are parents, spouse, close friends, co-workers, supervisors or doctors. The theory assumes that a person will perform or not perform the behaviour in compliance with pressure from his or her significant others. As far as physical activity is concerned, it was noted above that SN have not received a great deal of support

in relation to predicting intention (Bozionelos & Bennett, 1999; Downs & Hausenblas, 2005a; Hagger, Chatzisarantis, & Biddle, 2002; Kwan & Bryan, 2010).

Some explanations for the weak link between SN and intention have been put forward. SN are a global perception of social pressure either to comply with the wishes of our significant others or not; however, the exertion of social pressure in relation to physical activity is rarely direct or explicit (Armitage & Conner, 2001). It was suggested that the weak predictive power of SN was due to the fact that significant others do not play significant roles in exercise (Downs & Hausenblas, 2005b). More research should be conducted on whether people's intentions are influenced by their motivation to comply with the belief that others want them to exercise or whether it is the social support associated with exercising that influences their intention.

In the context of physical activity for leisure, social norms have only marginal influence on exercise levels among the general population and SN would probably, exert more influence on exercise levels among sports people (Bonzionelas 1999).

2.4.2.4 PBC

The TRA was extended in 1991 to include PBC with the rationale that it would allow prediction of behaviours that were not under complete volitional control (Armitage & Conner, 2001). In the TPB, attitudes and SN are parallel determinants of intention to act along with PBC (Godin, Valois, & Lepage, 1993). A meta-analytic review by Armitage and Conner (2001) found that PBC contributes uniquely to the prediction of behaviour demonstrating the efficacy of this construct. There are two versions of TPB with regards to PBC, in the first, PBC predicts the behaviour directly; and in the second, PBC predicts behaviour indirectly via intention (Terry & O'Leary, 1995). The first version is based on the assumption that if a person doubts the extent to which the behaviour is controllable, then the person is unlikely to be motivated to perform it. In the second version, the effect of PBC on behaviour is assumed to be both mediated via intention (indirectly). This proposal is based on the assumption that the

performance of the behaviour is dependent not only on the extent to which the person is motivated to perform the said behaviour but the extent to which the behaviour is under their control (Terry & O'Leary, 1995). In the second version, all three constructs of the TPB would affect the behavioural intention.

Findings from a study conducted by Trafimow et al. (2002) provide support to distinguish the two aspects within PBC, that is, perceived control and perceived difficulty. Perceived control refers to the extent to which people consider the performance of a behaviour to be under their control and perceived difficulty refers to whether people consider a behaviour to be easy or difficult to perform (Trafimow et al., 2002). The two aspects are also termed perceived capacity, that is, the degree to which one believes that one is able to perform a behaviour, and perceived autonomy, which is the degree to which one believes that one has control over behavioural performance (Yzer, 2012).

Thus, PBC is a function of beliefs about resources, opportunities and other factors that facilitate or obstruct behavioural performance (Yzer, 2012). There are various factors that could influence the degree of control a person has over a given behaviour, which could be classified as internal and external factors (Ajzen, 2005). Internal factors influence the successful performance of an action and comprise information, skills, abilities, emotion and compulsion (Ajzen, 2005). Information, skills and abilities are required by a person who intends to perform an action; however, a lack of these qualities is readily modified by training and experiences.

Opportunity and dependence on others are two external factors that could determine the extent to which circumstances facilitate or interfere with the performance of a behaviour (Ajzen, 2005). When a person has formed an intention to perform a behaviour, it has to be supplemented with an opportunity to perform the behaviour. A lack of opportunity, such as occurrences of unexpected events, may impede or change the intention.

In summary, beliefs about the probability that control factors will be present or absent are known as control beliefs and the perceived influence in facilitating or obstructing behavioural performance is known as perceived power (Yzer, 2012).

The overall sense of PBC is indicated control belief × perceived power (Yzer, 2012).

2.4.3 Literature review of studies on physical activity using the TPB

Identifying the determinants of decision-making processes is at the forefront of studies in physical activity (Buchan et al., 2012) and the TPB is one of the most comprehensive and widely researched theories used in the prediction and understanding of physical activity behaviour (Ajzen, 2011; Armitage & Conner, 2001; Downs & Hausenblas, 2005b). The TPB states that the proximal determinant of behaviour is the intention to perform or not to perform a behaviour and intention is determined by attitude, SN and PBC towards the behaviour (Jackson, Smith, & Conner, 2003).

One of the early reviews of the literature on the predictive capability of TPB constructs was conducted by Blue (1995). Blue (1995) reviewed studies using TPB or TRA as their theoretical framework in analysing exercise behaviour from 1980 to 1995. The review included 23 studies involving 5,014 participants: 16 studies used TRA and the remaining 7 used TPB as their framework. In this review, Blue (1995) found that intention was predictive of an individual's behaviour. Studies included in this review measured behaviour between 2 weeks and 2 months after intention was measured and it was discovered that time frames did not affect the intention-behaviour correlation. The review also found that the direct effect of attitude on behaviour was weak and the correlation between SN and intention was positive but not significant. As for the comparison of TRA and TPB, the review found that the inclusion of PBC significantly increased the prediction of intention. Conversely, Dzewaltowski, Noble and Shaw (1990) found that PBC did not add to the prediction of behaviour. However, the results of two other studies revealed that PBC also added to the explained variance of exercise behaviour (Kimiecik, 1992; Madden, Ellen & Azjen, 1992). Finally, this review provided support to the idea that TPB is superior to TRA in predicting exercise behaviour.

A subsequent meta-analysis examining the utility of TRA and TPB for explaining and predicting exercise behaviour was carried out by Hausenblas, Carron and Mack (1997) and built on the work of Blue (1995). Manual searches were also made using

the reference list from Blue (1995) and Godin (1993). The principle inclusion criteria in this review were that the studies focussed on exercise and incorporated at least two constructs of TRA or TPB in their methods. The results provided strong support for the validity of TRA and TPB for explaining and predicting exercise behaviour (Hausenblas, 1997). The combined analysis of data showed that intention has a large effect on exercise behaviour and attitude has a large effect on intention to exercise. SN had only moderate effects on intention to exercise. These results illustrated that insofar as exercise behaviour is concerned, the construct of intention is more strongly related to the construct of attitude than PBC or SN (Hausenblas, 1997). This finding also demonstrated the superiority of TPB compared to TRA in predicting exercise-related behaviour (Hausenblas, 1997). It also suggested that in the context of TPB, the more a person feels the goal is under volitional control, the stronger the relationship between intention and behaviour. In addition, there is a strong relationship between PBC and behaviour and attitude when individuals have great commitment to exercise and they hold favourable beliefs about the activity and believe that they can perform the activity (Hausenblas et al., 1997).

Bozionelos and Bennett (1999) investigated the predictive utility of TPB in the context of exercise to identify the possible mediators and moderators of the relationship. The study involved 114 students from a United Kingdom (UK) university. Questionnaires were distributed twice with a 3-week interval between. The questionnaires at Time 1 were standardised and derived from pilot interviews with 20 students whilst questionnaires at Time 2 only concerned their level of exercise. The constructs measured were attitude, SN, PBC, behavioural intention, behavioural criterion, perceived barriers, role beliefs and personal norms, and sex role identity. The findings that SN had little impact on the prediction of exercise behaviour reinforced the view that significant others have marginal influence over people's exercise behaviour. Behaviour was predicted by attitude, intentions and PBC but not social normative beliefs. Past behaviour was also found to be a strong predictor of both intention and behaviour. The timing of this study towards the end of the academic year and overlap with examinations probably influenced the results. Both attitude and PBC failed to emerge as a significant predictor of exercise behaviour. The timing of the study, which was conducted prior to year-end examination, may have caused students to engage in counter-attitudinal behaviour and they may have

failed to judge their control over behaviour during an examination period. The researchers suggested that the examinations could have exerted pressure on students to engage in counter-attitudinal behaviour.

A prospective study conducted by Jackson et al. (2003) examined the utility of TPB by extending the variables to see which would account for additional variance in physical activity, these included descriptive norms, personal norms, self-identity and past behaviour along with the three TPB constructs. Two hundred employees of a college in the north of England completed questionnaires at two time points. Findings showed that attitude, self-efficacy, PBC and SN accounted for 40.8% of the variance in intention with attitude and self-efficacy as significant predictors of intention. Contrary to expectation, descriptive norms were not found to be significant predictors. Jackson et al, (2003) suggested this was due to descriptive norms being measured using a single-item scale, which had weakened the correlation between descriptive norms and intention. Past behaviour contributed an additional 3.4% of the variance in intention. Practically, this means that promoting physical activity to individuals who had been sedentary throughout their life would not be particularly useful. As for the prediction of behaviour, this study found that 22% of the variance of physical activity behaviour was accounted for by intention, self-efficacy and PBC but descriptive norms did not add to the prediction of intention. Descriptive norms were a significant predictor of intention for individuals reporting low to moderate past behaviour. On a practical level, intervention targeting descriptive norms should be designed for individuals with less experience in physical activity.

Another meta-analytic study on TRA and TPB in relation to exercise behaviour was conducted by Downs and Hausenblas (2005a). This study analysed 111 studies published since 1975 and sought to examine the strength and the predictive utility of the TPB or TRA constructs and the influence of moderator variables in exercise behaviour. The analysis discovered a large magnitude of effect for intention-behaviour, intention-PBC and intention-attitude. The effect was found to be moderate for SN-behaviour and PBC–behaviour. The effect between attitude-intention was also found to be larger than PBC-intention and SN-intention. These findings are consistent with other TPB or TRA reviews and suggest that people’s intention is the strongest determinant of exercise behaviour and their attitude has the strongest

influence on the intention (Downs & Hausenblas, 2005b). It was also found that intention and PBC predicted behaviour with intention emerging as the stronger predictor. Attitude was the strongest determinant of intention but only marginally stronger than PBC in predicting intention. Consistent with other findings, SN did not predict intention and indicated that significant others had less impact on exercise intention or behaviour (Downs & Hausenblas, 2005a). An important aspect to note about the above review is that the association between intention and behaviour was large when the behaviour was measured within 1 month compared to durations of more than a month. This result showed that the predictive power of intention decreases as the time between intention and behaviour measured increases (Downs & Hausenblas, 2005b). The association between self-efficacy and intention was found to be larger than PBC–intention or perceived barrier-intention.

A meta-analytic review by Hagger et al. (2002) evaluated the predictive validity of TRA and TPB in physical activity behaviour with the aim of extending the work of Hausenblas (1997). This study also examined self-efficacy and past behaviour as additional variables to the TPB and investigated the moderating role of: 1) attitude-intention relationship, 2) age and 3) time period of assessment of past behaviour. Online and manual searches were made through journals, reference lists, conference proceedings and abstracts from *Dissertation Abstracts International* and *Psychological Abstracts*. The researchers examined 72 papers including 31 studies reviewed by Hausenblas et al. (1997). Their findings corroborated those of Hausenblas (1997) whereby medium to large effects for the relationship between intention-behaviour, attitude-intention and PBC-intention were found. A smaller effect was shown for the SN-intention relationship. Their findings illustrated that SN has a peripheral effect on intention. This review supported the conclusion that TPB is superior to TRA in the physical activity domain and PBC is as substantial as attitude as a predictor of intention. The results also showed that PBC has both direct and indirect effects on behaviour mediated by intention.

2.4.3.1 Literature reviews of studies on physical activity in Malaysia using the TPB

Searches were made for studies using TPB on physical activity in Malaysia using keywords such as the “theory of planned behaviour/behaviour”, “physical activity”,

“exercise” as well as Malay translation of the words. Discussion of the studies follows.

The earliest study on a Malaysian sample using TPB to examine exercise behaviour was carried out by Yap and Sabaruddin (2008). This cross-sectional study used the extended model of TPB to predict intention to exercise. Data were collected using questionnaires. The study was carried out among 217 participants recruited through informal contacts from Klang Valley. The extended model accounted for 79% of the explained variance with attitude and PBC as a significant predictor of intention. Instrumental attitude (β = .461, $p < .001$) was found to be the strongest predictor of intention followed by affective attitude (β = .377, $p < .001$). Perceived control (β = .170, $p < .01$) and perceived need (β = .163, $p < .001$) were found to have less effect on exercise intention.

A study to examine the relationship between the background factors of gender, age and education level with TPB constructs among a Malaysian sample was conducted by Othman et al. (2011). The study, which employed a cross-sectional design, was conducted with 512 adults recruited in Klang Valley. The results showed that males scored higher in both affective and instrumental attitude compared to females. No significant difference between males and females for injunctive and descriptive norms as well as perceived self-efficacy and controllability were found. Respondents with “lower education” scored less on instrumental attitude and no significant associations were found between education level and SN components. Those with “lower education” again scored low in perceived control compared to those with “higher education”. No significant relationship was found between education and self-efficacy.

A study to explore the moderating effect of exercise habit strength and specific habit processes within the TPB was carried out by Hashim et al. (2014). The cross-sectional design study was carried out among children attending primary school in Malaysia (n = 380, mean age = 10.46 years). The school children were given a set of questionnaires before a 1-mile run test to validate the self-report data. Results indicated that the majority of the children were moderately active with a higher percentage of females in the low active group. The study showed a significant link between intention and physical activity behaviour when no

consideration was given to habit strength. A moderating effect of habit strength could also be observed between PBC and intention to exercise. SN also exerted a significant influence on behaviour regardless of whether habit strength was weak or strong. The study also revealed that negative affect significantly moderated the relationship between TPB constructs. The results suggested that negative affect, such as guilt, could be used to promote physical activity among children.

Chuan, Yusof, Soon and Abdullah (2014) conducted a study to understand the factors that influence participation in recreational sports using TPB. They studied 101 students aged between 13 and 16 years from high schools around Kuala Lumpur. Results showed a significant correlation between attitude and SN with behavioural intention. SN ($\beta = .037$, $p < .05$) and attitude ($\beta = .247$, $p < .05$) were the significant predictor of intention. However, PBC was found to have no significant relationship with intention.

In continuation, a study to determine the factors associated with exercise among elderly sarcopenic individuals was conducted by Ahmad et al. (2014). Sarcopenia is a condition in which muscle mass and strength decline with the ageing process and sarcopenic elderly individuals tend to have limited functional ability. The study recruited 65 participants who were divided into an exercise group ($n = 34$) and control group ($n = 31$); the mean age was 67.5 years for men and 66.5 years for women. Using structural equation analysis, the study found that attitude ($\beta = .60$) and PBC ($\beta = .24$) were major predictors of exercise intention among men at baseline. Among women, SN ($\beta = .82$) was the major predictor of exercise intention. After 12 weeks, attitude (men's $\beta = .68$; women's $\beta = .24$) and SN (men's $\beta = .12$; women's $\beta = .87$) were the main predictor variables for exercise intention for both men and women. The intention also significantly predicted exercise behaviour at both baselines and after a 12-week interval.

All but one of the studies above used a cross-sectional design with respondent numbers ranging from 65 to 512 participants. Two studies used general population samples, two studies were conducted with students and one among the elderly population. Studies on exercise behaviour using TPB in Malaysia are

limited and research on physical activity behaviour among the Malaysian population is needed to better understand exercise behaviour in this cultural context.

2.4.4 Summary and research gap on TPB in relation to physical activity

Based on the literature reviewed, the following research gaps can be outlined.

a) Lack of studies using longitudinal design

There are few studies on TPB; in particular, there are a few analysing physical activity behaviour that employ a longitudinal design. For studies that have used longitudinal designs, few have analysed intention and behaviour with an intervening period of more than 1 month (Armitage, 2005). As successful maintenance of physical activity is typically considered to be an individual's consistent performance of a behaviour for at least 6 months (Marcus et al., 2000), studies with longer interval periods are needed.

Focussing on Malaysia, studies on physical activity behaviour using TPB are limited and, only one study was identified that used a longitudinal design and measured actual behaviour. The adoption of the findings of cross-sectional studies as policy is due to bias from measuring intention and behaviour simultaneously (Armitage, 2005). The present study addresses this limitation with data collection that spans 1 year and four-time points.

b) Lack of studies using TPB to predict future intention and use of indirect measures

One of the limitations of the previous research on physical activity using TPB is the lack of prospective measures of behaviour or intention (Armitage, 2005). A large proportion of studies in the physical activity domain use cross-sectional design which increases the consistency bias when all variables are measured contemporaneously (Armitage, 2005). Another concern is that whenever a prospective design is used, the interval between assessment of TPB variables and subsequent measure of intention or behaviour is short and does not exceed 1 month (Armitage, 2005; Randall & Wolff, 1994). Given that physical activity should

be performed consistently and the health benefits associated with it take some time to accrue, prospective designs that span longer than a month are required. To address this issue, the present study includes prospective examination of intention to perform physical activity. In this examination, the independent variables of attitude, PBC and SN were used to predict the intention at the next time point. Another strength of the present study was that it included indirect measures of the TPB constructs.

c) Lack of qualitative studies using TPB

Studies adopting the TPB with qualitative methods are not common (Renzi & Klobas, 2008). The methods developed for data collection and analysis with TPB are mostly quantitative with qualitative studies suggested for elicitation studies only (Ajzen, n.d.; Renzi & Klobas, 2008). Qualitative methods have their advantages compared to quantitative methods as they describe in greater detail the meaning of a phenomenon. To address this limitation, the present study employed a mixed methods approach with three qualitative studies and four time points of quantitative questionnaire data collection.

2.5 Definition of Quality of Life and Related Concept

This section discusses quality of life and studies on quality of life in relation to physical activity and quality of life in relation to physical activity in Malaysia. The research gaps are identified at Section 2.5.3.

Quality of life is a complex and multifaceted construct that requires multiple approaches from different theoretical angles (Theofilou, 2013). The definition of quality of life varies in the literature: some definitions focussed on individuals' perception of their health status and some focussed on individuals' level of satisfaction with their health status (Blake, 2012). A commonly cited definition for quality of life is a state of well-being that is a composite of two components: the ability to perform everyday activities that reflect physical, psychological and social well-being; and patient satisfaction with the level of functioning and control of disease and/or treatment-related symptoms (Blake, 2012). Literature searches on

quality of life and its association with physical activity revealed a wide range of studies exploring multiple related concepts including subjective well-being, psychological well-being, satisfaction with life, affect, self-esteem, enjoyment, sense of coherence and happiness.

Assessment of quality of life has increased in recent years (Poole, Murphy, & Nurmikko, 2009) and there are a number of challenges to developing a meaningful understanding of quality of life and well-being (Theofilou, 2013). Quality of life is difficult to measure and define as it encompasses a multidimensional concept that emphasises the self-perception of an individual's current state of mind (Bonomi, Patrick, Bushnell, & Martin, 2000).

Quality of life includes individual's evaluation of all aspects of life including factors such as safety of the environment in which they live, whether they feel they have access to health care and social services as well as their current spiritual status (Bonomi et al., 2000). The WHOQOL defined quality of life as individuals' perception of their position in life in the context of the culture and value system in which they live and in relation to their goals, expectations, standards and concerns (Bonomi et al., 2000). Despite this definition by the WHOQOL Group, there is still no consensus on the definition of quality of life (Bonomi et al., 2000; WHOQOL Group, 1995) but there is considerable agreement among experts that the characteristics of quality of life are subjective, multi-dimensional and include both positive and negative dimensions (WHOQOL Group, 1995).

Subjective well-being is a broad category of phenomena that includes people's emotional response, domain satisfaction and global judgement of satisfaction (Diener, Suh, Lucas, & Smith, 1999). For the subjective features of quality of life, the WHOQOL Group (1995) proposed three levels of questioning: the first area are information about functioning (e.g. how many hours of sleep did you get last night?), global evaluation of functioning (e.g. how well do you sleep?) and highly personalised evaluation of functioning (How satisfied are you with your sleep?). The second area of consensus is the multi-dimensional nature of quality of life. It was proposed that quality of life includes physical, psychological, social and spiritual dimensions (WHOQOL Group, 1995). The third area of understanding is that quality of life includes both positive and negative dimensions. Studies into quality of life

must include positive dimensions such as role functioning, contentment and mobility and negative dimensions such as dependence on medication, fatigue and pain (WHOQOL Group, 1995)

The WHO organised their quality of life measure (WHOQOL) into six broad domains: physical, psychological, level of independence, social relationship, environment and spirituality (WHOQOL Group, 1995). The WHO Quality of Life instrument assesses an individual's perception of their position in life in the context of the culture and value system in which they live in relation to their goals, standards, expectation and concerns (WHO, 1998). The WHOQOL-BREF is the shorter version of the assessment instrument which comprises four domains with 24 facets relating to quality of life (WHO, 1998). The four domains of the WHOQOL-BREF are physical health, psychological, social relationship and environment. (For a detailed discussion about the instrument, please refer to Chapter 4 – Instrumentation Development).

2.5.1 Quality of life and physical activity

A large body of literature on the relationship between physical activity and mental health conditions using cross-sectional designs showed that non-exercisers are characterised by anxiety and depression (Stubbe et al., 2007). Evidence through randomised control trials also showed that exercise acutely reduces the feelings of tension, anxiety and anger as well as increasing the feeling of vigour (Stubbe et al., 2007). Exercise is a sub-group of leisure behaviour and there is a general consensus that participation in exercise is linked to higher levels of well-being (Sylvester et al., 2014). The experience of well-being has been consistently found to result in a range of positive and adaptive responses among adults, such as more fulfilling relationships or longer and healthier lives (Sylvester et al., 2014).

A study on the effect of aerobic exercise on quality of life among patients with hypertension in Nigeria was carried out by Maruf, Akinpelu, and Salako (2013). In this 12-week randomised control trials study, participants were recruited from patients newly diagnosed with mild to moderate hypertension who were randomly assigned to antihypertensive drugs or on exercise + drugs group. The results showed that physical health, psychological and social relationship domains improved significantly in the both groups post-intervention. The environmental domain and

exercise capacity improved on exercise + drug group. Findings indicated that with aerobic exercise, the patients with hypertension experienced wider quality of life domain improvement compared to drug-only patients.

Quality of life and physical activity among elderly individuals in Indonesia was assessed by Kusumaratna (2008). The study involved 21 males and 80 females older than 60 years (mean age = 66.4 years) and participants were classified into low, moderate and highly active groups. The overall quality of life scores on all four domains were significantly higher in the group reporting higher level of physical activity.

Group physical activity was used to improve the quality of life among patients with a depressive disorder. A study to compare quality of life over 32 weeks with depressed women using anti-depressant drug + exercise and without exercise was conducted by Carta et al. (2008). Female participants aged between 40 and 60 years with a diagnosis of major depressive disorder resistant to ongoing treatment were recruited for the study from a psychiatric unit. Data were collected using WHOQOL-BREF at eight time points (Time 1 to Time 8) during the study period. The results indicated that the quality of life for physical domain among patients with physical activity and drug treatment recorded significant improvement from baseline to Time 8. By contrast, no significant improvement in the physical domain was reported in the control group without exercise regime. Both exercise and control group did not report significant differences in other domains of quality of life. The study provides support for the view that physical activity could potentially improve the physical domain of quality of life among patients with depressive disorder.

The literature reviewed so far corroborates the findings of Bize, Johnson, and Plotnikoff (2007) that studies on health-related quality of life have (HRQOL) not really focussed on the general population and have been predominantly concerned with clinical populations or the elderly population. The following discussion considers data from selected studies on quality of life in general populations.

A systematic review to examine physical activity in the “no clinical condition” general population and HRQOL was carried out by Bize et al. (2007). Eligible studies included in this review were those exploring HRQOL in relation to physical activity

among the general population. Participants consisted of healthy adults aged 15 or older, studies specifically targeting older adults aged 65 years and above were excluded. This review accessed electronic databases in two phases for papers published from 1966 until 2007. From the searches, 1426 papers were retrieved and after a screening process by two independent assessors, only 14 papers were included in the final review. Of the 14 papers, 7 were cross-sectional studies, 2 cohort studies, 4 randomised control trials and 1 mixed cross-sectional and longitudinal study. The inclusion criteria for papers were studies on HRQOL in relation to physical activity in the general population and not specific clinical populations with specific chronic illness. Reviews from five cross-sectional studies showed that all reported significant statistical associations of physical activity and physical functioning: four with vitality, three with general health domain and one with mental health and role-physical domain. The support provided for the relationship between HRQOL from results based on cohort and randomised control trials studies was, however, weak. Studies from these two designs found differences in scores for HRQOL according to group allocation or physical activity level.

A study on the association between physical activity and quality of life among population-based adults who were not included in the systematic review by Bize et al. (2007) was conducted by Pucci et al. (2011). The study was carried out on 1,461 adults between the ages of 18 and 65 years living in Curitiba, Brazil. The quality of life was assessed using the WHOQOL questionnaire and physical activity using IPAQ. The results showed a positive association between physical activity and quality of life with a different relationship for men and women. For men, walking for leisure was associated with social relationships ($\beta = 1.5$, $p = .011$) and environment ($\beta = 3.3$, $p = .015$). Moderate intensity was associated with physical ($\beta = .30$, $p = .016$) and psychological ($\beta = 2.9$, $p = .003$) domains while vigorous intensity was related to only the physical ($\beta = 1.8$, $p = .028$) domain. For women, walking was reported to have a significant association between quality of life and physical ($\beta = 3.2$, $p = .045$) and environment ($\beta = 4.1$, $p = .011$) domains while moderate intensity had relationship between quality of life and social relationships ($\beta = 4.6$, $p = .037$) and environment ($\beta = 6.1$, $p = .01$) domains. In conclusion, the findings showed a positive relationship between physical activity and quality of life.

2.5.2 Studies on the quality of life and physical activity in Malaysia

Literature searches for studies on quality of life in relation to physical activity were carried out and four studies published in English were found with one using the WHOQOL-BREF questionnaire and the others using alternative instruments. Mat Ludin et al. (2015) used the WHOQOL-BREF in their cross-sectional study to evaluate physical activity and HRQOL among the non-academic staff of Faculty of Health Sciences, National University of Malaysia. The 105 participants were aged between 18 and 60 years. The majority of the participants (72%) demonstrated high physical activity of more than 3000 metabolic equivalent of task (MET) per week. However, the results also showed that there were no significant correlations between physical activity and all the domains of the WHOQOL. The authors suggested that the results were possibly due to sample size, sampling method and response bias where respondents over-report their physical activity level.

Three other studies were conducted using the 36-item Short Form Health Survey (SF-36), 12-item Short Form Health Survey (SF-12) and Centers for Disease Control and Prevention Quality of Life (CDC HRQOL-4) to assess quality of life. The SF-36 was used by Ibrahim (2014) to examine the HRQOL among pre-diabetic patients and its relationship with BMI. The SF-36 is a 36-items instrument which measures eight domains: physical functioning, role-physical, bodily pain, general health, vitality, social functioning, role-emotion and mental health. This cross-sectional study involved 268 patients recruited from two primary care clinics. The results of this study showed that the prevalence of normal weight, overweight and obesity was 7.1%, 21.6% and 71.3%, respectively. The study also found that 53.4% of the pre-diabetic patients had a family history of diabetes, 15.7% were smokers and 60.8% were physically inactive. The pre-diabetic patients with normal weight reported higher HRQOL compared to those overweight and obese. The findings support previous literature that reported that higher BMI was associated with lack of physical activity and poorer physical quality of life.

Another study which investigated the relationship between HRQOL scores and the stages of change of adequate physical activity and fruit and vegetable intake was conducted by Liau et al. (2013). The 144 participants were staff of Science University of Malaysia. Data on physical activity and fruit and vegetable intake was collected

using the WHO STEP approach to surveillance (STEPS) instruments for chronic disease risk factors surveillance. The SF-12 (Quality Metric, 2002) was used to gather information on participants' HRQOL. The SF-12 is a shorter alternative to SF-36 to evaluate physical and mental health. The stages of change were measured using an instrument developed by the Pro-Change Behaviour System Incorporation (©2008 Pro-Change Behavior System Inc, Kingston, RI, USA). Findings showed that there was no statistical significant difference in the SF-12 domains with the stages of change for both risk factors. Analysis on the distribution of SF-12 and the stages of change of physical activity showed an increasing trend for the domain of physical component scores, physical functioning and general health as the intention to change increased. However, the domain of mental component scores (MCS) showed a decreasing trend, which was in contrast to other literature. The authors called for further studies with longitudinal design and larger samples.

A cross-sectional study to determine the relationship between physical activity and HRQOL among the staff of MARA University of Technology, Pahang was conducted by Wan Norsyam, Muhammad Rafiai, and Ismail (2013). The study involved 65 participants and used the General Practice Physical Activity Questionnaire (GPPAQ) to determine the physical activity index and the CDC HRQOL-4. The study found that there were no associations between physical activity index and health status measure and three HRQOL domains, which were recent physical health, recent mental health and recent activity limitation. Participants in this study also reported high HRQOL regardless of physical activity index and in contrast with other literature which found higher HRQOL in active individuals. Limitations included the use of self-reported questionnaires and inaccuracy in estimating physical activity and recall bias which could have contributed to the results of this study. The authors suggested that more studies investigating the relationship between HRQOL and physical activity with body's biochemical markers be conducted.

2.5.3 Summary and research gap on quality of life in relation to physical activity

There is well-documented evidence of somatic benefits associated with physical activity including the prevention and treatment of a range of medical conditions.

However, research on HRQOL in relation to physical activity has predominantly focussed on the older population or populations with chronic disease (Bize et al., 2007). Even among the existing literature on the relationship between physical activity and well-being, studies use measures that are mainly of negative affect or focussed on clinical outcomes such as anxiety, depression or stress (Stubbe et al., 2007). By using such measures, any positive results from findings only provide support relating to improvement of such conditions and not increased quality of life. The association between physical activity and positive measures of well-being, such as happiness, enjoyment or life satisfaction, among population-based samples remains unexplored (Stubbe et al., 2007). As such, the present study will attempt to address the following limitations of existing literature on quality of life and physical activity.

a) Relationship between quality of life and physical activity among the general population

Evidence providing support for the relationship between physical activity and HRQOL among disease-free general population and individuals younger than 65 years is limited (Bize et al., 2007; Blake, 2012; Scully et al., 1998). Elderly people usually have poor physical function and strength while those with chronic conditions, such as cardiovascular disease, arthritis and diabetes, require tailored physical activity programmes (Bize et al., 2007). Due to the specific conditions of both groups, elderly individuals and those with long-term conditions, findings on the relationship between physical activity and HRQOL may not be generalisable. The findings from the present study will contribute to the body of knowledge on the relationship between quality of life and physical activity among the general population. The results could benefit future research on the same subjects and public health policy-makers.

b) Quality of life and physical activity using a repeated measures design

In the systematic review conducted by Bize et al. (2007), it was found that cross-sectional studies showed moderate to strong associations between HRQOL and physical activity. Higher physical activity level was consistently associated with higher scores of HRQOL dimensions. However, studies using

randomised control trials and cohort design were scarce and insufficient to draw a conclusion between physical activity and HRQOL changes over time. The present study addresses this by employing a repeated measures design, which is complemented by the addition of a qualitative interview study to gather a more in-depth understanding of quality of life and physical activity.

2.6 Self-Efficacy and PBC

This section describes self-efficacy and PBC and discusses the concept of self-efficacy within the context of physical activity. The research gaps are identified at Section 2.6.3.

Since the initial description of TPB, there has been some confusion concerning the relationship between self-efficacy and PBC (Manstead & Eekelen, 1998). The extent to which people believe they can perform a given behaviour if they are inclined to do so is termed as PBC in TPB (Ajzen, 2008). Self-efficacy was defined by Bandura (1995) as people's beliefs in relation to their capability to produce performances that influence events affecting their lives; Ajzen (2005) suggested that self-efficacy is a lower level construct of PBC. Self-efficacy is also defined as people's judgement of their capabilities to organise and execute courses of action required to attain a desired outcome (Samson & Solmon, 2011).

Aspects of PBC and self-efficacy are important in explaining physical activity intention (Armitage & Conner, 2001; Hagger, Chatzisarantis, & Biddle, 2002). Some researchers have proposed that PBC and self-efficacy are the same, that is the amount of control an individual believes they have about performing a behaviour (Giles-Corti & Donovan, 2002; and Hamilton & White, 2008). There have also been suggestions that PBC and self-efficacy overlap conceptually (Downs & Hausenblas, 2005a; Manstead & Eekelen, 1998) with self-efficacy being more clearly defined and conceptualized than PBC (Armitage & Conner, 2001).

There is a growing body of evidence that supports the theoretical difference between the two constructs (Armitage & Conner, 1999, 2001; Norman & Hoyle, 2004) with findings showing a strong relationship between self-efficacy and intention (Conner &

Armitage, 1998). In a study on the application of TPB and self-efficacy in the prediction of intention and behaviour of breast self-examination by Norman and Hoyle (2004), it was found that self-efficacy was positively associated with intention to perform breast self-examination but not PBC and both were not predictive of behaviour. In this study, 95 women were recruited and completed a set of questionnaire and breast self-examination at baseline and follow-up after 1 month. Analysis using principal component analysis showed that items measuring perception of control and self-efficacy items loaded onto separate factors. The correlation between self-efficacy and behaviour was stronger at r = .35 compared to PBC and behaviour at r = .18. The study concluded that it provided support to the distinction between self-efficacy and PBC, and self-efficacy emerged as the stronger predictor of intention and behaviour.

The concepts of self-efficacy and PBC can also be differentiated by the ways in which they are measured. PBC is measured by asking direct questions about capacity to perform a behaviour or indirectly on the basis of beliefs about the ability to deal with any inhibiting or facilitating factors (Ajzen, 2002). A majority of studies used the direct measures approach but the indirect measures have the advantage of providing insight into the cognitive foundation underlying the perception of behavioural control (Ajzen, 2002). As self-efficacy is concerned with the confidence in one's ability to perform a behaviour, it is measured by asking participants to rate their confidence in their ability to perform a behaviour under a variety of circumstances (Ajzen, 2002). The distinction between self-efficacy and controllability is that measures of self-efficacy ask about the ease or difficulty of a task while measures of controllability ask about people's beliefs concerning the extent to which performing a behaviour is up to them (Ajzen, 2002). To add clarity to the term controllability, it is an appraisal of the extent to which other people or events will interfere with the performance of the behaviour (Terry & O'Leary, 1995).

A study to predict intention to perform regular exercise and actual exercise behaviour by Terry and O'Leary (1995) found that separate measures should be employed for self-efficacy and PBC. In this study, 146 undergraduates were recruited in a prospective design with data collected at baseline and at 2-week intervals. The result from confirmatory factor analysis (CFA) showed that items for self-efficacy and PBC

loaded separately and PBC emerged as a significant predictor of behaviour but not intention. In contrast, self-efficacy was associated with intention but not actual behaviour.

From the reviews of previous studies, it can be concluded that both PBC and self-efficacy are distinct but closely related constructs that exert influence on intention and behaviour. As such, the present study will adopt a separate set of questions to measure self-efficacy and PBC.

2.6.1 Self-efficacy in the context of physical activity

Self-efficacy is the central influence of exercise behaviour in Social Cognitive Theory (Robbins et al., 2004) and is also one of the most identified predictors of exercise behaviour (Yoon, Buckworth, Focht, & Ko, 2013). The perception of self-efficacy is a product of complex processes of four sources of efficacy information, namely, past performance accomplishments, social/verbal persuasion, vicarious experiences/modelling and interpretation of physical/emotional states (Samson & Solmon, 2011). Examples of past performance are a successful performance of a behaviour which strengthens the self-efficacy for that behaviour (Yoon et al., 2013). Verbal persuasion alone has limited influence but it can encourage an individual to persevere and there are four forms of verbal persuasion: feedback, social support, goal-setting and self-talk (Samson & Solmon, 2011). In vicarious experiences, observing others succeed or fail can influence an individual's self-efficacy and often when we see what others are able to do, we will use that information to form our own expectation of that behaviour (Yoon et al., 2013). Physiological information, for example, strength, fitness, fatigue, pain, body composition, and heart rate have shown to be an important source of efficacy information in the case of physical activity. Emotional states can also play a role in forming efficacy such as positive or negative emotion could increase or decrease efficacy beliefs (Samson & Solmon, 2011).

There is evidence that people with higher self-efficacy will persist longer and be more robust in their effort to engage and maintain their exercise behaviour (Samson & Solmon, 2011; Yoon et al., 2013); this means that people with high levels of self-efficacy are more likely to pursue their goals and persevere despite setbacks

compared to people with low self-efficacy who tend to give up when challenged with obstacles.

In addition to influencing engagement in physical activity behaviour, self-efficacy can also affect the enjoyment that one derives from participating in exercise (Samson & Solmon, 2011; Yoon et al., 2013). Physical activity clearly exerts psychological and physical demands where the feelings of enhanced physical fitness, reduction of stress and elevation of mood can strengthen self-efficacy (Yoon et al., 2013).

2.6.2 Studies using the ESE scale

The ESE scale developed by Bandura (1997, 2006) was used as a measure in this study. Online literature searches were made to look for past studies on self-efficacy and physical activity using the ESE scale. Two published studies were found and are discussed below; for further details on the ESE scale see Chapter 4 – Instrumentation Development.

A study to assess the psychometric properties and demographic response pattern of the ESE scale among Korean adults with chronic disease was carried out by Shin et al. (2001). The study included 249 participants (mean age, 48.94 years) of which 51.8% were women; all were patients diagnosed as having cardiovascular disease, respiratory disease, renal disease, gastrointestinal disease, diabetes mellitus or musculoskeletal disease. Descriptive analysis showed that the participants of this study had relatively low exercise self-efficacy. The results also showed that participants who exercised regularly had higher exercise self-efficacy than those who exercised intermittently or never exercised. An important outcome of this study was that it found the ESE scale to be a useful measure of exercise beliefs of Korean adults with chronic disease.

In addition to the above study, there was a study to compare the perceived exercise self-efficacy, exercise benefits, exercise barriers and commitment to a plan to exercise among Korean women with osteoporosis or osteoarthritis carried out by Shin, Hur, Pender, Jang, and Kim (2006). This study used three instruments: ESE (Bandura, 1997, 2006), Exercise Benefits and Barriers Scale (Sechrist, Walker, & Pender, 1987) and Commitment to a Plan for Exercise Scale (Pender, 1996). The

study involved 154 women of over 40 years of age with a clinical diagnosis of osteoporosis or osteoarthritis. Analyses of the data revealed that exercise self-efficacy accounted for a majority of variance in commitment to a plan for exercise with 27% among patients with osteoporosis and 53% among patients with osteoarthritis. The results provide support for the cross-cultural relevance of exercise self–efficacy in explaining commitment to exercise.

2.6.2.1 Self-efficacy and physical activity in Malaysia

A literature search found one published paper that used the ESE scale (Bandura, 2006) which examined barriers to exercise among cancer survivors in Malaysia. Data on the ESE scale (Bandura, 2006) was, however, only briefly presented in the paper. The cross-sectional study carried out by Loh, Chew, and Lee (2011) included 51 breast cancer survivors diagnosed between 9 and 83 months before data collection. Measurement tools used in the study included IPAQ (Craig et al., 2003) and the ESE scale (Bandura, 2006). The results showed that 88% of the participants did not consider engaging in physical activity. Self-efficacy was relatively low with situational/interpersonal found to be the lowest. However, there was no significant difference across sub-factors of the scale. Lack of time was cited as the main barrier preventing participants from engaging in physical activity. Other barriers reported were no friends to exercise with, busy with household chores and weather.

Three other studies analysed the relationship between self-efficacy and physical activity but did not utilise the ESE scale. The most recent study found was conducted by Sreeramareddy, Majeed Kutty, Razzaq Jabbar and Boo (2012) to investigate the factors associated with physical activity among young Malaysian adults. The study was carried out online among 474 participants who had registered at Universiti Tun Abdul Razak opinion poll survey. The mean age of the participants was 22.4 years with 53.4% females. Results indicated that 51.1% of the participants had sufficient physical activity. Self-efficacy, intention and facilities were strongly associated with higher physical activity in this study.

The second study, which was conducted by Siti Affira, Mohd Nasir, Hazizi, and Kandiah (2011), aimed to determine the socio-demographic and psychological

factors associated with physical activity among working women in Malaysia. The study was conducted on 215 working women from four companies. The results showed that: 24.7% were overweight and 7.9% were obese; and 28.8% had low physical activity level, 48.8% moderate and 22.3% were in high physical activity level. Analyses further revealed an association between monthly income, current physical activity behaviour and physical activity level. Physical activity was also positively correlated with perceived barriers but no association was found between self-efficacy and physical activity. Results also showed that higher socio-economic group reported higher participation in physical activity.

The final study identified was conducted by Chiu (2009); it examined the psychological determinants of leisure time physical activity. The study was carried out on 1352 undergraduates student using the Leisure Attitude Scale (Ragheb & Beard, 1982), Self-efficacy for Exercise Scale (Benisovich et al., 1998), Leisure Constraints Questionnaire (Alexandris & Carrol, 1997) and Motivation for Physical Activity Measure (Frederick & Ryan, 1993). The results showed that motivation and self-efficacy were the best predictors of leisure time physical activity.

2.6.3 Summary and research gap on self-efficacy in relation to physical activity

Previous social psychological research has shown that attitudes do not always predict behaviour with some researchers suggesting that it is necessary to take into account other variables to improve prediction of behaviour (Terry & O'Leary, 1995). In the TPB, the combination of attitude, SN and PBC leads to the formation of intention and people are expected to carry out the intention when the opportunity arises (Ajzen, 2002). Intention is assumed to be an antecedent of behaviour but the execution of many behaviours poses a challenges due to a limit in volitional control, so it also useful to consider the direct effect of PBC on behaviour (Ajzen, 2002).

A review of the literature revealed limitations which the present study attempts to address and its findings will contribute to the body of knowledge as follows:

a) Establishing a distinction between self-efficacy and PBC

While physical skills and ability are important to the successful completion of a physical task, having confidence in one's abilities to be able to apply those skills in a given situation is crucial (Samson & Solmon, 2011). Within the sports and exercise domains, self-efficacy has also emerged as one of the strongest predictors of physical activity behaviours (Samson & Solmon, 2011). Meta-analysis showed differences between the measures for self-efficacy and PBC (Armitage & Conner, 2001). Recognising the distinction between self-efficacy and PBC, it is important to include self-efficacy when studying physical activity behaviour using TPB to demonstrate the separate effects of control and self-efficacy on intention and behaviour. The results from this study should provide further support to previous studies that the two constructs are not synonymous.

b) Relationship between self-efficacy and physical activity

Studies which examine self-efficacy in relation to physical activity are still lacking in Malaysia. Only four studies were identified that considered the relationship between self-efficacy and physical activity in Malaysia and only one used the ESE scale (Bandura, 2006). The present study aims to overcome this limitation by including a self-efficacy measure administered on the general population in Malaysia.

2.7 Overall Summary and Research Gaps

Briefly, the TPB posits that human action is influenced by three major factors: attitude towards the behaviour, SN and PBC (Ajzen, 2005). Generally, the validity of TPB in predicting human behaviour in relation to physical activity has been demonstrated in many studies. However, its efficacy in different populations and settings remains to be examined.

To summarise, the following research gaps in the existing literature have been identified in this chapter. Firstly, the TPB was shown to have good predictive utility in studies related to physical activity; however, only a small amount of research has

been conducted in a Malaysian population. Conducting a study on physical activity using TPB in Malaysia is important because statistics showed that 43.1% of the Malaysian population were categorised as obese or overweight in 2006 and the percentage increased to 47.7% in 2015.

Secondly, existing literature has also shown that self-efficacy is useful in predicting physical activity behaviour and it is distinct from the concept of PBC in the TPB. Similarly, studies utilising this construct in Malaysian populations are very limited.

Thirdly, from the literature reviewed here, it is apparent that physical activity has a positive relationship with quality of life. However, most of the existing literature focussed on populations with clinical conditions or elderly people.

2.7.1 Objectives and research questions

Based on the outlined research gaps, the aims, specific objectives and hypotheses of this thesis are as follows.

2.7.1.1 Aims of study

1. To evaluate the utility of the TPB and self-efficacy in predicting physical activity behaviour.
2. To examine the relationship between physical activity behaviour and quality of life among participants of NGOs receiving support from the Ministry of Health to run physical activity programmes in Malaysia.

2.7.1.2 Objective 1

Test the TPB and investigate its predictive utility in relation to physical activity behaviour in a Malaysian population setting.

Research question 1

Is the TPB a good predictor of physical activity behaviour among participants of NGOs who received support from the Ministry of Health to run physical activity programmes in Malaysia?

Hypotheses

1a) The constructs of TPB will significantly predict intention to perform physical activity among participants of NGOs who received support from the Ministry of Health to run physical activity programmes in Malaysia.

1b) The constructs of TPB will significantly predict future intention to perform physical activity among participants of NGOs who received support from the Ministry of Health to run physical activity programmes in Malaysia.

1c) Intention will significantly predict physical activity behaviour among participants of NGOs who received support from the Ministry of Health to run physical activity programmes in Malaysia.

2.7.1.3 Objective 2

Test the predictive utility of self-efficacy in relation to physical activity behaviour in a Malaysian population setting.

Research question 2

Is self-efficacy a good predictor of physical activity behaviour among participants of NGOs who received support from the Ministry of Health to run physical activity programmes in Malaysia?

Hypotheses

2a) Self-efficacy will independently predict intention to perform physical activity behaviour among participants of NGOs who received support from the Ministry of Health to run physical activity programmes in Malaysia.

2b) Self-efficacy will independently predict physical activity behaviour among participants of NGOs who received support from the Ministry of Health to run physical activity programmes in Malaysia.

2.7.1.4 Objective 3

To investigate the relationship between physical activity and quality of life in a Malaysian population setting.

Research question 3

Does engaging in physical activity have an effect on quality of life?

Hypotheses

3a) Physical activity of low intensity has an effect on quality of life

3b) Physical activity of moderate intensity has an effect on quality of life

3c) Physical activity of vigorous intensity has an effect on quality of life

Chapter 3

3.0 METHODS

3.1 Introduction

This chapter details the methods used in the present study as well as the justification for employing the research approach. The present study adopted a mixed methods approach which addressed the utility of the TPB in analysing physical activity among the Malaysian population. A convergent parallel mixed methods design was employed in which the researcher adopted concurrent timing in collecting the quantitative and qualitative data and kept both strands independent during analyses and then mixed the results at the final overall interpretation (Creswell & Clark, 2011).

In this study, quantitative data were used to test the utility of the TPB in predicting physical activity behaviour among the attendees of NGOs in Malaysia. In addition to the TPB constructs, a self-efficacy scale was administered to the participants as a variable predicting their physical activity behaviour. The relationship between the physical activity behaviour of the participants and their quality of life was then examined.

The qualitative section of this study comprised interviews with Malaysians living in Liverpool, England and the attendees of NGOs, organisers of NGOs and health officials in Malaysia. The data were used to devise a questionnaire and explore in greater depth the beliefs held by the participants in continuing their exercise behaviour with the NGOs as well as the role of the health department in promoting a healthy lifestyle.

3.2 Mixed Methods

Mixed methods research is becoming increasingly recognised as the third major research approach along with qualitative and quantitative research (Johnson, Onwuegbuzie, & Turner, 2007). In England, one-fifth of health services research funded by the Department of Health between 1994 and 2004 was mixed methods with evidence that the number would increase over time (O'Cathain, Murphy, & Nicholl, 2007).

A mixed method is defined as a class of research in which the researcher mixes or combines quantitative and qualitative research techniques, methods, approaches, concepts or language into a single study (O'Cathain et al., 2007). Mixed methods was presented as a type of research by Johnson et al. (2007) where it was defined as a study that involves mixing within a programme of research and the mixing might occur across a closely related set of studies.

3.2.1 Justification in choosing mixed methods design

Social experiences and lived realities are multi-dimensional and our understanding would be inadequate if we only viewed these phenomena along a single dimension (Mason, 2006). Mixed methods offers a way to understand the complexities and context of social experiences. An important principle in deciding whether to employ a mixed methods design is to describe the reasons for mixing quantitative and qualitative data within a study.

For the present study, samples for both quantitative and qualitative research comprised the same participants, which were the attendees of NGOs receiving supports from the Ministry of Health Malaysia. However, for the qualitative section there were additional samples of organisers of the NGOs and health officials to provide multiple views into the data. The sample size for the qualitative section was smaller than for the quantitative section; both set of data were collected independently where quantitative data were gathered using questionnaires and qualitative data were collected using interviews.

Themes and excerpts of interviews from the qualitative study were later used to explain the quantitative findings in more details. The use of such a combination helped to better understand how personal experiences matched up with the quantitative instrument results. Figure 5 shows the data collection process of the present study.

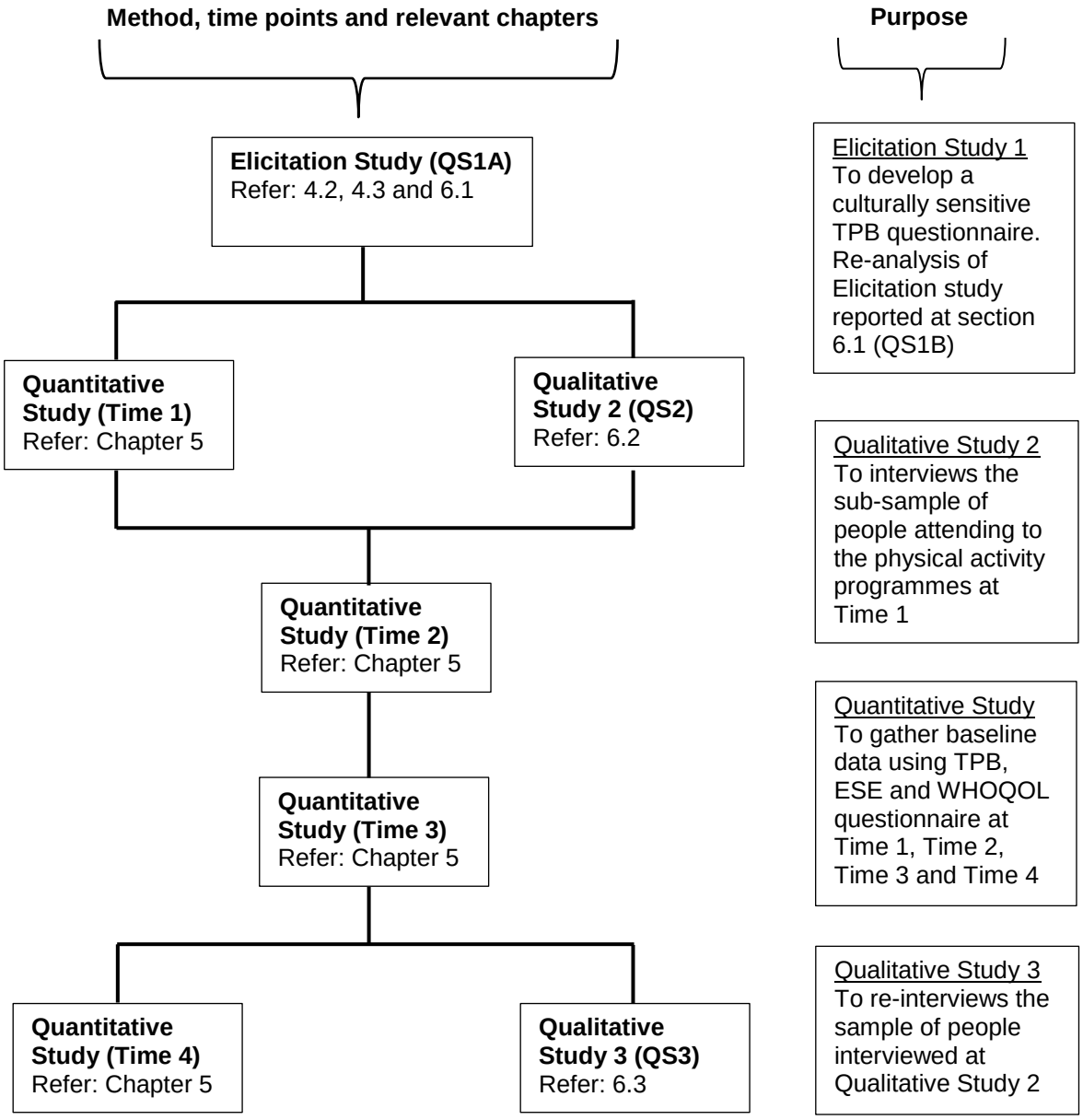

Figure 5: Flow chart of the data collection of the present study

The data collection of the present study started with an elicitation study (QS1A) and the process of devising the questionnaire is detailed in Sections 4.2 and 4.3. The data collected were re-analysed for themes in Section 6.1 (QS1B). After the development of the TPB questionnaire was completed, it was used in quantitative data collection at Time 1 and at the same time a series of qualitative interviews was carried out in Malaysia. Analyses of quantitative data at Time 1 are detailed in Chapter 5 and Section 6.2 (QS2) for the qualitative interviews. The same set of questionnaires was later used for quantitative data collection at Time 2 and Time 3. Analyses of the data collected are detailed in Chapter 5. Time 4 was the final leg of the quantitative data collection and it was carried out in parallel with Qualitative Study 3 (QS3). The analyses of Time 4 quantitative data are also detailed in Chapter 5 and analyses for QS3 are reported in Section 6.3.

3.3 Instrument Development

In the present study, the TPB questionnaire was developed based on the manual *Constructing Questionnaires Based on the Theory of Planned Behaviour* (Francis, Eccles, & Johnston, 2004). Developing measures using the TPB involves first collecting qualitative data and using the findings to develop an instrument well adapted to the population. The process involved an elicitation study whereby a sample of the Malaysian population was interviewed and the themes extracted were later used to develop the questionnaire. The detailed process to devise the TPB questionnaire is available in Section 4.3 and a sample of the questionnaire in English and Malay language is available at Appendix 1 and Appendix 2.

3.4 The Measurement of Physical Activity

Physical activities and physical fitness are complex entities comprising numerous diverse components that present a challenge in terms of accurate and reliable measurement (Haskell, 2007). Developing and evaluating physical activity intervention requires reliable, valid, cost effective, practical and unobtrusive means of measurement (Kowalski, 2012). The measurement of physical activity in the

present study was similar to that used in the study by Khiang Nang et al. (2010) where an interview-administered questionnaire with a recall period of the previous 7 days was used. Their questionnaire was adapted from several established questionnaires validated in other populations and included transport, occupation, leisure time and household activities. Participants were asked the type and duration of various activities. A MET value was then assigned to each reported activity according to the “Compendium of Physical Activity” by Answorth et al. (2011). The minutes and days spent on performing physical activity were summed up for physical activity behaviour analyses (refer to Section 5.3).

Physical activity measures need to assess four key dimensions: frequency, duration, intensity and type of setting of the physical activity performed (Kowalski, 2012; Shephard, 2003). Frequency is usually expressed as the number of times a given activity is performed in a week and an important aspect of frequency is whether a person does a day’s activity in a single session or whether the activity is split into several smaller parts (Shephard, 2003). Duration of an individual exercise may be combined with frequency to indicate the total number of minutes accumulated; however, if absolute intensity of effort has to be estimated for the purposes of a study, then figures should cite the corresponding gross or net energy expenditure, expressed in kilojoule or MET (Shephard, 2003).

There are many common terms to describe the intensity of physical activity, such as light or low, moderate or mild, hard or vigorous and very hard or strenuous (U.S Department of Health and Human Services, 1996). However, by using MET, physical activity has been categorised into three intensities which are light, moderate and vigorous. Light intensity is defined as an activity requiring <3 METs, moderate as 3 to <6 METs and vigorous as ≥6 METs (Ainsworth et al., 2011; Pate et al., 2008; Prescatello et al., 2014). Light-intensity has sometimes been used interchangeably with sedentary behaviour but actually both are distinct constructs. Light intensity physical activity involves energy expenditure of 1.6 to <3 METs compared to 1.0 to 1.5 METs for sedentary behaviour (Pate et al., 2008). Light-intensity activities include slow walking, sitting and writing, cooking food or washing dishes (Pate et al., 2008).

In the questionnaire, there were 12 items on physical activities commonly carried out by the general population and these covered three types of intensity. The three types

of intensity were light intensity (<2.9 MET), moderate intensity (3.0 – 5.9 MET) and vigorous intensity (>6.0 MET) (Ainsworth et al., 2011). The type of intensity for the activities listed in the questionnaire was coded based on the Compendium of Physical Activities (Ainsworth et al., 1993). For instance, a participant reported performing aerobics and according to the Compendium, general aerobics requires 6.0 MET and as such, the activity was coded as vigorous intensity. (Refer to Appendix 3 for types of activities and intensities).

As a general principle, to achieve health benefits, participants must perform enough activity to substantially raise total energy expenditure; this increase in total energy expenditure can be accomplished either by prolonging duration or frequency or increasing the intensity of the activity (Ekkekakis, 2006). The Ministry of Health Malaysia recommendation for adults aged between 18 and 64 years is to perform at least 150 minutes of moderate intensity physical activity per week or at least 75 minutes of vigorous-intensity physical activity (Ministry of Health Malaysia, 2018).

However, there are reports that high-intensity physical activity can be associated with unpleasant feelings due to higher perceived exertion (Ekkekakis 2006). The literature examining the association between physical activity and HRQOL among general adults is limited and the available literature shows a positive relationship between physical activity and quality of life (Bize, 2007). Based on the available literature, we theorise that there is a positive association between performing vigorous-intensity physical activity with quality of life. It is also a practical decision to use intensity as an outcome variable in the present study because it will make the findings more acceptable to Malaysian policy-makers and the general public who are more familiar with intensity compared to other ways of describing physical activity.

3.5 Participants of Quantitative and Qualitative Studies

The study collected data from seven NGOs in Malaysia. The NGOs were registered associations who received support from the Health Promotion Board Malaysia, in particular financial funding to run physical activity health promotion programmes. Application for funding is open all year round but, for the purpose of this study, only NGOs who started their programmes from April until May 2013 were included; this

was to coincide with the researcher going back to Malaysia for data collection. All NGOs involved in the study were provided by the Health Promotion Board Malaysia. The NGOs involved in the present study are detailed in Table 1 below.

Table 1: NGOs involved in the present study

No.	NGOs' name	English translation	Main physical activity carried out
1.	Kelab Sukan Komuniti Lembah Keramat (Kesumat)	Keramat Valley Sports Club	Badminton
2.	Kelab Sukan Komuniti Dinamik (Dynamic)	Dynamic Community Sports Club	Aerobic type exercise
3.	Persatuan Kesenian dan Riadah Melayu Semenyih Selangor (Rikmas)	Semenyih Malay Arts and Leisure Association	Aerobic type exercise
4.	Persatuan Kecegasan dan Senamrobik Metropolitan Pulau Pinang (PKSM)	The Penang Metropolitan Fitness and Aerobics Association	Aerobic type exercise
5.	Persatuan Komuniti Sejahtera Kampung Kepala Bukit Tobiar (Tobiar)	The Peaceful Community of Kepala Hill Village Tobiar	Aerobic type exercise
6.	Kampung Kuala Merah, Kuala Ketil Health Info Centre (KK)	The Kuala Merah Village Health Info Centre	Aerobic type exercise
7.	Persatuan Belia Seri Warisan Shah Alam (BSW)	Seri Warisan of Shah Alam Association	Aerobic type exercise

Four NGOs are from Selangor and Kuala Lumpur (Klang Valley) they are Kesumat, Dynamic, Rikmas and BSW. Kuala Lumpur is the capital state of Malaysia while Selangor is the most industrialised state in Malaysia encircling Kuala Lumpur. The PKSM is based in Penang, an island city in the north of Peninsular Malaysia. Tobiar and KK are based in the countryside in the state of Kedah, which is a state neighbouring Penang also in the north of Peninsular Malaysia.

The Kesumat is an all-men NGO established by ex-servicemen and the President of the club is a retired colonel of the Royal Malaysian Army. The NGO organised several leisure activities such as bowling and golf but their main activity was badminton. The Kesumat is based in Keramat, which is an area within the constituency of Titiwangsa in the Federal Territory of Kuala Lumpur and it borders the district of Ampang in Selangor. The Kesumat is provided with free usage of Keramat's sports hall and many of the committee members live in that area.

Dynamic is a women's NGO based in Keramat but, unlike Kesumat, members are not from any particular occupation or industries. However, most of the members are cancer survivors or have a family history of fighting the disease. This NGO organised activities such as aerobics exercise and hiking, and it is likely that during these activities the members share their challenges as well as provide informal support to one another.

Rikmas is a NGO based in Semenyih, a town in the Hulu Langat district. The members of this NGO are of mixed gender but mostly women and are all of Malay ethnicity. Most of the members live in Semenyih. This NGO organises an aerobics exercise session during weekend mornings at an open space courtesy of a local businessman.

BSW is an NGO based in Shah Alam, a city in the state of Selangor. At the time of the study, this NGO was organising a weekly aerobic exercise session in Shah Alam. The majority of committee members are not from Shah Alam and the exercise programme organised by BSW receives poor support from the locals. This was possibly due to political differences between the locals and the NGO or the NGO is seen as an outsider because only one resident is on the committee. BSW shares the same address with the office of a political party who partly fund some of the programmes run by the NGO.

The PKSM is an NGO based in Penang, an island town in the north of Malaysia. This NGO organised aerobics exercise sessions at two locations within the island: Taman Metropolitan Relau and the Penang International Sports Arena. The exercise sessions are not limited to members and are open to all. Non-members can make non-obligatory donations to sustain the programme. As attendees are not necessarily members, they are usually made up of small groups of friends.

Tobiar is an NGO established by people who live in Kepala Bukit Tobiar, a village in the state of Kedah. The village is about 30 minutes' drive from Alor Setar, the capital state of Kedah. Members of this NGO are mostly of Malay ethnicity with a few Siamese. Members are trained by the local health department on simple health activities such as aerobics exercise, taking blood pressure readings and calculating

BMI. Activities held by the NGO provide opportunities for social interaction among villagers during out-of-work hours.

KK is another village-based NGO; the NGO is in Kuala Merah, in the district of Kuala Ketil in Kedah. All members live in Kuala Merah village but unlike Tobiar whose members are of mixed gender, KK is an all women organisation. Members of KK are also trained by the local health department on blood pressure readings, BMI and aerobics exercise. Most members are housewives and activities are organised during working hours when husbands are out to work and children are at school. The programmes organised by the NGO provides an opportunity for social interaction among members who live in the village.

The Health Promotion Board Malaysia is a statutory body under the Ministry of Health Malaysia. The objective of the Board is to promote healthy lifestyles by working with the NGOs. The Board undertakes to empower organisations and communities through training and capacity-building initiatives to improve health. Among the support provided by the Board to the NGOs was financial assistance to conduct various health promotion activities. The present study focussed on the NGOs who received funding to run physical activity programmes.

3.6 Quantitative Study

The present study adopted a repeated-measures design where all participants would take part in a similar condition, which was a physical activity promotion programme, with data collection carried out at multiple time points which were Time 1, Time 2, Time 3 and Time 4. The methods employed in carrying out the quantitative study are presented in this chapter. The results of the quantitative study is in Chapter 5.

3.6.1 Measures

The present study used a questionnaire set which could be broken into four components. Detailed of the measures used in this study are described in Chapter 4 – Instrumentation Development.

3.6.2 Sampling technique

Sample recruitment was carried out via the permission of the organisers of the NGOs as the “gatekeeper”. Some of the NGOs did not have a complete list of attendees as they were free to “walk-in” and for NGOs with a complete list of names of members, attendance of members at sessions fluctuated. Considering that not all members of the NGOs would consent to participate in the study and in order to gather the biggest sample possible, the present study used the convenience sampling technique (Etikan, 2016). Using this technique, the researcher distributed the questionnaire to all members of the NGOs and for participants who returned their questionnaire, an implied consent was assumed.

3.6.3 Sample size and power

For sample size calculation, the study used the formula for sample size estimation given below (Habib, Johargy, Mahmood, & Humma, 2014; Suresh & Chandrashekara, 2012). The formula and computation for sample size estimate were as follows:

$$N = \frac{(Z_{\alpha/2})^2 P(1-P) D}{E^2}$$

Where : $Z_{\alpha/2}$ is the value of normal deviates for type 1 error (alpha) – two tailed
P is the prevalence of the interest of study
E is the precision or margin of error
D is the design effect reflects the sampling design used in the study

The present study used an alpha of 0.05 and as such the z score or the value of the normal deviation for type 1 error (two-tailed) would be 1.96. The *P* value was the prevalence of the interest of study and according to the NHMS 2011 (Teh et al., 2014), the prevalence of physical activity of Malaysians was at 64.3%. Therefore, the *P* value used in the formula would be 0.64. For purposive and convenience sampling, the suggested *D* value was 10 and *E* value was 10% of *P* (Suresh, 2012). The calculation for the sample size would therefore:

$$N = \frac{(1.96)^2\ 0.64(1-0.64)\ 10}{(0.1)(0.64)}$$

$$= \frac{(3.84)\ (0.23)\ (10)}{0.06}$$

$$= \frac{8.83}{0.06}$$

$$= 147$$

The above calculation produced an estimation of 147 participants for the present study. As the present study was a repeated measures design, the factor of attrition had to be taken into account. The final estimated sample size was calculated by taking into account the factor of attrition using the following formula.

$$N^1 = \frac{N}{1 - q}$$

Where : *N* is the estimated sample size before taking into account the factor of attrition or withdrawal
q is the proportion of attrition

The value of *N* = 147 and *q* = 10% was suggested as the proportion of attrition/withdrawal (Habib et al., 2014; Suresh & Chandrashekara, 2012). Considering the present study was a repeated measures design with four time points of data collection, the researcher expected that a higher rate of attrition would occur. Peterson et al. (2012) had reported a drop-out rate between 25 and 44% in longitudinal studies of 6 to 12 months' duration. As such, the present study would adopt an estimated 40% attrition rate. Therefore, the total estimated sample size for this study would be as follows:

$$N = \frac{147}{1 - (0.4)}$$

$$= \frac{147}{0.6}$$

$$= 245$$

The total estimated sample size for the present study would be 245 participants. Having obtained the estimated sample size, a power calculation was computed to determine whether a satisfactory effect size and power could be achieved. The test for power was conducted assuming an alpha value of 0.05, medium effect size with *d* = 0.5 (Cohen, 1988) and two-tailed distribution. The power calculation was carried out using an estimated 245 participants at baseline and 147 participants assuming a 40% attrition rate, by the end of the study. The power calculation was completed using G-Power (Faul, Erdfelder, Lang, & Buchner, 2007) software using post-hoc type of analysis. Using an estimated 245 participants, the results from the analysis showed the power = 1.0. A second analysis using 147 estimated participants gave the result of power = 0.99. Therefore, the estimated sample size was able to achieve the minimum 80% statistical power (McQueen & Knussen, 2013).

3.6.4 Procedure

The present study was conducted with assistance from the Health Promotion Board Malaysia. A list of NGOs receiving support from the Board to conduct physical activity programmes was given to the researcher.

A two-step recruitment strategy was used in the present study in which the researcher approached the organisation first followed by individual enrolment. In a study on the promotion of physical activity and nutrition behaviour (Plotnikoff, McCargar, Wilson, & Loucaides, 2005), a liaison officer within an organisation was identified to help with recruitment of participants. In the present study, the researcher first contacted the organisers of the NGOs via telephone calls based on the list provided by the Health Promotion Board Malaysia. An organiser from each of the NGOs that agreed to take part in this study, acted as the contact person for the organisations. The organisers were asked to notify their members about the study and help to distribute and collect questionnaires for the baseline study. By involving the organiser, the researcher hoped to be seen as respecting them as the "gatekeeper" to their organisation. In addition, this would help to recruit more participants as members of the NGOs would volunteer to participate as a sign of approval and respect to their organisers.

After contacting the organisers, NGOs who agreed to take part were e-mailed the study kit containing participant information (PI) sheet, consent form and samples of the questionnaire in Malay and English. This was followed by a meeting with the organisers to further explain the study. The organisers then informed their members about this study and meanwhile a meeting with the members was arranged. During a meeting with the members, the researcher again explained the study and answered any queries pertaining to the study. The questionnaire was distributed to all members of the NGOs during this meeting and participants were free to choose which language version of the questionnaire they preferred.

Time 1, the organisers helped to collect the completed questionnaires and hand them over to the researcher. For Time 2 to Time 4, the researcher was back in the UK and the questionnaire was posted to participants by colleague of the researcher in the Ministry of Health Malaysia in Malaysia. The questionnaires were mailed to the address provided by the participants in Time 1 with a freepost envelope. For members who did not provide a postal address, subsequent questionnaires were posted to the organiser's address. Emails were sent to the organisers before the questionnaires were mailed to the participants and the organisers. Completed questionnaires were collected by the researcher's colleague and sent to the UK for analyses.

3.6.5 Ethical consideration

For the current study, participants were provided with a detailed information sheet and were given reasonable time to fill it prior to starting the study process. The protocol was approved by the Liverpool John Moores University (LJMU) Ethics Committee (Reference number 13/NSP/015) on 25 March 2013.

3.6.6 Demographic characteristics

The participants were asked to give demographic information at Time 1: gender, age, ethnicity and education. The demographic details of the participants at each time point based on these data were as follows (see Table 2).

Table 2: Demographic profiles of the participants

	Time 1		Time 2		Time 3		Time 4	
	n	**%**	***n***	**%**	***n***	**%**	***n***	**%**
Gender								
Male	71	29.1	36	26.9	29	24.4	26	24.8
Female	169	69.3	98	73.1	90	75.6	79	75.2
Did not specify	4	1.6	-	-	-	-	-	-
Age								
18 – 19	1	0.41	1	0.75	1	0.84	1	0.95
20 – 29	31	12.7	6	4.48	6	5.04	6	5.71
30 – 39	28	11.48	19	14.18	19	15.97	15	14.29
40 – 49	49	20.08	39	29.10	37	31.09	37	35.24
50 – 59	56	22.95	41	30.60	37	31.09	33	31.43
60 – 69	37	15.16	19	14.18	14	11.76	12	11.43
70 – 79	3	1.23	2	1.49	1	0.84	1	0.95
Did not specify	39	15.98	7	5.22	4	3.36	-	-
Ethnicity								
Malay	223	91.4	122	91.0	107	89.9	93	88.6
Chinese	12	4.9	7	5.2	7	5.9	7	6.7
Others	6	2.5	5	3.7	5	4.2	5	4.7
Did not specify	3	1.2	-	-	-	-	-	-
Education								
University/college/ professional degree	39	16.0	11	8.2	8	6.7	6	5.7
Diploma/certificate / vocational	15	6.1	7	5.2	7	5.9	6	5.7
STPM/HSC/A-Level & below	122	50.0	94	70.1	88	73.9	82	78.1
Did not specify	68	27.9	22	16.4	16	13.4	11	10.5

There were more female than male participants, with more than 69% of female participants at each time point. As for the age distribution, at Time 1 the mean age was 46.4 years (*SD* = 13.72 years) with the highest percentage of participants from age category of 40–49 and 50–59 years. In terms of ethnicity, the majority of the participants were ethnic Malay. Other ethnicities that also participated in this study were Chinese, Indian and others, including Malaysians of Thai descent. As for the educational background of the participants, a majority of the participants were educated at *Sijil Tinggi Persekolahan Malaysia* (STPM)/Higher School Certificate (HSC)/A-Level or below. A review of the table revealed that while the participants were happy to indicate their gender and ethnicity, a number chose to conceal their

age and education. Nearly 30% of the participants did not specify their education and 16% did not specify their age.

3.7 Qualitative Study

The definition of qualitative research is contentious (Green & Thorogood, 2014; Sparkes & Smith, 2014) but there are some methods that are particularly associated with qualitative studies. The most basic way of explaining qualitative methods is that it seeks to describe in detail answers to what, how and why of a phenomenon rather than how many or how much (Green & Thorogood, 2014). Qualitative methodologies consist of philosophical perspectives, assumptions, postulates and approaches that researchers employ to render their works open to analysis, critique, replication, repetition and adaptation (Vaismoradi, Turunen, & Bondas, 2013). As qualitative research focuses on human behaviour in context, health care practitioners now increasingly use this method in studies to enhance understanding of health, health services, health risk-related behaviour and to improve management or provision of services (Green, 2014).

Qualitative studies typically rely on four methods of data collection which are participating in the setting, observing directly, interviewing and analysing documentation and materials culture (Marshall & Rossman, 2006).

In this section, the methods employed in qualitative study are detailed, beginning with a consideration of qualitative approaches and justification for the use of thematic analysis (TA) (Braun & Clarke, 2006), which is the data analysis approach used in the present study. This is followed by the methods employed in qualitative study 1 (QS1B – Views on physical activity: re-analysis of the elicitation study data), qualitative study 2 (QS2 – Understanding participation with promotion of physical activity in Malaysia: analysis of heterogeneous viewpoints of NGOs and health officials) and finally QS3 (QS3 – Analysis of follow-up interviews of the NGOs' attendees).

3.7.1 Consideration of qualitative approaches and justification for using TA

The philosophical assumptions, strategies, and methods of data collection and analysis employed in qualitative approaches to scholarly inquiry differ from those employed in quantitative methods (Creswell, 2009). Qualitative approaches are frequently used to complement quantitative methods in health research, and are particularly widely used to evaluate the effectiveness of health interventions (Silverman et al., 2002). Qualitative research methods are heterogeneous with no definitive typology, although some share common characteristics (Carrera-Fernandez, Guardia-Olmos, & Pero-Cebollero, 2012). Howitt (2010) listed six popular qualitative data analysis methods, which are TA, grounded theory, discourse analysis, conversation analysis, narrative analysis, and interpretive phenomenological analysis (IPA). The following will briefly discuss these different approaches and present the justification for using TA in the present study as compared to other qualitative data analysis approaches.

Grounded theory (Glaser & Strauss, 1967) is an iterative study design that entails cycles of simultaneous data collection and analysis, whereby analysis informs the next cycle of data collection (Lingard, Albert, & Levinson, 2008). It seeks to construct a theory about an issue through a process of data collection that is often described as inductive where the researcher has no preconceived ideas (Higginbottom & Lauridsen, 2014). Grounded theory relies on theoretical sampling which involves recruiting participants with differing experience of the phenomenon so as to explore multiple dimensions of the social process under study (Starks, 2007). The ultimate aim of grounded theory is to develop theory appropriate to the data. The method is useful when a study does not have an *a priori* theory and aims to develop a new theory or model based on the findings. In the current study, the TPB was used as a theoretical framework to study behaviour related to physical activity engagement and as such grounded theory methods were not considered suitable.

Discourse analysis (1983) involves analysing transcription at a level beyond individual words which includes rhetoric, voice, discursive repertoires and the dialogical nature of talk (Howitt & Cramer, 2010). Discourse analysts argued that language and words are themselves essentially meaningless, (Stark 2007) and that meaning is ascertained from a variety of indices including choice of words, idioms,

speaking rhythm and cadence, inflection, intonation, gestures and non-verbal utterances such as laughter or sigh (Padgett, 2012). Discourse analysis is the best analysis method if the researcher is interested in language use in a social context or how social order is produced. This method was not considered useful to achieve the objectives of the current research because semiotic events of language and gestures are not the primary focus of the current study.

Conversation analysis (1992) examines the sequencing, turn taking, “holding the floor”, interruption and other aspects of conversation that reveal how social roles and identities are manifested during talk (Padgett, 2012). Conversation analysis is also concerned with how conversation is carried out in particular ways or different settings. This method is suitable when the study is about finding the sequencing of conversation, such as conversation between doctors and patients, or involving speech and language disorders such as aphasia (Wilkinson, 2014). Considering the nature of conversation analysis, the researcher was of the opinion that the method was inappropriate for the aims of the current study.

Narrative analysis uses metaphor in order to understand individuals’ stories. Research data are typically stories linking events in a chronological fashion and are analysed with a moral and evaluative focus with an emphasis on how stories are structured or what their function is, to understand how individuals relate to life events (Howitt, 2010). It aims to arrive at a plausible explanation of why some events happen the way they do and/or are described the way they are by individuals (Beal, 2013). The construction of narrative is a human propensity which helps people deal with a confused or disorderly world by bringing a state of orderliness. Narrative in relation to illness is common since illness disrupts the orderliness of everyday life. Narrative analysis is suited as a method of analysis if the data gathered have a story-like quality either produced by a participant, such as diaries, or interaction with others including researchers, such as interviews. In the current research, data were not collected in that way; hence, narrative analysis was not employed as the study method.

Of all the approaches summarised by Howitt (2010) one that might have been considered most appropriate to the current study is IPA (Smith, 1996). It could be suggested that this approach would have captured the meaning and common

features or essences of performing physical activity (Stark, 2007). IPA was developed within health psychology in the 1990s as a way to understand the experience of health issues such as pain (Howitt & Cramer, 2010). In psychological research, IPA has been used to explore a variety of issues, such as the relationship between body image, gender and sexual orientation (Morgan & Arcelus, 2009), how being HIV positive impacts on personal relationships (Jarman, Walsh, de Lacey 2005) and how people come to terms with the death of a partner (Golsworthy & Coyle, 1999). It could be argued that using IPA in the present study would allow a deeper understanding of physical activity behaviour in the wider context of an individual's lifestyle. However, after detailed consideration, the researcher was of the opinion that TA (Braun & Clarke, 2006) was a better approach than IPA for the following reasons.

In carrying out an IPA study, the researchers would usually find a fairly homogeneous sample through purposive sampling (Smith, 2007). Additionally, another main concern of IPA is to give full appreciation to each participant's account and, for this reason, the samples in IPA are usually small and typically range from 1 to 10 persons (Pietkiewicz, 2012; Starks, 2007). However, in the present study, the sample was NGOs chosen by the Malaysian Health Promotion Board and as such the researcher did not have the required level of control over the sample.

A theoretical orientation of IPA is its reliance upon idiography, which refers to its in-depth analysis of single cases and examination of the individual perspectives of study participants in their unique context (Pietkiewicz, 2012). IPA studies are carried out using detailed case-by-case analysis of individual transcripts which takes a long time (Smith, 2007). In the present study, the qualitative elements of the research were additional to the longitudinal quantitative aspects and the researcher lacked resources in the form of time to complete this.

Additionally, the researcher was based in the UK and had limited time and resources whilst in Malaysia to collect data. Before data collection could commence, in addition to ethical approvals, the researcher had to apply and obtain clearance from various departments both officially and informally prior to setting up the interviews with the different stakeholders (participants, group organisers, ministry officials). To carry out individual interviews, the researcher required a proper venue or room with privacy for

the interview to take place and then arrange a mutually convenient time and date for it to occur. This was logistically challenging and, during this period, at times the researcher could not always access a suitable room. Furthermore, the NGOs are located in different geographical areas with the PKSM, KK and Tobiar located in the north of Malaysia, approximately over 300 kilometres away from Kuala Lumpur. The most realistic approach to gather data from as many participants as possible was to carry out some group interviews which were not suitable for IPA analysis.

Reports from IPA studies, often written as anecdotes or thematic stories, produce rich description that provides insight into the meaning of the lived experiences (Starks, 2007). Such accounts enhance the readers', usually experts or other audiences whose practice would be enhanced understanding of how an individual lived through and made sense of a particular experience (Starks, 2007). The results from a TA study are, however, accessible to audiences who are not part of academic communities (Braun, 2014). As the researcher is attached to the Ministry of Health Malaysia, the results from the present study will be presented to Ministry officials with different academic backgrounds and professions and a TA report would be more useful during presentations.

3.7.2 Rationale for using TA

TA is used to analyse, classify and present themes that relate to the data and is considered the most appropriate method for a study that seeks to discover using interpretation (Ibrahim, 2012). The present study employed TA over other approaches for the following reasons.

TA has the flexibility to cope with analyses of data that have to be collected at different phases or times (Ibrahim, 2012). The present study involved three phases of data collection where QS2 and QS3 used the same sample at two different time points. Using TA enabled the researcher to observe the differences and similarities between them. (For report on QS2, refer to Section 6.2; for report on QS3, refer to Section 6.3)

The TA approach also provided the opportunity to code and categorise data into themes that could be processed according to similarities and differences (Ibrahim,

2012; Miles & Huberman 1994). In the present studies, data were collected over time at four different time points and gathered from different groups: 1) people attending physical activity groups, 2) physical activity group organisers and 3) health officials. The themes that emerged from the separate analyses of these data were then compared and triangulated.

The present study aimed to uncover the beliefs of a small sample of the three groups stated above (those participating in group physical activity, physical activity group organisers and senior officers in the Health Ministry who funded the groups). Participant interviews were analysed by the researcher to look for patterns in the transcribed responses of group participants and organisers to relate these to the views of the health authorities. While the quantitative part of the study was designed to address the main research questions, the qualitative part was designed to look into the processes that relate to or support any behavioural change. The research objectives were not to make an in-depth analysis of social and cultural influences on physical activity or to delve deeply into individuals' experiences of the type provided by using approaches, such as IPA (1996), phenomenological approaches (e.g. Colazzi, 1978) or grounded theory (1967). The researcher was of the opinion that the TPB (Ajzen, 2005) is still useful and the literature among the Malaysian population is far from reaching a saturation stage that would drive the researcher to develop a new theory.

In addition, the data for the elicitation study were initially collected and used for the sole purpose of developing the questionnaire. Subsequently, these data were viewed as a source of additional information to triangulate with the other data collected and were thus subjected to re-analysis. At this point, the interviews had already been conducted and transcribed; hence, the data were slightly more limited in their scope than would be needed for approaches other than a simple TA.

Based on the above, the researcher felt that TA was the most appropriate analytic method to be employed in this study.

3.7.3 The TA

TA is a method for identifying, analysing and reporting patterns or themes within the data (Braun & Clarke, 2006). The process of data analysis is a broad-brush approach and does not link to any particular theory. TA is widely used but does not appear to exist as a “branded” analysis like other methods and is sometimes claimed as something else, such as discourse analysis or content analysis (Braun & Clarke, 2006). While TA deals with codes and themes, content analysis is a systematic coding and categorising approach used to determine trends and patterns of word frequency and relationships, and the structure and discourse of communication. TA as used in health research is primarily descriptive or aims to describe key issues of particular groups or individuals (Esmaeili, Cheraghi, Ali, & Salsali, 2014)

3.7.3.1 Advantages and disadvantages of using TA

TA is not without criticism. The first is that, unlike some other qualitative methods, it lacks an underlying theory or philosophy (Braun & Clark, 2006). Additionally, there is still insufficient literature which comprehensively outlines the TA method (Aronson, 1994; Braun & Clarke, 2006; Howitt & Cramer, 2010). However, the paper written by Braun and Clarke (2006) is user friendly and a useful starting point before advancing to read other detailed literature by, for example, Boyatzis (1998) or Howitt (2010).

The advantage of using TA is that it is a flexible and relatively easy method compared to other qualitative analysis approaches. The method is often one of the first to be learned by qualitative researchers before advancing to other, more sophisticated techniques. The results from TA are also generally accessible to the educated general public (Braun & Clarke, 2006).

The flexibility of the method allows a very broad range of things to be said about the data (Braun & Clarke, 2006). This could be problematic for the researcher who has the responsibility of selecting the focus on their data in terms of theme generation and writing up.

Braun and Clark (2006) contended that many of the disadvantages of TA are due to poorly conducted analyses or inappropriate research questions rather

than the method itself. Being a simple method also means that it has limited interpretive power beyond mere description of the data if it is not used within a framework to anchor the analytic claims made (Braun & Clarke, 2006).

TA is a method that did not win any kudos as an analytic approach (Braun & Clarke, 2006). Some literature refers to it using different names or mixes it with other techniques giving the impression that a study using TA is generally carried out by a novice researcher without the skills or knowledge to perform other more advanced techniques. However the current novice researcher was of the opinion that choosing this widely used but poorly demarcated and rarely acknowledged method (Braun & Clarke, 2006) was itself a challenge.

3.7.3.2 TA procedure

Thematic analysis (TA) is a process for encoding qualitative information into explicit codes (Boyatzis, 1998). It enables the researcher to use a wide variety of types of information in a systematic manner that increases their accuracy in understanding.

Briefly, TA comprises three processes: 1) transcription, 2) analytic effort and 3) identifying themes and sub-themes (Howitt & Cramer, 2010). The transcription process involves converting any form of data into textual material. In this study, it involved transcribing interviews into text. The analytic effort was the work the researcher did to generate the themes, which involve five components: familiarisation with the data; coding and conceptualisation; processing and reprocessing the data; any difficulties encountered during the analysis and the efforts to resolve these; and, lastly, ensuring thoroughness when checking between the analysis and the data (Howitt, 2013).

The identification of themes and sub-themes is the process of refining the themes through analytic work to the end of the analysis. A well-accepted outline of the TA process by Braun and Clarke (2006) details a six-stage process. A summary of each stage is presented the Table 3 below.

Table 3: Six stages of TA

Phase	Description of the process
1. Familiarizing yourself with the data	Transcribing data, reading and re-reading the data, noting down initial codes
2. Generating initial codes	Coding interesting features of the data in a systematic fashion across the entire data set, collating data relevant to each code
3. Searching for themes	Collating codes into potential themes, gathering all data relevant to each potential theme
4. Reviewing themes	Checking if the themes work in relation to the coded extract and the entire data set, generating thematic map of the analysis
5. Defining and naming themes	Ongoing analysis to refine the specifics of each theme, and the overall story the analysis tells, generating clear definitions and names for each theme
6. Producing the report	The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back of the analysis to the research question and literature, producing a scholarly report of the analysis

Note: Reprinted from “Using thematic analysis in psychology” by Braun, V. and Clarke, V., 2006, *Qualitative Research in Psychology, 3*, p.87, Copyright 2006 by Edward Arnold (Publishers) Ltd

Doing TA requires an underlying competency in pattern recognition (Boyatzis, 1998). This competency is the ability to sustainably see patterns in seemingly random information. It has to be sustainable as research using qualitative methods requires long hours of immersion in information and more hours in processing and analysis before interpretation (Boyatzis, 1998). Knowledge relevant to the arena being examined is crucial as a foundation. Often referred to as tacit knowledge, tacit knowledge is important as this type of analysis involves emotional, value-laden and theoretical preconceptions, preferences and worldviews (Boyatzis, 1998).

As TA deals with identifying patterns, observations are classified into groups known as “codes” and “themes”. A code is a word or short phrase that is symbolically

assigned because it is a summative, salient, essence-capturing and/or evocative attribute for a portion of language-based or visual data (Saldana, 2009).

A theme is a pattern found in the information that at minimum describes and organises the possible observations and at maximum interprets aspects of the phenomenon (Boyatzis, 1998). A theme also captures something important about the data in relation to the research question and represents some level of patterned response or meaning within the dataset (Braun & Clarke, 2006).

3.7.4 Methods of QS1B

The following explain the methods employed in analysing data of QS1B. The results of the analysis are presented in Section 6.1.

3.7.4.1 Introduction

During the questionnaire development phase reported in Chapter 4, an elicitation study was conducted among 20 participants to determine their beliefs about physical activity. The participants were asked about their beliefs on physical activity according to the guidelines on developing a questionnaire based on the TPB (Francis, Eccles, & Johnston, 2004). The interviews were analysed using content analysis technique to develop items for questionnaire development purposes, and are reported in Chapter 4. Previous analysis targeted at developing items for TPB questions specifically and other potential areas of discussion or context were not included. Re-analysis will explore in greater depth and identify any additional themes.

3.7.4.2 Rationale for re-analysis using TA

The transcripts of the interviews had been subjected to analysis using the content analysis technique for questionnaire development purposes and the results are reported in Chapter 4. The transcripts were first analysed using content analysis, a method for questionnaire development, as outlined in Chapter 4. The following is the rationale for the re-analysis of the same data using TA.

Both thematic and content analysis share the same technique of examining narrative material by breaking the text into relatively small units of content (Vaismoradi et al., 2013). However, by using content analysis the textual information is coded and categorised to determine trends and patterns of word, frequency and structures (Vaismoradi et al., 2013). In this way, the themes generated are based on the frequency of their occurrence in the text are concerned with the surface meaning of the data rather than hidden meaning (Vaismoradi et al., 2013).

TA permits the researcher to combine the analysis of the meaning within a particular context because in TA the researcher has to consider both manifest and latent content of the data. Manifest content is the literal idea behind a text while latent content is the figurative or expression of the manifest content. In TA, the importance of a theme does not necessarily depend on quantifiable measures but rather its relation to the overall research question (Vaismoradi et al., 2013). By subjecting the data to a secondary analysis using TA, the researcher will be able to examine the data in greater depth and discuss the analysis in combination with the meaning within the context of the culture and environment of the participants.

Even though there are some overlapping features between the two analysis methods, the above comparative discussion showed that re-analysis of the data using TA will result in a broader understanding of the context influencing the stories of the participants.

3.7.4.3 Objective and aims of this analysis

The overall objective of this re-analysis is to explore the data further to identify common threads or themes and interpret them within the context of the environmental settings and the TPB.

The specific aims of this analysis are:

a) What are the benefits from participating in physical activities?
b) What are the barriers that prevent them from engaging in physical activity?
c) Do the types of activities affect their adherence to physical activity?

3.7.4.4 Methods

TA (Clarke & Braun, 2013) was employed to analyse the interviews. The detailed process of TA is described in Section 3.7.3.2

3.7.4.5 Participants

The participants in this study were 20 Malaysians living in the UK: 17 students and 3 working adults. A total of 13 interviews (eight in English and five in Malay) were conducted. These took place within and outside LJMU campus premises. The duration of the interviews was between 15 to 45 minutes.

3.7.4.6 Ethical consideration

The protocol of the interviews was approved by the LJMU Research Ethics Committee (Reference number 12/NSP/042) on 2 August 2012.

3.7.5 Methods of QS2

The following explains the methods employed in analysing data from QS2. The results of the analysis are presented in Section 6.2.

3.7.5.1 Introduction

The researcher went back to Malaysia in 2013 to start on the quantitative data collection as well as conducting interviews. Presented below are the analyses of QS2. The overall PhD study covered seven NGOs and of those, representatives from six NGOs agreed to be interviewed. The study was organised so that the interviews were conducted with the organiser and attendees of each NGO as well as officials from two departments within Ministry of Health Malaysia who are directly responsible for health promotion in Malaysia.

An important point that needs to be highlighted here was that the NGOs involved in the present study were direct beneficiaries of assistance given by the Ministry of Health Malaysia through the Health Promotion Board Malaysia and Health Education Division. As the researcher is also an officer from the Ministry of Health Malaysia, this may have potentially affected responses during the

interviews. This issue is also discussed in the limitations and reflexive statement in Section 6.2.8.3 and 6.2.7.

3.7.5.2 Aims of study

The overall objective was to understand the beliefs and context or setting that may affect the participants' decision to engage in physical activity. These beliefs and context or setting are variables that could be easily identified or measured numerically (Creswell, 2013). The qualitative study focused on the subjective meanings and beliefs of the individuals regarding physical activity and recognised that they intertwined with culture, religion and the environment and the individuals' lived environment. The result of the analysis would support and complement the statistical analysis of the quantitative data.

The aims of this qualitative study in this research were:

i. To identify the motivating and facilitating factors to physical activity
ii. To identify the barriers to physical activity

The study looked at the above aims from heterogeneous viewpoints which were: a) the group attendees, b) the organiser and c) health officials as sponsor and policy-makers'.

3.7.5.3 Study design

This study explored the beliefs related to physical activity initiation and adherence. The study utilised two data-gathering techniques which were individual interviews and group interviews. The organisers of the NGOs and the health officials were all interviewed individually while for the NGOs' attendees both techniques were used.

3.7.5.4 Sampling

In total, the qualitative part of this study involved interviews with 29 persons categorised into three groups:

a) Attendees of the NGOs

These were the public who joined the NGOs as members.

b) Organiser of the groups

These were the committee members of the NGOs who managed and organised the activities of their group including exercise sessions. Interviews were conducted with key persons of the committee such as the president, chairperson, deputy or committee members

c) Two executives from Ministry of Health Malaysia

One of the executives was an official from the Health Promotion Board Malaysia. The Health Promotion Board Malaysia is the organisation responsible for empowering the community on health promotion through the provision of grants and training and through engaging community-based organisations. The other executive was from the Health Education Division, which is the department responsible for the promotion of health in Malaysia through policy-making, implementation, publicity, dissemination of information and evaluation.

3.7.5.4 (a) Attendees of the NGOs

The study of the attendees involved 20 persons who were either interviewed in groups or individually. Interviews with the participants were arranged in three focus group discussions and eight individual interviews. All interviews with this group were carried out in Malay languages. There were 5 male and 15 female participants. Only 8 participants provided their age to the researcher which ranged from 42 to 63 years. The occupation of the participants was a mixture of workers, retirees and homemakers.

3.7.5.4 (b) Organisers

The interviews of the organisers involved seven volunteers all of whom were interviewed individually. There were three male and four female participants. Refer to Table 4.

Table 4: Gender, age and languages used in the interview with the organisers

Code	Gender	Language used in the interview
P21	Male	English
P22	Female	Malay
P23	Male	Malay
P24	Female	Malay
P25	Male	Malay
P26	Female	Malay
P27	Female	Malay

3.7.5.4 (c) Officials from the Ministry of Health Malaysia

This section of interviews covered only two persons and they were interviewed separately. Both were male and worked in the Health Promotion Board Malaysia and the Health Education Division respectively.

Table 5: Officials from the Ministry of Health Malaysia

Code	Organisation/department	Language used in the interview
P28	Health Promotion Board Malaysia, Ministry of Health Malaysia	English
P29	Health Education Division, Ministry of Health Malaysia	English

3.7.5.5 Materials

A list of points of discussion for interviews was developed to help the researcher and to guide the semi-structured interviews (refer to Appendix 4). The list was developed by the researcher in consultation with the supervisory team. Three different sets of lists were developed for the interviews with participants, organisers and health officials to elicit data about motivating factors and barriers, beliefs, values and experiences about physical activity from three different angles. Examples of discussion points for attendees were: “What do you plan to achieve from this programme” and “What do you think of the organisers?”

Other materials developed for this study included emails to health officials, emails to participants requesting for interviews, PI sheet and consent form detailing the objectives and other information about the study including a

participant's right to withdraw from the study (refer to Appendices 5, 6, 7 and 8 respectively). These were drafted for ethical submission.

3.7.5.6 Procedure

This study was conducted as part of a larger quantitative study examining the beliefs of the participants on physical activity; the study was anchored on the TPB. The whole interview process took place while the researcher was in Malaysia from April to June 2013. Participants for the interviews were approached by the researcher according to the flow chart shown in Figure 6.

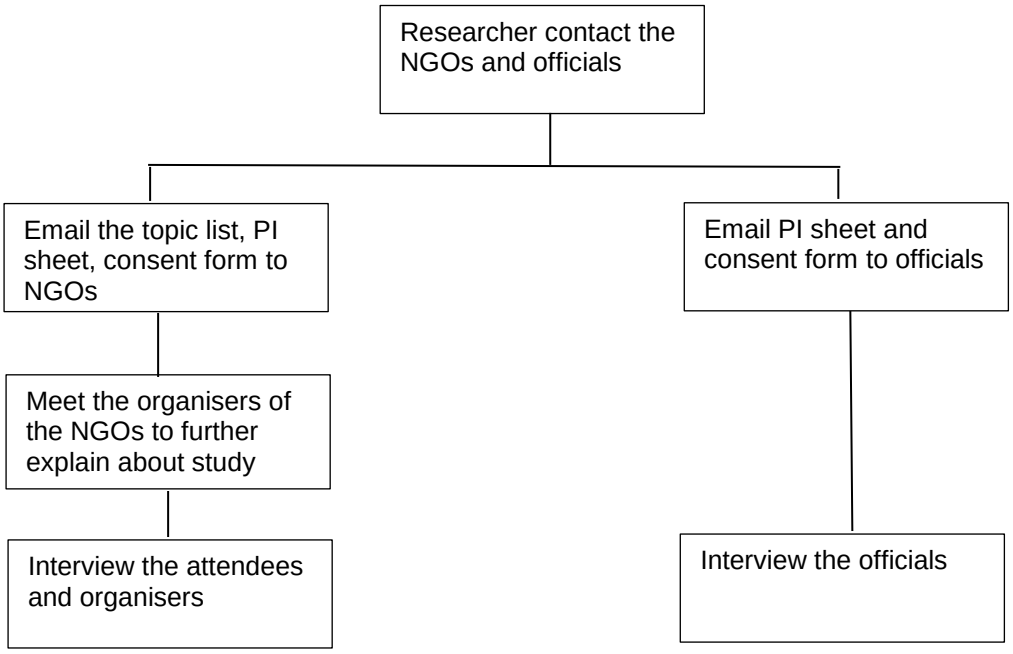

Figure 6: Procedure for approaching the participant for interview

A list of groups who were in receipt of a support grant was provided by the Health Promotion Boards of Malaysia. An officer from the Board informed the organisers about the study via telephone, this was followed by a subsequent telephone call by the researcher. The organisers were usually the president or chairperson or someone who acted as a key decision maker in the group and had provided their details to the Health Promotion Board Malaysia as the key contact person. The organisers who agreed to participate in the study were then sent an email with the quantitative questionnaire and PI sheet for the qualitative study.

The researcher then arranged meetings with the organisers to further explain the study as well as to exchange contact details and build rapport with them. A date for the researcher to interview organisers and to meet the participants to recruit as interviewees in this study was then arranged.

The attendees were recruited via their organiser (potential participants were identified by the organisers) and approached in person by the researcher. Participants who agreed to be interviewed were provided with a PI sheet and consent form. The health officials were contacted via telephone and email. Date and time of interviews were scheduled with the officials and their respective office secretaries.

All attendees and organisers chose to be interviewed at the location where they conducted their exercise session. Interviews were carried out either before or after they finished their exercise session or in the exercise breaks. The health officials were interviewed at their respective offices. The interviews with the attendees ranged from approximately 5 minutes to 20 minutes whilst the interviews with organisers ranged from approximately from 10 minutes to 37 minutes. The interviews with the health officials were 30 minutes and 37 minutes.

All interviews were digitally recorded and transcribed verbatim using Sony Digital Voice Editor 2 and Microsoft Word software. To preserve the anonymity of the interviewees, all participants were given codes of P1 to P29.

3.7.5.7 Ethical approval

All material developed was sent for ethical consideration by LJMU Research Ethics Committee prior to the data collection process in Malaysia. A full approval was given to the study on 25 March 2013 (No. 13/NSP/015). The data collection process took place from April until June 2013 when the researcher went back to Malaysia for data collection purpose.

3.7.5.8 Analytical procedure

The analysis procedure involved transcription, translation and analysis using TA methods according to the outline by Braun and Clarke (2006). In total, there were 23 interview sessions of which 21 were held in Malay language and 2

sessions were held in English. The analytical process involved in examining the data was as per Table 3 – Six stages of TA.

3.7.5.9 Data transcription

As this study employed the TA approach and is not interested in analysing the conversation as a social action, the researcher chose to use the orthographic transcription for transcribing the interviews.

3.7.5.10 Translation

As most of the interviews were conducted in the Malay language, the data needed to be translated into English before the analysis process begin. The data were translated into English as the researcher transcribed the conversation.

3.7.6 Methods of QS3

The following section explains the methods employed in QS3. The results of the analyses are presented in Section 6.3.

3.7.6.1 Introduction

The prospective cohort design of the main study, where participants were observed via questionnaire and qualitative interviews over a period of time, provided the opportunity to carry out follow-up interviews with participants who were interviewed at baseline collection in Malaysia. The participants were contacted and interviewed again about their physical activity beliefs and behaviour approximately 1 year later.

3.7.6.2 Aims of the study

The aims of the study were to investigate whether the attendees interviewed in 2013 had continued to attend the NGOs and engage in physical activity. In addition, it sought to explore what motivated them to continue or stop exercising.

3.7.6.3 Sampling

In line with the aims of the study, only the 20 attendees interviewed in QS2 were approached for re-interview under QS3 (refer to Section 3.7.5.4 (a)). The current

study received a response rate of 45%; that is out of the 20 attendees who were contacted, nine replied and were included in the study. Those who took part in the current study are described in Table 6.

Table 6: List of participants in the follow up interview study

Attendee	Participant interview number	Age	Gender	NGO	Participant questionnaire number	Method
1	P19	47	Female	TB	092	Telephone
2	P20	42	Female	TB	094	Telephone
3	P11	48	Female	KK	052	Telephone
4	P12	53	Female	KK	058	Telephone
5	P6	N/A	Female	KOD	Did not participate in questionnaire	Post
6	P13	N/A	Female	PKSM	062	Post
7	P3	70	Male	KST	019	Post
8	P1	56	Male	KST	014	Post
9	P2	57	Male	KST	006	Post

Abbreviations
TB – The Kampung Kepala Bukit Tobiar Community Association
KK – The Kampung Kuala Merah Health Info Centre
KOD – The Keramat Dynamic Community Club
PKSM – The Penang Metropolitan Aerobics and Fitness Association
KST – The Keramat Community Sports Club

3.7.6.4 Procedure

The attendees were approached using the contact information provided earlier during the QS2 interview. Figure 7 shows the flow of process the researcher carried out in contacting the attendees. The attendees were sent an email regarding the study but the researcher received a poor response. The researcher then contacted the organisers of each NGO via email, telephone and text message to establish contact with the attendees. Following this, four attendees from two NGOs agreed to be interviewed via telephone (refer to Appendix 9 for topic list) and subsequently arranged times for interviews. To improve the follow-up data collection from the remaining 16 attendees, the interview topic guide was formulated into a survey with open-ended questions. The survey questions and a freepost envelope were sent to the addresses used for the questionnaire: three were sent to home addresses and 13 to the NGOs' registered address and the researcher received 5 replies to these. A colleague of

the researcher was based in Malaysia and the colleague assisted in sending and receiving the survey questions from the attendees. (Refer to Appendixes 10 and 11 for the postal survey in English and Malay language.)

The voice interviews were conducted via telephone from LJMU in the UK to Malaysia. The arrangement made was for the researcher to ring the organiser's telephone at an agreed date and time and the line would be passed to the attendees one by one. Two attendees from the same NGO telephone were interviewed via landline and the two interviews with attendees were conducted via mobile because no landline was available. Interview length ranged from 16 minutes to 22 minutes. All telephone interviews were digitally recorded using Sony Voice Recorder and transcribed verbatim.

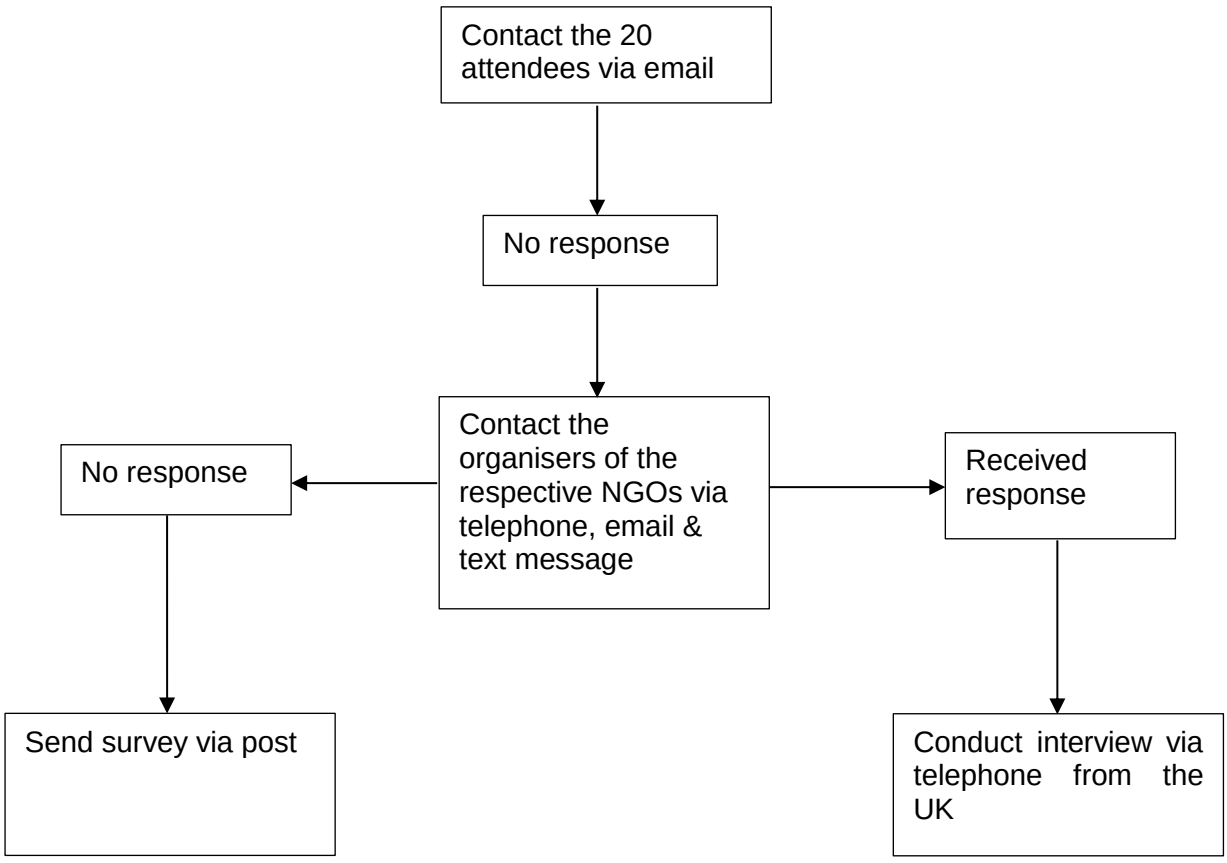

Figure 7: Flow-chart of interview procedure

3.7.6.5 Material

A topic list for interviews was developed in consultation with the supervisory team and on the basis of results from baseline interviews to guide the semi-structured interviews. The purpose of the interviews was to elicit data about motivating factors and barriers, beliefs, values and experiences about physical activity.

3.7.6.6 Ethical consideration

The ethical approval for the telephone interview was gathered on 25 March 2013 (No. 13/NSP/015) and following this, an application for minor ethical amendment to include the postal survey was sent to the LJMU Research Ethics Committee prior to the data collection process.

3.7.6.7 Analytical procedure

Analysis involved transcription, translation and analysis using the TA technique. In total there were two interview sessions with four people and five replies via postal questionnaire. All replies and interviews were in the Malay language. The TA technique used in analysis was informed by Braun and Clarke (2006).

3.7.6.8 Translation

All interviews were conducted in the Malay language. The transcribed data were translated from Malay language to English by the researcher before the analysis began. The set of questions sent out to participants via post was devised originally in English and later translated into Malay language by the researcher.

Chapter 4

4.0 INSTRUMENTATION DEVELOPMENT

4.1 Introduction

The present study is a mixed method comprised of quantitative and qualitative methods. For the quantitative study, the questionnaire set comprised of 101 items (excluding component 1 and 5) which could be broken into five components (see Table 7 below). This chapter details the development of the TPB measure as well as discussing the WHOQOL-BREF and ESE scale used in this study.

Table 7: Components in the quantitative study questionnaire

Component	Measure	Number of items
1	Physical activity for the past 7 days	Not applicable
2	Theory of Planned Behaviour	57
3	WHOQOL-BREF	26
4	Exercise Self-efficacy	18
5	Demography data	8

Component 5 comprised information given by the participants on their age, occupation, ethnicity, gender, education, email address, height and weight. Two optional request for information were name and postal address. However, from Time 2 to Time 4, participants were only asked to provide their body weight.

The qualitative part of this thesis comprised of four studies named as QS1A, QS1B, QS2 and QS3. The elicitation study (QS1A) to develop the TPB questionnaire is detailed in this chapter. The QS1B is the re-analysis of the elicitation study and it is described in Chapter 6 with two other studies, QS2 and QS3.

4.2 Component 1 – Physical Activity Behaviour

The first component of the questionnaire set was designed to collect data on comparable estimates of the physical activity level of the prospective participants. This component comprised a list of 12 items of physical activities adapted from other physical activity measures, such as the New Zealand Physical Activity Questionnaire-Short Form (National Obesity Observatory, 2011) and Rapid Physical Activity Assessment (University of Washington Health Promotion Research, 2006). Participants were asked to select activities completed in the last 7 days as well as to state how often and how much time they spent on the activity. Participants were allowed to select more than one activity and for activities that were not on the list, participants were able to write them in the “Others” category provided.

This component of the questionnaire provided this study with participant’s physical activity behaviour at baseline. This would enable identification of changes to their physical activity behaviour that occurred throughout the study period.

4.3 Component 2 – Development of TPB questionnaire

The second component of the questionnaire was the measures based on the TPB, which involved developing a culturally sensitive questionnaire to assess TPB constructs in a Malaysian population. The protocol outlined by Francis, Eccles, Johnston, et al. (2004) was used as a framework for this study. The process of devising the questionnaire involved five stages that are depicted in Figure 8.

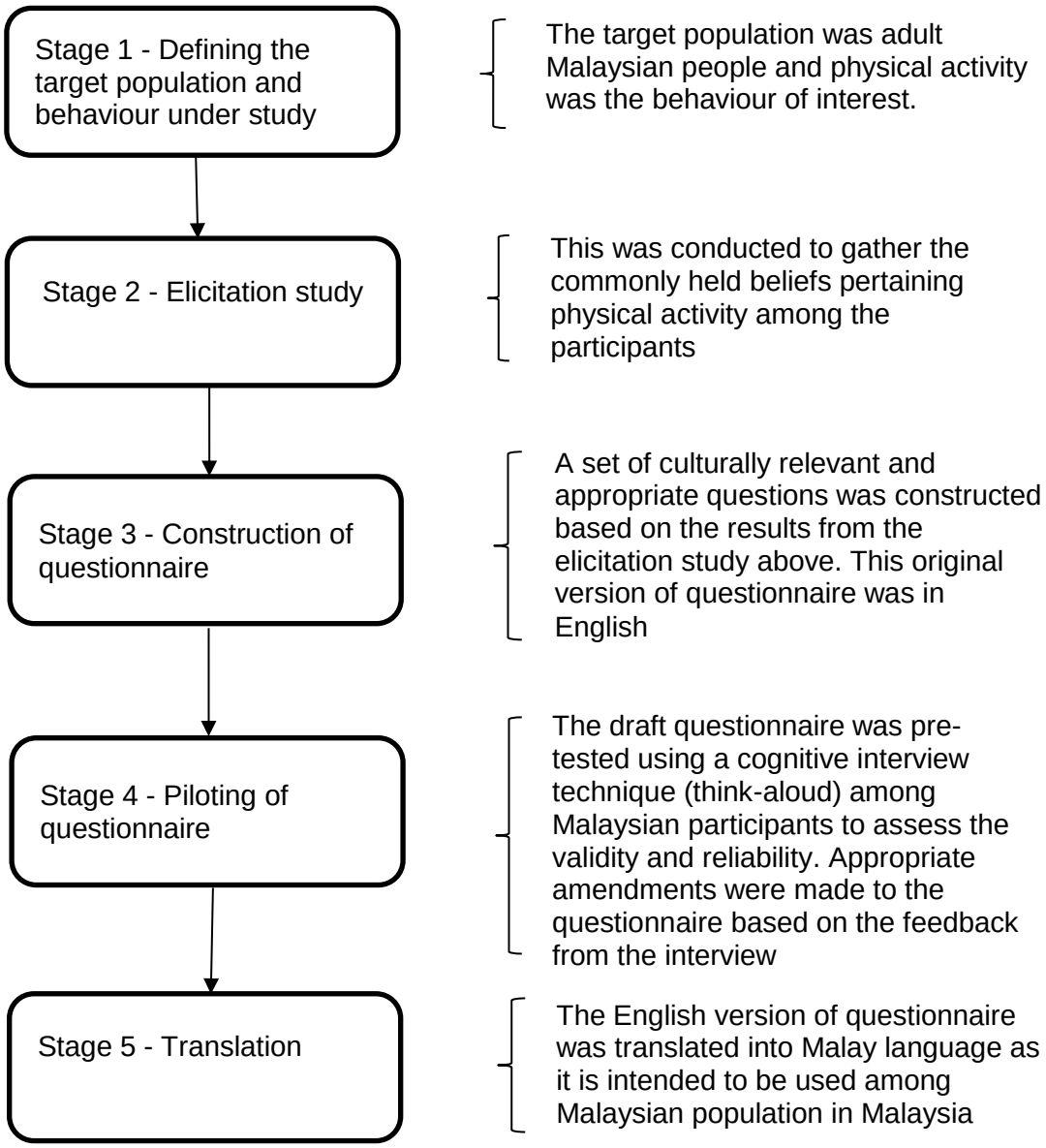

Figure 8: Flow-chart of TPB questionnaire development process

4.3.1 Stage 1: Defining the target population and behaviour under study

The first step in developing the questionnaire was defining the target population being investigated, which was to be Malaysians, aged above 18 years who participate in physical activity programmes organised by NGOs that receive support from the Ministry of Health Malaysia. The second step involved defining the target behaviour using the target, action, context and time (TACT) principle (Francis, Eccles, Johnston, et al., 2004). The TACT principle enables all items to have the same level of generality. In the current study, the target is the Malaysian population,

the action is maintenance of physical activity, the context is physical activity and the time is about 1 year, which was the period of data collection for this study.

4.3.2 Stage 2: Elicitation study (QS1A)

4.3.2.1 Introduction

This aim of the elicitation study was to identify the common behavioural beliefs about physical activity shared by the target population.

4.3.2.2 Sampling

The population of this elicitation study was Malaysian people living in Liverpool. Participants for the elicitation study were recruited from the Malay Speaking Circle Liverpool (MSCL) group and LJMU students. MSCL are a social group comprising students and working people from Malaysia living in Liverpool. Emails with information about the study were sent to MSCL and posters were displayed throughout LJMU facilities advertising the study. Malaysian students from Tunku Abdul Rahman University College who came to LJMU for their summer semester studies provided an additional pool of potential participants for this study.

4.3.2.3 Participants

Twenty people responded to the researcher's invitation and subsequently participated in the elicitation study. Brief demographic details of the participants are presented in Table 8.

Table 8: Demography details of the participants

Gender	Male	14
	Female	6
Ethnicity	Malay (indigenous)	13
	Chinese	6
	Indian	1
Status	Student (undergrads)	3
	Post-graduate (Master)	2
	Post-graduate (PhD)	12
	Shop Manager	1
	Consultant Architect	1
	Odd job/part-time	1

A sample size of 25 people was suggested by Francis, Eccles, Johnston, et al. (2004), however, this may vary according to the sampling method or if data saturation has been achieved. In the present elicitation study, no new information was obtained from the first 20 respondents and therefore the researcher decided to stop the recruitment of participants. This is also consistent with the findings of Guest, Bunce, and Johnson (2006), where it was suggested that saturation started to occurs from 12th participants onward in a homogeneous group.

The ethnic composition of the sample also mirrored the demographic characteristics of the Malaysian population. According to the Malaysian census of 2010 (Malaysia, 2010), the Malaysian population comprised 67.4% indigenous followed by Chinese at 24.6% and Indian at 7.3%. Thus, the researcher can conclude that the sample representation, as far as ethnicity is concerned, was fair and justified.

4.3.2.4 Interview questions/topic list

The researcher conducted the interviews according to a topic list. The topic list was developed based on elicitation study material in the protocol. The supervisory team was consulted over the topic list and the finalised questions were submitted for ethical review to ensure that they were appropriate and non-intrusive (see Appendix 12).

4.3.2.5 Procedure

All participants who responded to the adverts were sent an email inviting them to attend an interview at a specific time, date and venue. The initial intention was to hold a focus group discussion session; however, the respondents could not agree on a mutually convenient time and venue. As a result, the researcher conducted one-to-one interviews (7 sessions) and one-to-two interviews (6 sessions) and one-to-three interviews (1 session) with the participants. The researcher conducted a total of 13 interviews which were between 15 and 45

minutes' duration, of which eight were in English and five in Malay. The language used to conduct the individual interviews was chosen by the participants.

All interviews were conducted after the participant read the PI sheet and signed the consent form. During each interview, participants were asked whether they were in favour of doing physical activity in Malaysia and in the UK (attitude), the social pressure put upon them (SN) and whether they felt in control of doing physical activity (PBC). As the interview were semi-structured, the participant could expand the topics in more detail. All interviews were recorded and transcribed verbatim and the content was analysed later into themes. (Refer to Appendixes 13, 14 and 15 for sample of email to participants, PI sheet and consent form respectively).

4.3.2.6 Ethical Consideration

At the onset of the study, participants received information outlining the nature of the study and the basis of their voluntary participation. Participants were provided with a PI sheet and consent form with reasonable time to fill them in prior to starting the study process. Ethical approval was gathered from the LJMU Ethics Committee on 2 August 2012 with Reference number 12/NSP/042.

4.3.2.7 Results

Transcriptions were content analysed to identify the most prevalent themes generated (Francis, Eccles, Johnston, et al., 2004). Responses were examined to identify beliefs related to the study before they were classified as themes according to TPB constructs which were attitudes, SN and PBC. These beliefs or themes were then listed in order of most frequently mentioned to least frequently mentioned (Francis, Eccles, & Johnston, 2004). The results of the content analysis are presented in Table 9:

Table 9: Frequencies of themes mentioned by participants

Constructs		Themes	Frequency
Attitude	Advantages	Body image	7
		Healthy	7
		Fresh	6
		Fit	6
		Energetic	4
		Relax	2
		Mental	2
		Blood Circulation	2
		Heart/cardiovascular	2
		Satisfaction	1
		cheerful	1
		happy	1
		Light	1
		Self-esteem	1
		Long life	1
	Disadvantages	Injury	5
		Sweat	5
		Tired/exhausted	4
		Pain	1
		Waste time	1
Subjective norms		Friend	12
		Family	5
PBC	Facilitating factors	Coach	6
		Reward	6
		Cost/Facility provided free	3
		Good facility	2
		Enjoyable	1
	Barriers	Time	12
		Hot/warm weather	10
		Safety/criminal activity	8
		No mood/lazy	5
		chargeable facility	4
		coach	1
		pain	1
		Sports gear	1

4.3.2.8 Discussion

The objectives of this study were to identify the beliefs held by Malaysians to participate in physical activity. A range of positive and negative attitudes was

derived from the participants about physical activity. The most mentioned advantages of physical activity were body image and health, while the most mentioned disadvantages were injury and sweat. Frequent exercise is known to contribute to better body image and health (Korn, Gonen, Shaked, & Golan, 2013) and, as all of the respondents were adults, vanity and health seemed to be the most important issues to them. Injury is a common problem from doing physical activity and sweating is a disadvantage that goes in line with another frequently mentioned barrier, hot weather.

The results had several similarities to a review by Downs and Hausenblas (2005a) which identified a theme for behavioural advantages, such as improving physical fitness/conditioning-muscle tone, flexibility, strength, keep fit, get or stay in shape (89.5%) and feel healthy, better or good about self (68.4%), pain and injury (73.7%) and psychological problem/stress (21.1%). These compare to themes such as body image, healthy, fresh and fit, pan and injury in the present study.

In regard to SN, friends seemed to be the most influential factors in getting participants of the current study to participate in physical activity. The participants preferred to participate in physical activity with friends rather than doing it alone.

Five themes were generated for the facilitating factors and eight themes for barriers to participating in physical activity. The most mentioned facilitating theme was preference to participate in physical activity when a coach (trainer) and rewards were provided. In term of barriers, time and hot weather climate seemed to prevent the participants from joining physical activity programmes. Most participants seemed to prefer to join a structured physical activity programme with a coach; this would assist in reducing the risk of injury from physical activity because people who receive coaching on how to exercise in the correct way would be less likely to injure themselves. All participants were either students or lecturers furthering their studies at postgraduate level, and not being able to find time to exercise was the most mentioned reasons for not participating in physical activity.

Downs and Hausenblas (2005b) found that convenience (47.1%) and pleasure (35.3%) were dominant facilitating factors while social support (having exercise partner, support and encouragement, peers, contest, incentives) came third at (29.4%). In contrast, the current findings indicated that the facilitating factors of social interaction and structured programme (where people exercise in groups) were the most mentioned.

4.3.3 Stage 3: Construction of questionnaire

All 52 items in component 2 were constructed in English. Direct items asked about attitude, SN and PBC whereas indirect items focused on the behavioural beliefs and outcome evaluation relating to each belief.

As recommended by Francis, Eccles, Johnston, et al. (2004), themes representing 75% of participants beliefs were included in the final TPB questionnaire. Table 10 shows the themes that were included in the questionnaire for attitudes, subjective norms and PBC.

Table 10: Themes to be included in the TPB questionnaire

Attitude	**Subjective norms**	**PBC**
Body image	Friends	Coach
Healthy	Family	Reward
Fresh		Facility provided free/subsidized
Fit		Time
Injury		Hot/warm weather
Sweat		Safety/criminal activity

The scoring of the questionnaire involved the multiplication of: the relevant behavioural beliefs with outcome evaluation, control beliefs with control beliefs power, and normative beliefs with motivation to comply. The participants rated their responses to items under behavioural beliefs, control beliefs and normative beliefs on a Likert scale of 1 to 7 and they rated their responses to outcome evaluation, control beliefs power and motivation to comply on a Likert scale of −3 to +3. An example of the multiplication is presented in Figure 9 (For scoring key, refer to Appendix 16.)

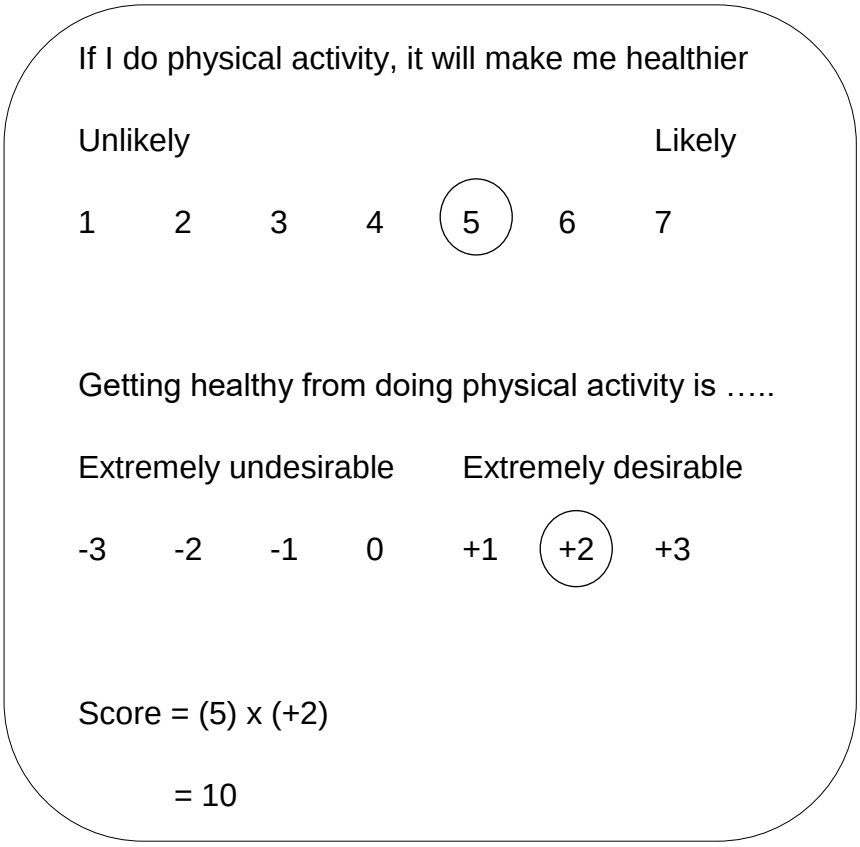

Figure 9: Example of scoring procedure for TPB indirect measure questions

4.3.4 Stage 4: Piloting of questionnaire

4.3.4.1 Introduction

Piloting the questionnaire enabled ambiguities to be corrected and to check that the questionnaire was asking the right questions and appropriate response options were provided. The piloting process of the questionnaire was carried out using the cognitive interview approach and appropriate amendments were made to the questionnaire based on the responses received (Francis, Eccles, Johnston, et al., 2004).

4.3.4.2 Procedure

Cognitive interviews were used to test the validity and reliability of the questionnaire. The cognitive interview technique (think-aloud) is used to assess how people approach the task of completing questionnaires. The cognitive interview was used to reveal any problems relating to comprehension, such as inability to understand terminology and variability in interpreting key terms

(French et al., 2007). In the “think-aloud” interviewing method, participants are asked to verbalise all the thoughts they are thinking in response to a particular question (Carbone, Campbell, & Honess-Morealle, 2002). (For PI sheet and consent form for questionnaire validation, refer to Appendixes 17 and 18.)

The participants for the think-aloud study were 10 volunteers from the same population as the elicitation study. All were Malaysians living in Liverpool, aged between 22 and 47 years; five of the participants were males and five were females. Out of the 10 participants, 6 participated in the earlier elicitation study. Participants were asked to complete the draft TPB questionnaire concerning physical activity while “thinking-aloud”. All interviews were carried out in English and all participants agreed to be audio recorded while the process took place.

4.3.4.3 Validity of the questionnaire

At the end of the think-aloud interview, participants commented on the clarity, difficulty, ambiguity, layout and cultural appropriateness of the questionnaire. Amendments were made alongside the interview process based on the comments received and the supervisory team were consulted afterwards. The process continued until no new issues were identified at the 10th participant; therefore, the researcher assumed that content and face validity was obtained.

4.3.5 Stage 5: Translation of questionnaire

4.3.5.1 Introduction

The original questionnaire was developed in English but intended for use in Malaysia. The translation process from English to Malay language was carried out following the recommendation for cross-cultural adaptation of health measures (Beaton, Bombardier, Guillemin, & Ferraz, 2000).

4.3.5.2 Procedure

The translation went through a five stage process which was translating, synthesising, back-translating, review and pre-testing. Each translation process was carried out by a different translator. The questionnaire was first translated into Malay language by two translators. Both translators were Malaysians

studying at postgraduate level in the UK and one of the translators was a Malay and native speaker of the Malay language.

The two translated versions (named T1 and T2) were later compared and synthesised to identify any discrepancies. The corrected version (T1-2) was then sent for the back-translation process to be completed.

The back-translation process was carried out by a further two different translators. The criteria for the selection of the two translators were proficiency in the Malay language and spoken English as their mother tongue as per the recommendation of the guideline; however, these criteria could not be fulfilled because the researcher could not find translators of such quality. As such, the translation was carried out by two translators who were proficient in both Malay and English and held a postgraduate degree of education from UK universities. Both back-translated versions (BT1 and BT2) were then compared with each other as well as with the original English copy to identify discrepancies. Appropriate corrections were made to T1-2 again.

The translated questionnaire was then reviewed by a committee comprising the supervisory team. The review process involved checking all translations (T1, T2, BT1, BT2 and T1-2) and developing the final version of the questionnaire.

The final version of the questionnaire was then pre-tested with five respondents as per recommendation of Francis, Eccles, & Johnston (2004). As no further issues were identified from the pre-testing, the content and face validity for the Malay language version were therefore deemed acceptable.

4.3.6 Internal consistency

Using data from Time 1 to Time 4, the internal consistency for direct measures and test-retest reliability was assessed. Cronbach's alpha was used to examine the internal consistency and intra-class correlation for test-retest reliability. Table 11 shows the results of the analyses.

Table 11: Internal consistency of TPB direct measures from Time 1 to Time 4

Factors/Constructs	Time 1	Time 2	Time 3	Time 4
Behavioural intention	.90	.94	.95	.88
Attitude Direct Measure	.81	.90	.88	.84
PBC Direct Measure	.34	.53	.63	.58
SN Direct Measure	.32	.79	.65	.70

The results showed that the alpha co-efficient of all variables was greater than .6 except for PBC direct measure at Time 1, Time 2, Time 4 and SN direct measure at Time 1. Although the alpha values of PBC and SN direct measure started low at Time 1, they increased at Time 2 and at Time 3 both measures were above the acceptable threshold of .6. At Time 4, the PBC direct measure showed a minor decrease in the alpha value.

Values for alpha as low as .5 have been suggested by some early researchers (Field, 2013); however, Nunnaly (1978, 1988) indicated that for newly developed measures, it can be accepted with an alpha value of .60. Considering the present study involved a new measure used in a new culture, a cut-off value of .6 for alpha coefficient was adopted.

Acceptable reliability was found for the direct measures of intention and attitude. The PBC and SN had lower reliability; however, Landis and Koch (1977) suggested that reliability above 0.41 can be considered acceptable and should not be disregarded. Except for Time 1, all reliability values for PBC and SN were above 0.41 of Cronbach's alpha value. The reliability was not calculated for indirect measures as the specificity of these items was not compatible with the principles associated with an external reliability test (Armitage & Conner, 1999) since they were generated from a specific sample pool.

4.3.7 Test-retest reliability

The test-retest reliability was assessed using Time 1 and Time 2 data using intra-class correlation coefficient (ICC). Table 12 shows the results of the analyses.

Table 12: Intra-class correlation coefficient of the TPB measure

Constructs	Time 1		Time 2		Average ICC
	M	SD	M	SD	
Intention	21.2	4.1	19.3	4.4	.84
Attitude Direct Measure	34.1	4.6	32.7	6.2	.84
Attitude Indirect Measure	21.0	3.6	20.5	3.7	.74
PBC Direct Measure	22.4	3.2	21.2	4.2	.64
PBC Indirect Measure	71.9	24.6	59.5	31.2	.65
SN Direct Measure	26.4	28.3	28.3	20.0	.68
SN Indirect Measure	63.0	29.8	47.0	32.5	.86

Note: M = median; SD = standard deviation; ICC = intra-class correlation coefficient

The ICC of the measure used in this study ranged from .64 to.86. The results showed the reliability was stable over time points and acceptable to be used on a repeated measures design study.

4.3.8 Factor analysis

Principal axis factoring was conducted on the 40 variables with orthogonal rotation (varimax) using data from Time 1 as it comprised the largest sample of participants (*n = 2*44). The Kaiser-Meyer-Olkin (KMO) measure verified the sampling adequacy for the analysis; the KMO was .803, which exceeded the recommended value of .6 (Kaiser, 1970; Kaiser, 1974). A Bartlett's test of sphericity reached statistical significance, supporting the factorability of the correlation matrix.

An initial analysis revealed the presence of 10 components with eigenvalues exceeding 1 and in combination explained 66.59% of the variance. However, an inspection of the scree plot showed an inflexion at the fourth and fifth component. It was decided to retain four factors as this had a better theoretical justification based on the TPB.

The four-component solution explained 45.14% of the variance, with component 1 contributing 20.37%, component 2 at 9.24%, component 3 at 8.33% and component 4 contributing 7.21%. (Refer to Appendix 19 for rotated factor matrix table.)

The results of the analysis showed that items measuring Intention and Attitude Direct Measure were mainly clustered in factor 1, items measuring SN were mainly clustered in factor 2, items measuring Attitude Indirect Measures were mainly

clustered in factor 3 and items measuring PBC Indirect Measures were mainly in factor 4.

Several cross-loadings were noticed such as 2.21 which was an item measuring PBC but loaded in factor 4 (PBC) at .333 but also loaded at factor 1 (intention and attitude direct measure) at .423. Item 2.9 × 2.16 and 2.6 × 2.13 which both measured attitude were loaded into factor 3 (attitude) at .399 and .353 but also loaded into factor 2 (SN) at .563 and .458, respectively. Item 2.22 that measured PBC was loaded at factor 4 (PBC) at .347 but also loaded at factor 3 (attitude) at .556.

4.4 Component 3 – WHOQOL-BREF

The WHOQOL-BREF (WHO, 1996) is a measure developed by the World Health Organization Programme on Mental Health. There are two versions of WHOQOL assessment: the WHOQOL-100 and the WHOQOL-BREF. The WHOQOL-100 has a 100 items while the WHOQOL-BREF is a shorter version with 26 items. The WHOQOL measures the an individual's perception of their position in life in the context of the culture and value system in which they live and in relation to their goals, expectations, standards and concerns (WHO, 1998). The measure was developed collaboratively in 15 cultural settings and field tested in 37 field centres.

The WHOQOL-100 was too lengthy for practical use and the WHOQOL-BREF provides a shorter but broad and comprehensive assessment of quality of life (WHO, 1996). Each question in the WHOQOL-BREF assesses one of the 24 facets contained in the WHOQOL-100. Two items measure overall quality of life and general health and the remaining 24 questions are classified into four domains.

There were 26 items in this questionnaire and the response format was based on Likert scale of 1 to 5. The scoring procedure involved first recoding for items numbered 3, 4 and 26. The next step involved computing the domain scores with the following formula:

Domain 1 = mean(Q3, Q4, Q10, Q15, Q16, Q17, Q18) x 4
Domain 2 = mean(Q5, Q6, Q7, Q11, Q19, Q26) x 4
Domain 3 = mean(Q20, Q21, Q22) x 4
Domain 4 = mean(Q8, Q9, Q12, Q13, Q14, Q23, Q24, Q25) x 4

Note: Domain 1 – Physical health
Domain 2 – Psychological
Domain 3 – Social relationship
Domain 4 – Environment

All scores were multiplied by 4 to be compatible with scores derived from the WHO QOL-100. For a more detailed calculation procedure, including syntax, refer to "WHOQOL-BREF Introduction, Administration, Scoring and Generic version of Assessment" (WHO, 1996).

4.4.1 Validity of the measure

The WHOQOL-BREF assessment was developed using two data sets to select items for inclusion with the first from 15 field centres who participated in the WHOQOL pilot study (WHOQO Group, 1998). The pilot study assessment contained 236 questions related to quality of life. The second data set included data from another 13 centres that field tested the WHOQOL-100. A further data set including data from five new centres was also used to test the adequacy of the items selected. Each field centre piloted the questionnaire on 300 adults. The sampling quota applied to each centre was age (50% below 45 years, 50% above 45 years), sex (50% male, 50% female) and health status (250 with disease/impairment, 50 well persons). Upon analyses, the items that correlated most highly with the total score were chosen to be included in the WHOQOL-BREF. The result of the domain scores from WHO QOL-100 and WHOQOL-BREF correlated highly from 0.89 to 0.95. The Cronbach alpha values for each domain score ranged from 0.66 to 0.84 demonstrating good internal consistency. The WHOQOL-BREF was also able to discriminate between a healthy respondent and someone diagnosed as having clinical condition. The test-retest reliability showed high correlation for individual items, from 0.56 to 0.84 as well as for domains, from 0.66 to 0.87. Overall, the WHOQOL-BREF is a valid and reliable alternative to the WHOQOL-100 in studies where quality of life is of interest.

The WHOQOL-BREF Malay language was translated into Malay language by Hasanah, Naing, and Rahman (2003) and a psychometric properties report was published in the *Medical Journal of Malaysia* in 2003. A sample of 200 participants

was recruited from Universiti Sains Malaysia's hospital based on convenient sampling comprising 40 healthy individuals, 40 individuals with hypertension, 40 individuals with diabetes, 40 individuals with epilepsy and 40 individuals with schizophrenia. The age of the respondents ranged from 29 to 70 years (mean = 39.4 years). The participants were asked to score the WHOQOL-BREF in Malay language. The mean score ranged from 3.14 to 3.98 with *SD* ranging from 0.56 to 1.10 indicating a good spread of scores around the middle portion of the 5-point Likert scale. No obvious floor or ceiling effect was noted. The correlation coefficient ranged from 0.51 to 0.80 except for Question 8 which was at 0.38 and Question 26 at 0.43. All domain scores also correlated significantly with the overall question scores (Questions 1 and 2). The Cronbach alpha values ranged from 0.64 to 0.80 and were comparable to the WHOQOL-BREF pilot study in Hong Kong. The test-retest reliability was reflected in ICC, which ranged from 0.49 to 0.88. To test the criterion validity, 100 respondents were asked to complete the WHOQOL-100 (Malay version) 2 weeks before rating the WHOQOL-BREF (Malay version). The Pearson correlation of the domain scores was 0.74 for physical domain, 0.66 for psychological domain, 0.67 for social relationship domain and 0.71 for environmental domain. The WHOQOL-BREF (Malay version) was also able to discriminate between a healthy person and a patient with a clinical condition. Factor analysis was carried out and the results showed that 20 out of 24 questions were regarded as being grouped in the correct factor. The findings from this paper showed that the psychometric properties of the WHOQOL-BREF (Malay version) were satisfactory.

4.4.2 Summary

The review of psychometric studies conducted on the WHOQOL-BREF showed that the measure is a valid and reliable tool to assess HRQOL in relation to physical activity among the general population.

4.5 Component 4 – ESE Scale

The ESE scale was designed by Bandura (1997) to measure exercise behaviour among patients with diabetes; this version has a Cronbach alpha value of .89

(Noroozi et al., 2011). The 18-item scale is calculated by summing up all scores to create a composite representing overall exercise self-efficacy (Cornick, 2015). The literature review on the studies conducted to assess the validity of the scale is as follows.

4.5.1 Validity of the ESE scale

The ESE scale was translated into the Korean language and validated by Shin et al. (2001). Shin et al. (2001) reported that 249 adults with chronic disease were recruited from hospitals or health centres in Korea with the age of respondents ranging from 18 to 79 years (mean age = 48.94 years). The sample consisted of patients with cardiovascular disease, respiratory disease, renal disease, gastrointestinal disease, diabetes mellitus and musculoskeletal disease. The Cronbach alpha value was .94 and the item-total correlation of all items was between .57 and .72. The test-retest reliability was .77 with 2-week interval. Factor analysis with rotation was performed and three sub-factors were found: Situational/Interpersonal (V11, V12, V13, V16, V17, V18), Competing demands (V4, V8, V10, V14, V15) and Internal feelings (V1, V2, V3, V5, V6, V7, V9).

The scale was assessed on its psychometric properties in a cardiac rehabilitation setting in Australia by Everett, Salamonson, and Davidson (2009). The study recruited 110 participants comprising 79 males and 31 females (mean age = 60.11 years) from cardiac rehabilitation services in western Sydney. In this study, the response format was modified from a 0 to 100 scale to a simpler version of 0 to 10. The mean score for the scale was 103.64 (*SD* = 34.69) with a median of 103.50 and skewness of 0.25 and kurtosis of 0.01. Using a 30% cut-off value, the scale did not demonstrate a floor or ceiling effect. Results from factor analysis showed that all items loaded highly into a single component with factor loading ranging from 0.63 to 0.87. The coefficient alpha was at 0.95 and item-total scale correlation ranged from 0.59 to 0.84. The study concluded that the scale was reliable and valid to be used as a measure in a cardiac rehabilitation population.

The ESE scale was translated into the Persian language to be used in Iran. The translated version was tested for reliability and validity by Noroozi et al. (2011) on 348 women with diabetes recruited from a diabetes institute in Iran. An exploratory

factor analysis (EFA) was performed and it found three sub-factors which accounted for 53.2% of total explained variance. The factors were Situational (V11, V12, V13, V16, V17, V18), Competing demands (V4, V8, V9, V10, V14, V15) and Internal feelings (V1, V2, V5, V6, V7). The study dropped item V3 as it loaded weakly under the level of .5. Another difference between this study and findings from Shin et al.(2001) was that item V9 was in Competing demands instead of Internal feelings. The result from CFA conducted on the 17 items revealed a good fit and the Cronbach alpha value was .92. The study found the Persian language version of the scale to be valid and reliable to be used among individuals with diabetes in Iran.

The first factor structure analysis of the ESE scale conducted on a healthy population was carried out by Cornick (2015). The study involved two samples: sample A consisted of 2,663 college students with ages ranging from 18 to 23 years (66.4% females, 33.6% males) and sample B consisted of 2,294 college students of age 18 to 25 years (66% female, 33.2% males). In this study, the scale was used with 0–10 response format. Analyses revealed strong correlation between item SE10 and S11 (sample A r = .96 and sample B r = .97) and a new composite was created as SE1011. An EFA showed that SE2 and SE1011 produced substantial loading on both factors and consequently these items were dropped. Examination of the remaining 15 items revealed two factors named as Emotional issues (SE2, SE1, SE3,SE4,SE8, SE9, SE13, SE16, SE17) and External influences (SE5, SE6, SE7, SE18, SE14, SE15). Further analyses using structural equation modelling (SEM) showed the bi-factor model to be a good fit. The study concluded that the measure should be interpreted at both general factor and sub-factor level of External influences and Emotional issues.

4.5.2 Summary

From the review of studies above, it can be suggested that the ESE (Bandura, 1977) is a reliable and valid measure to be used in the general population. This study will adopt the 18-item version with the simpler response format of 0–10 points.

4.6 Reliability of WHOQOL-BREF and ESE Scale

Cronbach's alpha was used to assess the reliability of the scales for the WHOQOL-BREF and ESE variables. As both were validated measures, only Cronbach's alpha was used to assess the reliability. Table 13 shows the results of the analysis.

Table 13: Reliability of WHOQOL-BREF and ESE Scale

Measures	Factors/Domains	Time 1	Time 2	Time 3	Time 4
WHO QOL - Bref	Physical Health	.80	.81	.83	.87
	Psychological	.75	.77	.81	.90
	Social Relationship	.75	.58	.72	.82
	Environment	.86	.83	.91	.93
ESE	Exercise Self-Efficacy Scale	.89	.95	.98	.95

The results of the reliability tests on WHOQOL-BREF assessment and the ESE scale exceeded .6 except for the Domain of Social Relationship at Time 2 (.58). However, the alpha coefficient value did not deviate far from the acceptable threshold and rounded up to .6 and thus was deemed acceptable.

Chapter 5

5.0 RESULTS – QUANTITATIVE STUDY

5.1 Introduction

Upon completion of the scoring procedure, the data were then ready for further univariate and bivariate analyses which were carried out using IBM SPSS Version 21. However, prior to the analyses, the data were subjected to preliminary examination or data cleaning process. This was followed by analysing the demographic characteristics of the participants and the descriptive data.

Having evaluated the descriptive statistic of the sample, the analyses of the physical activity behaviour were analysed using Cochran's Q test and one-way repeated measure ANOVA. The relationships between TPB, WHOQOL-BREF and ESE variables were analysed using a multiple regression technique. To allow for simultaneous regression and to estimate the causal relationship between and among variables, the SEM technique was used. In the SEM, a two-step approach was used: first, analysis of the TPB measurement structure and the structural relationship among variables using CFA technique; second, investigation of the structural relationships among variables with SEM model.

This chapter will outline the result of the quantitative analysis of questionnaire data. Questionnaires were distributed and collected from the participants at four time points throughout the main study as detailed in Table 14 below:

Table 14: Time point of data collection

Time Point	Date	*n*
Time 1	April – June 2013	244
Time 2	August – September 2013	134
Time 3	January – February 2014	119
Time 4	May – June 2014	105

5.2 Data Cleaning

The data cleaning involved a data screening exercise which included detecting and dealing with outliers, normality testing, missing value analysis and consideration of attrition.

5.2.1 Univariate outliers

The data were first checked for outliers by inspecting the boxplot for any extreme points (*) and “mild” outliers indicated with small circles (°). Extreme values were detected on variables Time 1 Generalised Intention for ID number 64 with value of 6 and it was winsorised with the nearest value of 8. Further checking with boxplot after winsorising the value did not show any extreme value. The next step was to check for “mild” outliers and to decide on measures to take on the outliers. These outliers were detected on the variables listed in Appendix 20.

To further check for outliers, the *z* score of all variables was obtained via SPSS descriptive analysis. None of the *z* scores was beyond the acceptable range of ±3.29 (Tabachnik & Fidell, 2013). (Refer to the Appendix 21 for the *z* score.)

5.2.2 Multivariate outliers

The multivariate outliers were pursued using Mahalanobis distance analysis. The maximum Mahalanobis values were compared against the relevant critical chi-square value. The cases listed under the casewise diagnostic were also checked together with the Cook’s distance value. Outliers that could potentially affect the overall result were removed from the analysis. (The outliers removed were listed in Appendix 22.)

5.2.3 Missing value

Non-response missing values were detected in the TPB, WHOQOL-BREF and ESE scale. Measures to handle missing values were provided in the WHOQOL-BREF manual (WHO, 1996), where, if the non-response was less than 20%, the item would

be replaced with the mean of the other items in the domain for that individual. Details of the inputted measures are shown in Appendix 23.

However, for the TPB and ESE scale data, replacement with the mean option was not used as it would change the variance structure within the data (Scheffer, 2002). Multiple imputations, a more robust technique, was used to deal with the missing values in the data.

5.2.4 Pattern of missing data on ESE scales

The ESE scale was an 18-item scales and in this study's questionnaire booklet, it was placed in the last position. Considerable numbers of missing values were noted on the replies for this questionnaire. The missing value pattern is detailed in Table 15.

Table 15: Missing data of self-efficacy scale from Time 1 to Time 4

	Time 1	Time 2	Time 3	Time 4
Total received /(n)*	244	134	119	105
Replied to ESE**	132	121	98	87
Missing ***	112	13	21	18
Monotone replies****	2	3	9	2
More than 20%*****	4	48	45	25

*Total replies received from participant for each time point
** Total participant who fill up the ESE scales
*** Total participant who did not fill up any ESE scales
**** Participant who gave monotone answers e.g value 5 for all items
***** Participants who fill up the ESE scales but had more than 20% missing value

At Time 1, around 46% (112 participants) failed to complete the ESE scale. There were two participants who gave monotone answers and two participants who had more than 20% of missing values. At Time 2, the "missing" participants were 10% (13 participants); out of all the Time 2 participants, 48 participants (40%) had more than 20% of missing values and 3 gave monotone answers. At Time 3, only 98 completed the ESE scale and of these, 45 participants had more than 20% of missing values and 9 participants gave monotone answers. At Time 4, there were 18 participants (17%) who did not fill-up the ESE scale; of Time 4 participants, 25 participants (29%) had more than 20% of missing values and 2 gave monotone answers.

5.2.5 Pattern of missing data on WHOQOL-BREF

A pattern was also noticed on the missing data for WHOQOL-BREF and Table 16 below presents the number of missing values for the data at each time point.

Table 16: Number of missing values for WHOQOL-BREF from Time 1 to Time 4

Time point	Item no.										
	21	**6**	**25**	**26**	**4**	**16**	**7**	**12**	**14**	**15**	**18**
Time 1	1	-	-	-	-	-	-	-	-	-	-
Time 2	6	1	1	-	-	-	-	-	-	-	-
Time 3	5	2	-	1	1	1	-	-	-	-	-
Time 4	2	1	1	-	-	-	1	1	1	1	1

Most of the missing values were from Item number 21 that asked about the sexual satisfaction of the participants.

5.2.6 Testing for normality

Tests for normality were performed on all variables at every time point by checking the kurtosis and skewness and the respective *z* score value (Kim, 2013) (The skewness and kurtosis value and the *z* score are shown in Appendix 24.) The *z* scores of the skewness and kurtosis values were checked for values outside the acceptable range of ±2.58, $p = .01$ (Hair, Black, Babin, & Anderson, 2013). Several values were noticed to be outside the range.

As the normality of the data is a fundamental assumption of all subsequent analysis in this study, it was imperative to further confirm the distribution of the data through visual inspection. The distribution of the variables was checked by examining the Q-Q plot for normality. Through the visual inspection, it was found that the distribution of the data could be considered normal. As such, the necessity for the data to be subjected to correction for normality bias was not necessary; this also means that the distribution of the data has satisfied the assumption of normality for further tests in this study.

5.2.7 Means and *SD* of the variables

The mean and *SD* of the TPB, WHOQOL-BREF and ESE are presented in Tables 17, 18 and 19. A noticeable pattern for TPB mean scores was a steady decrease from Time 1 to Time 3 and increase again at Time 4 with an exception for PBC indirect measure and SN indirect measure. The mean score for WHOQOL-BREF scale was fairly stable from Time 1 to Time 4. The mean score for the ESE scale decreased from Time 1 to Time 2 before a small increase at Time 3 and a small decrease at Time 4.

Table 17: Means, standard deviations and ranges of TPB construct

Variables	No. of item	Time 1 (*n* = 244)				Time 2 (*n* = 134)				Time 3 (*n* = 119)				Time 4 (*n* = 105)			
		Min	**Max**	**Mean**	***SD***	**Min**	**Max**	**Mean**	***SD***	**Min**	**Max**	**Mean**	***SD***	**Min**	**Max**	**Mean**	***SD***
Generalised Intention	4	6	28	21.21	4.05	8	28	19.31	4.44	10	28	18.04	4.43	10	28	19.87	3.32
Attitude DM	6	22	42	34.11	4.59	14	42	32.66	6.19	20	42	31.74	5.26	24	42	33.65	4.06
PBC DM	4	12	28	21.04	3.59	13	28	20.49	3.65	13	28	18.91	3.74	16	28	20.30	3.26
SN DM	4	16	28	22.38	3.18	13	28	21.19	4.15	13	28	20.76	3.50	17	28	22.39	2.56
Attitude InDM	14	-9	128	71.85	24.56	- 4	125	59.54	3.15	10	123	50.80	25.06	13	131	65.81	22.77
PBC InDM	18	56	148	26.39	28.31	-19	83	59.54	31.15	10	123	50.80	25.06	13	131	65.81	22.70
SN InDM	12	-26	126	63.03	2831	-2	126	46.95	32.45	4	126	48.45	30.26	13	126	64.37	24.55

Note : DM – direct measure InDM – indirect measure

Table 18: Means, standard deviations and ranges of the WHOQOL-BREF

Variables	No. of item	Time 1 (*n* = 244)				Time 2 (*n* = 134)				Time 3 (*n* = 119)				Time 4 (*n* = 105)			
		Min	**Max**	**Mean**	***SD***	**Min**	**Max**	**Mean**	***SD***	**Min**	**Max**	**Mean**	***SD***	**Min**	**Max**	**Mean**	***SD***
Domain 1	7	9.71	20	14.02	1.94	9.71	20	14.37	1.93	10.29	20	13.99	1.92	12	20	14.13	1.99
Domain 2	6	10	20	14.33	1.80	10	19.33	14.16	1.74	11.33	19.33	13.85	1.74	12	20	13.89	2.15
Domain 3	3	10.67	20	14.82	2.27	9.33	20	14.88	2.09	10.67	20	14.03	2.21	12	20	14.13	2.31
Domain 4	8	9.50	20	13.88	1.95	10	19.50	13.88	1.74	10.50	20	13.52	2.04	10.50	19.50	13.21	2.32
General Health	2	8	20	14.81	2.39	10	20	14.71	2.43	12	20	14.57	2.27	10	20	14.83	2.80

Table 19: Means, standard deviations and ranges of ESE scale

Variables	No. of item	Time 1 (*n* = 244)				Time 2 (*n* = 134)				Time 3 (*n* = 119)				Time 4 (*n* = 105)			
		Min	**Max**	**Mean**	***SD***	**Min**	**Max**	**Mean**	***SD***	**Min**	**Max**	**Mean**	***SD***	**Min**	**Max**	**Mean**	***SD***
ESE	18	28	146	94.07	18.32	18	164	71.97	26.56	30	159	79.69	23.13	37	158	71.04	25.72

5.2.8 Exploring the relationship between variables

Bivariate correlations were obtained for all TPB, WHOQOL-BREF and ESE scale variables. A Pearson's correlation test was carried out to determine the relationship between all variables in the study. Tests were carried out on a time point basis (refer to Appendix 25 for Pearson correlation table).

Firstly, a check on the association between Generalised Intention and all TPB variables and ESE scale showed a positive significant correlation at all four time points. This is important as in the TPB, Generalised Intention mediated the influence of all constructs on behaviour. At Time 1, the strongest correlation was between Generalised Intention and Attitude direct measure at $r(242) = 0.65$, $p < .0001$ and remained large in size through Time 2 to Time 4: (Time 2 $r(132) = .61$, $p < .0001$), (Time 3 $r(117) = .71$, $p < .0001$), (Time 4 $r(103) = .55$, $p < .0001$). Checks on the association between Generalised Intention and WHOQOL-BREF domain also showed significant correlation al time points except Social Relationship domain at Time 1.

The direct measures also showed a moderate to strong and positive correlation with each other from Time 1 to Time 4. This suggests that the higher the score on one of the constructs, the higher the score on two of the other direct measures constructs. A similar pattern of relationship was found for indirect measures with moderate to strong correlations. This is consistent with TPB where attitude, PBC and SN influence behaviour via intention in a positive relationship. Next, each direct measure was checked against the indirect measure of the same construct (Francis, Eccles, Johnston, et al., 2004) and results showed a significant relationship with the exception of PBC direct–indirect measure at Time 1 and Time 4.

As for the WHOQOL-BREF domains, results showed a strong and positive correlation between domains. This also suggests that the higher the score on one of the domains, the higher the score of all other domains. This pattern is also consistent with the underlying concept of the WHOQOL in which all of its domains contribute to quality of life (The WHOQOL Group, 1995).

5.3 Analysis of Physical Activity Behaviour

Table 20 describes the physical activity by level of intensity at each time point for all participants.

Table 20: Frequency table of level of intensity from Time 1 to Time 4

Time point	Light intensity		Moderate intensity		Vigorous intensity	
	No	Yes	No	Yes	No	Yes
Time 1	90	148	46	192	121	117
Time 2	13	117	28	102	79	52
Time 3	33	85	14	104	79	40
Time 4	5	100	25	79	73	31

The results from participants who provided data at each time point were examined to check for differences over time. As all data were categorical, Cochran's Q test was used to determine any differences. Table 21 below present the results of the Cochran Q test on the level of intensity of exercise conducted by the participants.

Table 21: Cochran's Q-test result on level of intensity of physical activity

Time point	Light Intensity		Moderate Intensity		Vigorous Intensity	
	No	Yes	No	Yes	No	Yes
Time 1	60	33	15	77	73	20
Time 2	8	85	21	71	70	23
Time 3	32	61	14	78	73	20
Time 4	5	88	24	68	69	24
n	93		92		93	
Cochran's Q	100.78		5.24		2.10	
df	3		3		3	
Sig.	.000**		.155		.553	

Note: $p < .0001$ $^{*}p < .05$

From the analysis presented, statistically significant differences were evident for light intensity of exercise. There are differences in the proportion of participants carrying out light-intensity activities from Time 1 to Time 4 whereby light intensity activity

increased. The test result for both moderate and vigorous intensity revealed no significant difference from Time 1 to Time 4.

5.3.1 Changes in days spent on activity for the past 7 days according to type of intensity

For each activity participants stated they carried out in the last 7 days, they also reported the number of days they did the activity. The data for each type of activity was summed and a mean value calculated. Table 22 below describes the days spent on physical activity by all participants for each time point.

Table 22: Frequency table of days spent on physical activity

Time point	Light Intensity		Moderate Intensity		Vigorous Intensity	
	Total Days	Mean Days	Total Days	Mean Days	Total Days	Mean Days
Time 1	971	4.39	1351	6.11	277	1.25
Time 2	486	5.17	518	5.76	139	1.17
Time 3	537	4.79	682	6.26	110	0.96
Time 4	919	9.01	961	9.61	129	1.26

Subsequently, one-way repeated measures ANOVAs were performed to establish any difference in days spent on physical activities from Time 1 to Time 4. The results are presented in Table 23 as follows.

Table 23: Descriptive statistics for days spent in physical activity

Time point	Light intensity			Moderate intensity			Vigorous intensity		
	n	Mean days	*SD* days	*n*	Mean days	*SD* days	*n*	Mean days	*SD* days
Time 1	63	2.73	4.57	55	5.24	6.43	83	.73	1.79
Time 2	63	4.57	3.83	55	4.44	5.49	83	.55	1.35
Time 3	63	3.57	4.53	55	4.95	4.23	83	.52	1.27
Time 4	63	8.95	4.15	55	7.09	5.58	83	.99	2.23
Wilks' Lambda	.386			.820			.921		
Sig	.000**			.015*			.085		

Note: ** $p < .0001$ *$p < .05$

There was a significant effect for time on days spent on light-intensity activities (Wilks' lambda = .386, F (3,60) = 31.83, $p < .001$, $\eta^2 = .61$) and moderate-intensity activities (Wilks' lambda = .820, F(3,52) = 3.81, $p < .05$, $\eta^2 = .18$). There were changes in the mean number of days spent on activities categorised as light and moderate intensity among the participants from Time 1 to Time 4. As for vigorous intensity, the result indicated that there was no significant effect for time.

5.3.2 Changes in minutes spent on activity for the past 7 days according to type of intensity

Participants also stated the duration they spent in minutes for the activities they performed in the last 7 days. Again, mean scores for this were computed as presented in Table 24.

Table 24: Frequency table of minutes spent on physical activity

Time point	Light Intensity		Moderate Intensity		Vigorous Intensity	
	Total Minutes	Mean Minutes	Total Minutes	Mean Minutes	Total Minutes	Mean Minutes
Time 1	19206	63.27	13539	63.27	10985	49.71
Time 2	6695	81.65	8319	90.42	6605	58.97
Time 3	4963	45.12	7257	69.78	4665	41.65
Time 4	22310	218.73	14910	150.61	4880	43.50

A one-way repeated measures ANOVA was conducted to explore whether there were significant differences in terms of time spent on the activity. The results were as per Table 25.

Table 25: Descriptive statistics for minutes spent on physical activity by intensity

Time point	Light intensity			Moderate intensity			Vigorous intensity		
	n	**Mean minutes**	***SD* minutes**	***n***	**Mean minutes**	***SD* minutes**	***n***	**Mean minutes**	***SD* minutes**
Time 1	52	35.10	62.01	59	64.76	128.46	81	38.46	99.72
Time 2	52	68.85	66.20	59	77.95	109.80	81	38.21	106.59
Time 3	52	34.04	49.89	59	56.54	74.44	81	27.59	71.49
Time 4	52	207.69	199.27	59	154.68	159.49	81	37.04	94.48
Wilks' Lambda	.511			.776			.982		
.Sig	.000**			.003*			.691		

Note: ** $p < .0001$ *$p < .05$

Table 25 presents a summary of the minutes spent on physical activities for the past 7 days from Time 1 until Time 4. A one-way repeated measures ANOVA demonstrated a significant effect for time for light intensity (Wilks' lambda = .511, $F(3,49) = 15.63$, $p < .001$, $\eta^2 = .49$). Activities of moderate intensity also showed a significant effect of time (Wilks' lambda = .776, $F(3,56) = 5.38$, $p < .05$, $\eta^2 = .22$). Thus, there was a change in minutes spent performing moderate-intensity activities from Time 1 to Time 4. A pairwise comparison indicated that significant differences at $p < .05$ level occurred between Time 1 and Time 2 and between Time 3 and Time 4.

There was no significant difference of time for minutes spent on vigorous intensity in this study. Hence, it could be concluded that the participants did not change the amount of time they spent on performing vigorous activities from Time 1 to Time 4. Finding the right balance between duration and intensity is a challenging task since both factors have a potential negative impact on adherence (Ekkekakis, 2006) and perceived lack of time is consistently rated as a primary barrier to physical activity (Ekkekakis, 2006).

5.3.3 Changes to BMI

The participants were asked about their height and body weight at each time point. BMI was only obtained for participants who provided both readings. The BMI data were then separated into two groups, which were BMI in Time 1 as baseline and the

last BMI gathered (either Time 2, Time 3 or Time 4). Subsequently, a paired-samples *t*-test was conducted on the data.

Table 26: Paired samples statistic of BMI of the participants

	Mean	***n***	***SD***	**Std Error Mean**
Pair 1 Time 1 BMI	27.15	45	4.51	.67
Last BMI	27.41	45	4.86	.72

Table 26 above shows the mean, *SD* and standard error. Based on the test conducted, there was no significant difference in the BMI reading of the participants from Time 1 to the last BMI reading gathered ($t = -.45$, $df = 44$, $p = .659$).

5.4 Analysis of the Predictive Utility of TPB and ESE variables

Following preliminary analysis to check there were no violations of the assumption for regression, a series of hierarchical regressions were carried out to establish the impact of TPB and ESE variables on Intention. The analyses below report the predictive utility of TPB variables and in combination with ESE factors to predict intention to perform physical activity at various time points.

In predicting intention to perform physical activity, variables were entered sequentially to assess the significance of their unique contribution to the model. Direct measures of Attitude, SN and PBC were entered first to represent the basic TPB model. This was followed by the indirect measures of attitude, SN and PBC. The indirect components were entered at step 2 because they are perceived to have a more distal effect on intention and behaviour (Wang, 2015). As one objective of this study is to distinguish the predictive power of self-efficacy from PBC, the ESE was entered at step 3 to examine the contribution of ESE towards intention.

For this analysis, the TPB direct measures were entered at step 1, followed by TPB indirect measures at step 2, then finally ESE at step 3.

For the following regression analysis which involved TPB variables, the adjusted R^2 would be used as a measure of explained variance. The adjusted R^2 value was used

instead of R^2 as it produces an estimate closer to the population value (Hankins, French, & Horne, 2000). The analysis also has sufficient power for the expected effect size. To minimise the likelihood of a type 1 error, correction based on Bonferroni adjustment would be used where 0.05/7* = 0.007 (7* model tested using TPB and ESE variables). A maximum p = 0.007 would be used as the threshold for significance level.

5.4.1 Predictive utility of the TPB and ESE variables on Intention at Time 1 (*n* = 244)

A hierarchical regression was used to assess the ability of three TPB direct measures entered at step 1, TPB indirect measures at step 2 and ESE at step 3 to predict intention at Time 1. Table 27 presents the results from the analysis.

Table 27: Summary of hierarchical regression analysis for TPB and ESE variables predicting intention at Time 1

Variables	Model 1					Model 2					Model 3				
	B	**SE B**	**β**	**t**	**Sig.**	**B**	**SE B**	**β**	**t**	**Sig.**	**B**	**SE B**	**β**	**t**	**Sig.**
Att. direct	.61	.05	.67	12.53	.000*	.56	.05	.61	11.22	.000*	.54	.05	.60	11.03	.000*
PBC direct	-.10	.06	-.08	-1.59	.113	-.05	.06	-.04	-.77	.444	-.04	.06	-.03	-.63	.527
SN direct	.05	.07	.04	.70	.486	-.06	.07	-.04	-.79	.429	-.04	.07	-.03	-.54	.593
Att. indirect						.02	.01	.11	2.05	.042	.02	.01	.11	2.15	.033
PBC indirect						.01	.01	.08	1.49	.138	.01	.01	.07	1.31	.192
SN indirect						.02	.01	.11	1.76	.079	.01	.01	.09	1.56	.121
ESE											.03	.01	.11	2.34	.020
Adjust. R^2	.43					.46					.47				
R^2 change	.44					.04					.01				
F change	60.23					5.953 (Sig. F ch. < .001*)					5.487 (Sig. F ch.< .020)				
Sig.	*p* < .001*					*p* < .001*					*p* < .001*				

Note: * p< .007

5.4.1.1 Testing the assumption of multiple regression

Preliminary analyses were conducted to ensure no violation of the assumption. The tolerance values of all variables in step 1 to step 3 were above .10 (Pallant, 2010) and variance inflation factor (VIF) values were below 10, indicating no multicollinearity. Another sign of multicollinearity was the correlation values among the variables of above r = .9 (Pallant, 2010) and a check on the correlation tables shows that all variables were below this value. The scatterplot of the standardised residual did not show any systematic pattern to indicate homoscedasticity. The Durbin-Watson value was within the acceptable range of 1.5 < d < 2.5 indicating no auto-correlation in the data. The Mahalanobis distance values were lower than the critical value of chi-square of $\chi^2(7) = 24.32$, p = .001 and Cook's distance value was also below 1 indicating independence of the residual.

5.4.1.2 Predictive utility of TPB and ESE on Intention at Time 1 (step 1)

At step 1, the total variance explained by the model was 43%, $F(3,234) = 60.23$, p = .000. Only the Attitude variable was significantly associated with intention whereas PBC and SN showed no significant relation to intention.

5.4.1.3 Predictive utility of TPB and ESE on Intention at Time 1 (step 2)

At step 2, the total variance explained by the model was 46%, $F(6,231) = 35.00$, p = .000. The TPB indirect measure had added an additional variance of 4% but no variables made a significant contribution to the model. Again, only Attitude direct measure was significantly associated with Intention to perform physical activity.

5.4.1.4 Predictive utility of TPB and ESE on Intention at Time 1 (step 3)

After entry of the ESE at step 3, the total variance explained by the model as a whole was 47%, $F(7,230) = 31.37$, p = .000. The addition of ESE factor at step 3 did not make a significant change to the explained variance. In the final model only Attitude direct measure (beta = .60, p < .001) was significantly related with Intention. The other TPB variables and ESE were not significantly associated with intention.

5.4.2 Predictive utility of the TPB and ESE variables on Intention at Time 2 (*n* = 134)

A hierarchical regression was used again to examine the predictability of TPB direct measures entered at step 1, TPB indirect measures at step 2 and ESE at step 3 to predict intention at Time 2. Table 28 present the results from the analysis.

Table 28: Summary of hierarchical regression analysis for TPB and ESE variables predicting intention at Time 2

Variables	Model 1					Model 2					Model 3				
	B	**SE B**	**β**	**t**	**Sig.**	**B**	**SE B**	**β**	**t**	**Sig.**	**B**	**SE B**	**β**	**t**	**Sig.**
Att. direct	.373	.077	.503	4.827	.000*	.369	.080	.497	4.608	.000*	.360	.075	.485	4.820	.000*
PBC direct	.127	.112	.104	1.137	.258	.190	.120	.156	1.581	.116	.021	.118	.017	.175	.861
SN direct	.125	.098	.117	1.278	.203	-.016	.120	-.015	-.131	.896	-.096	.113	-.090	-.853	.396
Att. indirect						-.010	.014	-.067	-.688	.492	.008	.013	-.059	-.648	.518
PBC indirect						.010	.016	.048	.658	.512	.016	.015	.073	1.075	.284
SN indirect						.025	.014	.183	1.844	.068	.011	.013	.081	.845	.400
ESE											.063	.014	.374	4.492	.000*
Adjust. R^2	.431					.437					.511				
R^2 change	.444					.018					.075				
F change	34.36					1.45 (Sig. F ch. > .233)					20.18 (Sig. F ch.< .000*)				
Sig.	*p* <. 001*					*p* <. 001*					*p* <. 001*				

Note: * p< .007

5.4.2.1 Testing the assumption of multiple regression

Preliminary analyses were conducted to ensure no violation of the assumption of regression. The tolerance values of all variables in both step 1 and step 2 were above .10 and VIF values were below 10, indicating no multicollinearity and the correlation among variables was below $r = .9$. A check on the scatterplot of the standardised residual also did not show any systematic pattern to indicate homoscedasticity. The Durbin-Watson value was within the acceptable range of $1.5 < d < 2.5$ indicating no auto-correlation in the data. The Mahalanobis distance value was lower than the critical value of chi-square of $\chi^2(7) = 24.32$, $p = .001$ and Cook's distance value was below 1 indicating independence of the residual.

5.4.2.2 Predictive utility of TPB and ESE on Intention at Time 2 (step 1)

At step 1, the total variance explained by the model was 43%, $F(3,129) = 34.36$, $p < .001$. Only Attitude direct measure variables were significantly related to intention; PBC and SN showed no significant relation to intention.

5.4.2.3 Predictive utility of TPB and ESE on Intention at Time 2 (step 2)

At step 2, the total variance explained by the model was 44%, $F(6,126) = 18.08$, $p < .000$. The addition of TPB indirect measures did not add any significant additional variance to the model. In the step 2 model, only Attitude direct measure was significantly related to intention.

5.4.2.4 Predictive utility of TPB and ESE on Intention at Time 2 (step 3)

After entry of the ESE at step 3, the total variance explained by the model as a whole was 51% $F(7,125) = 20.74$, $p < .001$. There was an additional 8% of the variance explained in Intention after controlling the TPB constructs (R^2 change = .075, F-change (1,125) = 20.18, $p < .001$. In the final Time 2 model, Attitude direct measure (beta = .49, $p < .001$) and ESE (beta = .37, $p < .001$) were significantly related to intention.

5.4.3 Predictive utility of the TPB and ESE variables on Intention at Time 3 (*n* = 119)

Hierarchical regression was carried out to determine the relationship between TPB variables entered at step 1, TPB indirect measures at step 2 and ESE at step 3 with Intention using Time 3 data. Table 29 presents the results from the analysis

Table 29: Summary of hierarchical regression analysis for TPB and ESE variables predicting intention at Time 3

Variables	Model 1					Model 2					Model 3				
	B	SE B	β	t	Sig.	B	SE B	β	t	Sig.	B	SE B	β	t	Sig.
Att. direct	.271	.069	.322	.910	.000*	.225	.071	.267	3.178	.002*	.225	.072	.267	3.116	.002*
PBC direct	.599	.105	.504	5.713	.000*	.546	.109	.459	5.012	.000*	.546	.112	.460	4.888	.000*
SN direct	.098	.082	.076	1.187	.238	-.047	.102	-.036	-.462	.645	-.047	.103	-.036	-.459	.647
Att. indirect						.029	.015	.164	1.943	.055	.029	.015	.164	1.932	.056
PBC indirect						.001	.014	.006	.082	.935	.001	.015	.006	.082	.935
SN indirect						.014	.011	.089	1.201	.233	.014	.012	.089	1.170	.245
ESE											.000	.014	.000	-.006	.995
Adjust. R^2	.639					.652					.649				
R^2 change	.649					.022					.000				
F change	67.68					2.42 (Sig. F ch. > .071)					0.00 (Sig F ch > .995)				
Sig.	*p* <. 001*					*p* <. 001*					*p* < .001*				

Note: * *p* < .007

5.4.3.1 Testing the assumption of multiple regression

Preliminary analyses were conducted to ensure no violation of the assumption of regression. The tolerance values of all variables were above .10 with VIF values below 10 and correlation between variables below r = .9 indicating no multicollinearity. A check on the scatterplot of the standardised residual also did not show any systematic pattern to suggest homoscedasticity. The Durbin-Watson was within the acceptable range of 1.5 < d < 2.5. The maximum Mahalanobis distance value was lower than the critical value of chi-square of $\chi 2(6) = 22.46$, $p < .001$ and the maximum Cook's distance value was below 1 indicating independence of the residual.

5.4.3.2 Predictive utility of TPB and ESE on Intention at Time 3 (step 1)

At step 1, the total variance explained by the model as a whole was 64%, $F(3, 110) = 67.68$, $p < .001$. Two variables, PBC and Attitude direct measures, were significantly related to Intention.

5.4.3.3 Predictive utility of TPB and ESE on Intention at Time 3 (step 2)

At step 2, the total variance explained by the model was 65%, $F(6,107) = 36.35$, $p < .001$. No significant change in explained variance was found with the addition of TPB indirect measure. In step 2 model, Attitude and PBC direct measures were found to make a significant contribution to the model.

5.4.3.4 Predictive utility of TPB and ESE on Intention at Time 3 (step 2)

After entry of the ESE at step 3, the total variance explained by the model as a whole was still at 65% $F(7,106) = 30.87$, $p < .001$. The addition of ESE at step 3 similarly did not make any significant changes to the explained variance. In the final Time 3 model, variables with significant relationship with Intention were Attitude direct measure (beta = .27, $p < .001$) and PBC direct measure (beta = .46, $p < .001$).

5.4.4 Predictive utility of the TPB and ESE variables at Time 4 (*n* = 105)

Hierarchical regression was carried out to determine the relationship between TPB direct measure entered at step 1, TPB indirect measures at step 2 and ESE at step 3 with intention to perform physical activity at Time 4. Table 30 presents the results from the analysis.

Table 30: Summary of hierarchical regression analysis for TPB and ESE variables predicting intention at Time 4

Variables	Model 1					Model 2					Model 3				
	B	SE B	β	t	Sig.	B	SE B	β	t	Sig.	B	SE B	β	t	Sig.
Att. direct	.360	.070	.445	5.104	.000*	.223	.069	.276	3.217	.002*	.272	.075	.336	3.623	.000*
PBC direct	.164	.096	.169	1.713	.090	.270	.085	.277	3.184	.002*	.162	.107	.166	1.512	.134
SN direct	.314	.116	.256	2.702	.008	.258	.122	.210	2.115	.037	.196	.127	.159	1.544	.126
Att. indirect						.046	.016	.319	2.815	.006*	.051	.017	.355	3.101	.003*
PBC indirect						.053	.011	.360	4.751	.000*	.044	.012	.301	3.605	.001*
SN indirect						-.055	.013	-.422	-4.317	.000*	-.056	.013	-.429	-4.426	.000*
ESE											.019	.011	.148	1.620	.109
Adjust. R^2	.551					.680					.686				
R^2 change	.565					.135					.008				
F change	41.16					13.78 (Sig. F ch. < .000*)					2.62 (Sig. F ch. < .109)				
Sig.	*p* < .001*					*p* < .001*					*p* < .001				

Note: * *p* < .007

5.4.4.1 Testing the assumption of multiple regression

Preliminary analyses were conducted to ensure no violation of the assumption of regression. The tolerance values of all variables were above .10 and VIF values were below 10 (Pallant, 2010). The correlation among variables was also below *r* = .9 (Pallant, 2010). A check on the scatterplot of the standardised residual also did not show any systematic pattern, which indicated no homoscedasticity. The Durbin-Watson value was within the acceptable range of 1.5 < d < 2.5 indicating no auto-correlation in the data. The maximum Mahalanobis distance values were lower than the critical value of chi-square of $\chi 2(7) = 24.32$, $p < .001$ and Cook's distance value was below 1 indicating independence of residual.

5.4.4.2 Predictive utility of TPB and ESE on Intention at Time 4 (step 1)

At step 1, the total variance explained by the model as a whole was 55%, $F(3,98) = 41.16$, $p < .001$. Attitude was significantly related to intention. PBC and SN showed no statistical significant relationship with intention.

5.4.4.3 Predictive utility of TPB and ESE on Intention at Time 4 (step 2)

After entry of the TPB indirect measures at step 2, the total variance explained by the model as a whole was 68% $F(6, 92) = 35.78$, $p < .001$. The indirect measures variables when added explained an additional 14% of the variance explaining Intention, after controlling for TPB variables (R^2 change = .135, *F*-change (3,92) = 13.78, $p < .001$). In the step 2 model, five variables were significantly related to Intention; they were PBC Indirect with the largest Beta values (.360) followed by PBC direct, Attitude direct, SN direct and SN indirect.

5.4.4.4 Predictive utility of TPB and ESE on Intention at Time 4 (step 3)

After entry of the ESE at step 3, the total variance explained by the model as a whole was still at 67% $F(7,91) = 31.58$, $p < .001$. The ESE did not make any significant contribution to the variance explained by the model. In the final Time 3 model, four variables were significantly associated with Intention, which were Attitude direct (beta = .34, $p < .001$), Attitude Indirect (beta = .36, $p < .001$), PBC indirect (beta = .30, $p < .001$) and SN indirect measures (beta = -.43, $p < .001$).

5.5 The Predictive Utility of TPB Variables on Future Intention

This study also explored the utility of TPB constructs in predicting future intention to engage in physical activity. This analysis was performed by using the TPB direct measures entered at step 1 and indirect measures entered at step 2 to predict the Intention of the next time point. Three models were produced and are presented as below.

5.5.1 The predictive utility of Time 1 TPB variables to predict Time 2 Intention

A hierarchical regression was used to predict the Intention to perform physical activity at Time 2 using Time TPB constructs. The TPB direct measures were entered at step 1 and TPB indirect measures entered at step 2. Preliminary analyses were conducted to ensure no violation of the assumption of normality, linearity, multicollinearity and homoscedasticity. Table 31 presents the results from the analysis.

Table 31: Summary of standard multiple regression analysis for Time 1 TPB variables predicting intention at Time 2

Variables	Model 1					Model 2				
	B	**SE B**	**β**	**t**	**Sig.**	**B**	**SE B**	**β**	**t**	**Sig.**
Attitude	.027	.087	.028	.315	.753	.027	.086	.028	.318	.751
PBC	.455	.109	.369	4.178	.000*	.500	.108	.405	4.639	.000*
SN	.084	.119	.061	.704	.483	.068	.126	.049	.540	.590
Att. Indir.						-.012	.016	-.063	-.719	.473
PBC Indir						-.046	.014	-.297	-3.338	.001*
SN Indir						.039	.015	.258	2.588	.011
Adjust. R^2	.139					.211				
R^2 change	.159					.089				
F change	7.961					4.841 (Sig. F ch. < .003*)				
Sig.	$p < .001$*					$p < .001$*				

Note: *$p < .007$

5.5.1.1 The predictive utility of Time 1 TPB variables to predict Time 2 intention (step 1)

A multiple regression was used to assess the ability of TPB constructs of Time 1 to predict intention in Time 2. The total variance explained by the model as a whole was 14%, $F(3,126) = 7.96$, $p < .001$. Results showed that only PBC was statistically significant at step 1. Both Attitude and SN were not statistically significant.

5.5.1.2 The predictive utility of Time 1 TPB variables to predict Time 2 intention (step 2)

After entry of the TPB indirect measures at step 2, the total variance explained by the model as a whole was 21%, $F(6, 123) = 6.77$, $p < .001$. The TPB indirect measures, when added, explained an additional 9% of the variance explaining Intention after controlling for TPB direct measures, R^2 change = .089, F-change (3,123) = 4.84, $p < .001$. In the final model, two variables were significantly related to Intention, which were PBC direct measure (beta = .41, $p < .001$) and PBC indirect measures (beta = −.30, $p < .001$).

5.5.2 The predictive utility of Time 2 TPB variables on Time 3 Intention

The analysis continued by assessing the predictive utility of Time 2 TPB variables in predicting intention at Time 3. Preliminary analyses were conducted to ensure no violation of the assumption of normality, linearity, multicollinearity and homoscedasticity. Table 32 presents the results from the analysis.

Table 32: Summary of standard multiple regression analysis for Time 2 TPB variables predicting intention at Time 3

Variables	Model 1					Model 2				
	B	**SE B**	**β**	**t**	**Sig.**	**B**	**SE B**	**β**	**t**	**Sig.**
Attitude	-.052	.090	-.071	-.584	.561	-.055	.092	-.075	-.601	.549
PBC	.465	.130	.383	3.583	.001*	.543	.138	.448	3.926	.000*
SN	.374	.114	.352	3.291	.001*	.202	.138	.190	1.462	.147
Att Indir						-.014	.016	-.097	-.864	.389
PBC Indir						.023	.019	.106	1.249	.214
Sn Indir						.028	.016	.207	1.803	.074
Adjust. R^2	.339					.354				
R^2 change	.356					.032				
F change	20.28					1.896 (Sig. F ch > .135)				
Sig.	*p* < .001*					*p* < .001*				

Note: *p* < .007

5.5.2.1 The predictive utility of Time 1 TPB variables to predict Time 2 Intention (step 1)

The total variance explained by the model as a whole was 34%, *F*(3, 110)=20.28, p<.001. Two variables that were significantly related to Intention were PBC and SN.

5.5.2.2 The Predictive Utility of Time 1 TPB variables to predict Time 2 Intention (Step 2)

After entry of the TPB indirect measures at step 2, the total variance explained by the model as a whole was 35%, *F*(6, 107) = 11.34, *p* < .001. No additional explained variance was found as a result of the addition of TPB indirect measures at step 2. In the final model, only the PBC direct measure (beta = .45, *p* < .001) was significantly related to intention.

5.5.3 The predictive utility of Time 3 TPB variables on Time 4 intention

A standard multiple regression was used to examine the utility of Time 3 TPB variables to predict intention at Time 4. Preliminary analyses were conducted to

ensure no violation of the assumption of normality, linearity, multicollinearity and homoscedasticity. Table 33 presents the results of the analysis.

Table 33: Summary of standard multiple regression analysis for Time 3 variables predicting intention at Time 4

Variables	Model 1					Model 2				
	B	**SE B**	**β**	**T**	**Sig.**	**B**	**SE B**	**β**	**t**	**Sig.**
Attitude	.167	.072	.268	2.328	.022	.171	.075	.273	2.274	.025
PBC	.163	.108	.188	1.501	.137	.173	.116	.199	1.493	.139
SN	.312	.088	.331	3.561	.001*	.219	.111	.232	1.976	.051
Att Indir						-.007	.016	-.053	-.429	.669
PBC Indir						-.001	.015	-.005	-.050	.960
Sn Indir						.021	.012	.193	1.747	.084
Adjust. R^2	.378					.379				
R^2 change	.398					.020				
F change	20.08					1.019 (Sig. F ch > .388)				
Sig.	*p* < .001*					*p* < .001*				

Note: *p* < .007

5.5.3.1 The predictive utility of Time 1 TPB variables to predict Time 2 intention (step 1)

The total variance explained by the model as a whole was 38%, *F*(3,91)=20.08, p<.001. The SN direct measure was significantly related to Intention at step 1.

5.5.3.2 The Predictive Utility of Time 1 TPB variables to predict Time 2 Intention (Step 2)

After entry of the TPB indirect measures at step 2, the total variance explained by the model as a whole was 38%, *F*(6, 88) = 1055, *p* < .001. The addition of TPB indirect measures at step 2 did not result in any significant changes in explained variance of intention. In the final model, none of the variables reached the significant threshold level of *p* < .007.

5.6 Analysis of the Relationship between TPB and Physical Activity Behaviour

A direct logistic regression was performed to assess the impact of TPB variables on the likelihood of engaging in light, moderate and vigorous-intensity physical activity. Based on previous literature, logistic regression had reliably distinguished the exercise behaviour of individuals involved in the study (Budden & Sagarin, 2007).

The TPB variables (Generalised Intention, Attitude direct measure, PBC direct measure and SN direct measure) were regressed against light, moderate and vigorous-intensity physical activity based on time points. To minimise the possibility of a type 1 error, correction based on Bonferroni adjustment would be used where 0.05/12* = 0.004 (12* model tested using TPB and physical activity behaviour). A maximum p = 0.004 would be used as the threshold for significance level. To enhance the validity of the results, residual analysis using Cook's distances, and studentised and standardised residuals were also conducted. The results of the analyses are presented below.

5.6.1 TPB variables predicting physical activity at Time 1 (n = 244)

Logistic regression was used to assess the ability of TPB constructs to predict the likelihood of performing light, moderate and vigorous-intensity physical activity for Time 1.

5.6.1.1 Light-intensity physical activity

Table 34 and 35 present the results of the analysis predicting likelihood of light-intensity by TPB variables for Time 1.

Table 34: Logistic regression predicting likelihood of light-intensity physical activity with TPB variables for Time 1

Variables	B	S.E	Wald	*df*	Sig.	Odd ratio	95% CI for Exp. (B)	
							Lower	Upper
Intention	-.141	.053	6.990	1	> .008	.869	.783	.964
Attitude	.086	.045	3.557	1	> .059	1.089	.997	1.190
PBC	.205	.046	20.011	1	< .001**	1.227	1.122	1.343
SN	.116	.051	5.146	1	> .023	1.122	1.016	1.240

Note: ** p < .004

Table 35: The Omnibus Test of Model Coefficient and Hosmer–Lemeshow Goodness of Fit Test for logistic regression of Time 1 TPB variables predicting light-intensity physical activity

Omnibus Test of Model Coefficient				Hosmer and Lemeshow Test			
Step 1	**χ^2**	***df***	**Sig.**	**Step**	**χ^2**	***df***	**Sig.**
Step	41.582	4	< .001**	1	6.734	8	> .566
Block	41.582	4	< .001**				
Model	41.582	4	< .001**				

Note: ** $p < .004$

The full model containing all predictors was statistically significant, χ^2 (4, n = 244) = 41.58, $p < .001$. This was supported by the Hosmer–Lemeshow goodness of fit test of $\chi2(8) = 6.73$, $p > .566$. This indicated that the model was able to distinguish between respondents who reported performing and not performing light-intensity physical activity. The model as a whole explained between 16.2% (Cox & Snell R^2) and 22.1% (Nagelkerke R^2) of the variance in performing light-intensity physical activity and correctly classified 62.6% of cases. Only PBC (Wald = 20.01, p = .000) variable made an individual significant contribution to the model with odds ratio of 1.23.

5.6.1.2 Moderate Intensity physical activity

Table 36 and 37 present the results of the analysis predicting likelihood of moderate-intensity by TPB variables for Time 1.

Table 36: Logistic regression predicting likelihood of moderate-intensity physical activity with TPB variables for Time 1

Variables	**B**	**S.E**	**Wald**	***df***	**Sig.**	**Odd ratio**	**95% CI for Exp. (B)**	
							Lower	**Upper**
Intention	.058	.053	1.184	1	> .276	1.060	.955	1.176
Attitude	-.026	.050	.273	1	> .601	.974	.882	1.075
PBC	-.024	.050	.221	1	> .638	.977	.885	1.078
SN	.152	.059	6.685	1	> .010	1.164	1.038	1.307
Constant	-1.705	1.721	.982	1	> .322	.182		

Note: ** $p < .004$

Table 37: The Omnibus Test of Model Coefficient and Hosmer–Lemeshow Goodness of Fit Test for logistic regression of Time 1 TPB variables predicting moderate-intensity physical activity

Omnibus Test of Model Coefficient				Hosmer and Lemeshow Test			
Step 1	**χ^2**	***df***	**Sig.**	**Step**	**χ^2**	***df***	**Sig.**
Step	9.010	4	> .061	1	6.160	8	> .629
Block	9.010	4	> .061				
Model	9.010	4	> .061				

Note: ** $p < .004$

The full model comprising of all TPB variables was statistically non-significant χ^2 (4, n = 244) = 9.010, p = .061, in predicting moderate physical activity for Time 1. The model was unable to significantly distinguish between participants who perform and did not performed moderate-intensity physical activity based on the data.

5.6.1.3 Vigorous intensity physical activity

Table 38 and 39 present the results of the analysis predicting likelihood of vigorous-intensity by TPB variables for Time 1.

Table 38: Logistic regression predicting likelihood of vigorous-intensity physical activity with TPB variables for Time 1

Variables	**B**	**S.E**	**Wald**	***df***	**Sig.**	**Odd ratio**	**95% CI for Exp. (B)**	
							Lower	**Upper**
Intention	-.140	.051	7.553	1	> .006	.869	.787	.961
Attitude	.088	.045	3.834	1	> .050	1.092	1.000	1.192
PBC	.261	.047	30.203	1	< .001**	1.298	1.183	1.424
SN	.097	.050	3.855	1	> .050	1.102	1.000	1.215

Note: ** $p < .004$

Table 39: The Omnibus Test of Model Coefficient and Hosmer–Lemeshow Goodness of Fit Test for logistic regression of Time 1 TPB variables predicting vigorous-intensity physical activity

Omnibus Test of Model Coefficient				Hosmer and Lemeshow Test			
Step 1	**χ^2**	**df**	**Sig.**	**Step**	**χ^2**	**df**	**Sig.**
Step	57.985	4	< .001**	1	10.609	8	>.225
Block	57.985	4	< .001**				
Model	57.985	4	< .001**				

Note: ** $p < .004$

The full model was statistically significant with $\chi^2(4, n = 244) = 57.99$, $p < .001$ and this was supported by the Hosmer–Lemeshow goodness of fit test of $\chi2(8) = 10.61$, $p > .225$. The whole model explained between 21.8% (Cox & Snell R^2)

and 29.1% (Nagelkerke R^2) of the variance in performing vigorous-intensity physical activity and correctly classified 51.3% of cases. Only PBC (Wald = 30.20, $p < .000$) made a significant individual contribution to the model with odds ratio of 1.30 (B = .261). This indicates that for every unit of score reported by a participant, they were 1.3 times more likely to report that they engaged in vigorous-intensity physical activity.

5.6.2 TPB variables predicting physical activity at Time 2 (*n* = 134)

Logistic regression was used to assess the ability of TPB constructs to predict the likelihood of performing light, moderate and vigorous-intensity physical activity for Time 2.

5.6.2.1 Light-intensity physical activity

The logistic regression for Time 2 TPB variables predicting light-intensity physical activity could not be carried out after removing cases that were reported as residual in the analysis. There were insufficient data to support the analysis due to missing values.

5.6.2.2 Moderate Intensity physical activity

Table 40 and 41 present the results of the analysis predicting likelihood of moderate-intensity by TPB variables for Time 2.

Table 40: Logistic regression predicting likelihood of moderate-intensity physical activity with TPB variables for Time 2

Variables	B	S.E	Wald	*df*	Sig.	Odd ratio	95% CI for Exp. (B)	
							Lower	Upper
Intention	.004	.062	.003	1	> .954	1.004	.888	1.134
Attitude	.037	.049	.589	1	> .443	1.038	.944	1.142
PBC	.033	.080	.165	1	> .684	1.033	.883	1.209
SN	-.057	.075	.575	1	> .448	.945	.816	1.094

Note: ** $p < .004$

Table 41: The Omnibus Test of Model Coefficient and Hosmer–Lemeshow Goodness of Fit Test for logistic regression of Time 2 TPB variables predicting moderate-intensity physical activity

Omnibus Test of Model Coefficient				Hosmer and Lemeshow Test			
Step 1	**χ^2**	***df***	**Sig.**	**Step**	**χ^2**	***df***	**Sig.**
Step	1.254	4	> .869	1	19.467	8	< .013*
Block	1.254	4	> .869				
Model	1.254	4	> .869				

Note: ** p < .004

The full model of TPB model predicting moderate intensity physical activity was not statistically significant $\chi^2(4, n = 134) = 1.254$, $p > .869$. The Hosmer–Lemeshow goodness of fit test was also significant, indicating a poor fit for this model.

5.6.2.3 Vigorous-intensity physical activity

Table 42 and 43 present the results of the analysis predicting likelihood of vigorous-intensity by TPB variables for Time 2.

Table 42: Logistic regression predicting likelihood of vigorous-intensity physical activity with TPB variables for Time 2

Variables	**B**	**S.E**	**Wald**	***df***	**Sig.**	**Odd ratio**	**95% CI for Exp. (B)**	
							Lower	**Upper**
Intention	.210	.071	8.647	1	< .003**	1.234	1.073	1.419
Attitude	-.124	.065	3.702	1	> .054	.883	.778	1.002
PBC	.241	.092	6.839	1	> .009	1.273	1.062	1.525
SN	.242	.079	9.309	1	> .002**	1.273	1.090	1.487

Note: ** p < .004

Table 43: The Omnibus Test of Model Coefficient and Hosmer-Lemeshow Goodness of Fit Test for logistic regression of Time 2 TPB variables predicting vigorous-intensity physical activity

Omnibus Test of Model Coefficient				Hosmer and Lemeshow Test			
Step 1	**χ^2**	***df***	**Sig.**	**Step**	**χ^2**	***df***	**Sig.**
Step	57.812	4	< .001**	1	13.959	8	> .083
Block	57.812	4	< .001**				
Model	57.812	4	< .001**				

Note: ** p < .004

The full model for TPB variables predicting vigorous-intensity physical activity was statistically significant, $\chi^2(4, n = 134) = 57.812$, p <.001 and this was supported by the Hosmer–Lemeshow goodness of fit test of $\chi2(8) = 13.959$,

p > .083. The whole model explained between 35.9% (Cox & Snell R^2) and 48.5% (Nagelkerke R^2) of the variance in performing vigorous-intensity physical activity and correctly classified 60.0% of cases. Two TPB variables made significant contribution to the model which were Intention (Wald = 8.647, *p* < .003) and SN (Wald = 9.309, *p* < .002). The variable which made the strongest predictor was SN (B = .242) with odds ratio of 1.273 indicating that for every unit score reported by a participant, they were 1.27 times more likely to report performing the a vigorous-intensity physical activity.

5.6.3 TPB variables predicting physical activity at Time 3 (*n* = 119)

Logistic regression was used to assess the ability of TPB constructs to predict the likelihood of performing light, moderate and vigorous-intensity physical activity for Time 3.

5.6.3.1 Light intensity physical activity

Table 44 and 45 present the results of the analysis predicting likelihood of light-intensity by TPB variables for Time 1.

Table 44: Logistic regression predicting likelihood of light-intensity physical activity with TPB variables for Time 3

Variables	B	S.E	Wald	*df*	Sig.	Odd ratio	95% CI for Exp. (B)	
							Lower	Upper
Intention	.30	.110	7.54	1	> .006	1.35	1.09	1.68
Attitude	-.15	.077	3.50	1	> .061	0.87	.74	1.01
PBC	.20	.124	2.51	1	> .113	1.22	.96	1.55
SN	.13	.087	2.14	1	> .144	1.14	.96	1.35

Note: ** *p* < .004

Table 45: The Omnibus Test of Model Coefficient and Hosmer–Lemeshow Goodness of Fit Test for logistic regression of Time 3 TPB variables predicting light intensity physical activity

Omnibus Test of Model Coefficient				Hosmer and Lemeshow Test			
Step 1	χ^2	*df*	Sig.	Step	χ^2	*df*	Sig.
Step	24.93	4	< .001**	1	4.44	8	> .816
Block	24.93	4	< .001**				
Model	24.93	4	< .001**				

Note: ** *p* < .0001 *p* < .05

The above model of TPB variables predicting light-intensity was statistically significant, χ^2 (4, n = 119) = 24.926, p < .001 and supported by the result of Homer–Lemeshow test, χ2(8) = 4.435, p > .816. The model explained between 19.5% (Cox & Snell R^2) and 28.6% (Nagelkerke R^2) of the variance in performing light-intensity physical activity. However, none of the variables contributed to the model below the threshold for significance level of p < .004.

5.6.3.2 Moderate intensity physical activity

Table 46 and 47 present the results of the analysis predicting likelihood of moderate-intensity by TPB variables for Time 3.

Table 46: Logistic regression predicting likelihood of moderate-intensity physical activity with TPB variables for Time 3

Variables	B	S.E	Wald	*df*	Sig.	Odd ratio	95% CI for Exp. (B)	
							Lower	Upper
Intention	-.056	.138	.162	1	> .687	.946	.722	1.239
Attitude	.084	.093	.810	1	> .368	1.087	.906	1.305
PBC	.289	.187	2.393	1	> .122	1.335	.926	1.924
SN	.197	.131	2.250	1	> .134	1.218	.941	1.575

Note: ** p < .004

Table 47: The Omnibus Test of Model Coefficient and Hosmer-Lemeshow Goodness of Fit Test for logistic regression of Time 3 TPB variables predicting moderate-intensity physical activity

Omnibus Test of Model Coefficient				Hosmer and Lemeshow Test			
Step 1	χ^2	*df*	Sig.	Step	χ^2	*df*	Sig.
Step	11.061	4	> .026	1	4.105	8	> .848
Block	11.061	4	> .026				
Model	11.061	4	> .026				

Note: ** p < .004

The overall model for TPB predicting moderate-intensity for Time 3 was not statistically significant χ^2 (4, n = 119) = 11.061, p > .026.

5.6.3.3 Vigorous-intensity physical activity

Table 48 and 49 present the results of the analysis predicting likelihood of vigorous-intensity by TPB variables for Time 3.

Table 48: Logistic Regression Predicting Likelihood of vigorous-intensity physical activity with TPB variables for Time 3

Variables	B	S.E	Wald	*df*	Sig.	Odd ratio	95% CI for Exp. (B)	
							Lower	Upper
Intention	.623	.175	12.738	1	< .001**	1.865	1.324	2.626
Attitude	-.072	.092	.619	1	> .432	.930	.777	1.114
PBC	.391	.174	5.039	1	> .025	1.478	1.051	2.079
SN	.477	.147	10.551	1	< .001**	1.611	1.208	2.148

Note: ** $p < .004$

Table 49: The Omnibus Test of Model Coefficient and Hosmer–Lemeshow Goodness of Fit Test for logistic regression of Time 3 TPB variables predicting vigorous-intensity physical activity

Omnibus Test of Model Coefficient				Hosmer and Lemeshow Test			
Step 1	χ^2	*df*	Sig.	Step	χ^2	*df*	Sig.
Step	82.956	4	< .001**	1	4.353	8	> .824
Block	82.956	4	< .001**				
Model	82.956	4	< .001**				

Note: ** p< .004

The above full model of Time 3 TPB variables predicting vigorous-intensity physical activity was statistically significant χ^2 (4, n = 119) = 82.956, $p < .001$. This was further supported by the Hosmer–Lemeshow test with $\chi 2(8) = 4.353$, $p > .824$ indicating good fit of the model. The model had correctly classified 66.1% of the cases with the variance explained by the whole model between 53.3% (Cox & Snell R^2) and 73.8% (Nagelkerke R^2). Two variables made significant contribution to the model which were Intention (Wald = 12.738, $p < .001$) and SN (Wald = 10.551, $p < .001$). Intention had the highest odds ratio at 1.87 (B = .623), which means for every unit of score reported by a participant, they were 1.87 times more likely to report they performed vigorous-intensity physical activity.

5.6.4 TPB variables predicting physical activity at Time 4 (n = 105)

Logistic regression was used to assess the ability of TPB constructs to predict the likelihood of performing light, moderate and vigorous-intensity physical activity for Time 4.

5.6.4.1 Light-intensity physical activity

The logistic regression for Time 4 TPB variables predicting light-intensity physical activity was not able to be carried out as the data were insufficient for the analysis to proceed.

5.6.4.2 Moderate intensity physical activity

Table 50 and 51 present the results of the analysis predicting likelihood of moderate-intensity by TPB variables for Time 4.

Table 50: Logistic regression predicting likelihood of moderate-intensity physical activity with TPB variables for Time 4

Variables	B	S.E	Wald	*df*	Sig.	Odd ratio	95% CI for Exp. (B)	
							Lower	Upper
Intention	.232	.135	2.983	1	> .084	1.262	.969	1.643
Attitude	-.131	.095	1.906	1	> .167	.878	.729	1.056
PBC	-.120	.113	1.135	1	> .287	.887	.710	1.106
SN	.562	.146	14.736	1	< .001**	1.753	1.316	2.336

Note: ** $p < .004$

Table 51: The Omnibus Test of Model Coefficient and Hosmer–Lemeshow Goodness of Fit Test for logistic regression of Time 4 TPB variables predicting moderate-intensity physical activity

Omnibus Test of Model Coefficient				Hosmer and Lemeshow Test			
Step 1	**χ^2**	***df***	**Sig.**	**Step**	**χ^2**	***df***	**Sig.**
Step	25.826	4	< .001**	1	6.015	8	> .646
Block	25.826	4	< .001**				
Model	25.826	4	< .001**				

Note: ** $p < .004$

The full was statistically significant, χ^2 (4, n = 105) = 25.826, $p < .001$ and this result was supported by the Hosmer–Lemeshow test, $\chi 2(8) = 6.015$, $p > .646$ indicating good fit of the model. The model had correctly classified 75.5% of the cases. The variance explained by the whole model in conducting moderate intensity physical activity were between 22.4% (Cox & Snell R^2) and 33.3% (Nagelkerke R^2). SN was the only variable that made significant contribution to the model (Wald = 14.736, B = .562, $p < .001$) with 1.75 odds ratio.

5.6.4.3 Vigorous-intensity physical activity

Table 52 and 53 present the results of the analysis predicting likelihood of vigorous-intensity by TPB variables for Time 4.

Table 52: Logistic regression predicting likelihood of vigorous-intensity physical activity with TPB variables for Time 4

Variables	B	S.E	Wald	*df*	Sig.	Odd ratio	95% CI for Exp. (B)	
							Lower	Upper
Intention	-.088	.130	.459	1	> .498	.92	.711	1.181
Attitude	-.120	.099	1.47	1	> .225	.89	.730	1.077
PBC	.567	.153	13.77	1	< .001**	1.76	1.307	2.380
SN	.065	.165	.157	1	> .692	1.07	.773	1.475

Note: ** $p < .004$

Table 53: The Omnibus Test of Model Coefficient and Hosmer–Lemeshow Goodness of Fit Test for logistic regression of Time 4 TPB variables predicting vigorous-intensity physical activity

Omnibus Test of Model Coefficient				Hosmer & Lemeshow Test			
Step 1	**χ^2**	***df***	**Sig.**	**Step**	**χ^2**	***df***	**Sig.**
Step	34.810	4	< .001**	1	11.880	8	>.157
Block	34.810	4	< .001**				
Model	34.810	4	< .001**				

Note: ** $p < .004$

The overall model comprising all predictors was statistically significant χ^2 (4, n = 105) = 34.81, $p < .001$ and was supported by the Hosmer–Lemeshow goodness of fit test, which was $\chi2(8) = 11.88$, $p > .157$ indicating good fit of the model. The whole model explained 29.9% (Cox & Snell R^2) and 43.6% (Nagelkerke R^2) of the variance in performing vigorous intensity physical activity and correctly classified 73.5% of cases. PBC was the only variable that made a significant contribution to the model (Wald=13.77, p<.001) with 1.76 odds ratio which means for every unit of score reported by a participant, they were 1.76 times more likely to report they performed vigorous-intensity physical activity.

5.7 Analysis of Relationship between Physical Activity and WHOQOL-BREF Domains

The following section presents the analysis of the relationship between physical activity behaviour and quality of life. To establish the relationship between the domains of the WHOQOL-BREF with the physical activity behaviour, a regression analysis was applied to physical activity of different intensities and the domain at each time point.

Multiple regression was used to assess the ability of three types of intensity to predict the WHOQOL-BREF domain. In this analysis, dichotomous variables of physical activity intensity carried out by the participants were used to predict their relationship with all four WHOQOL-BREF domains. Analyses were carried out based on time points to examine the relationship between types of intensity and quality of life over time. To minimise the likelihood of a type 1 error, a correction based on Bonferroni adjustment was used where 0.05/16* = 0.003 (16* model tested using TPB and ESE variables). A maximum p = 0.003 would be used as the threshold for significance level. Results of the analysis are presented below.

5.7.1 Relationship between the intensity of physical activity and WHOQOL-BREF domains at Time 1

A standardised multiple regression was used to explore the relationship between the intensity of physical activity conducted and WHOQOL-BREF domains at Time 1. Table 54 presents the results from the regression analysis.

Table 54: Summary of multiple regression analysis for physical activity intensity predicting WHOQOL-BREF domains at Time 1 (*n* = 244)

Variables	Physical health					Psychological					Social relationship					Environment				
	B	SE B	β	t	Sig.	B	SE B	β	t	Sig.	B	SE B	β	t	Sig.	B	SE B	β	t	Sig.
Light Intensity	.404	.290	.101	1.39	>.165	.595	.260	.160	1.29	>.023	-.021	.342	-.01	-.06	>.950	.275	.285	.07	.97	>.335
Moderate Intensity	-.038	.315	-.008	-.120	>.904	-.13	.282	-.028	-.45	>.654	-.205	.371	-.04	-.55	>.581	.856	.309	.17	2.77	>.006
Vigorous Intensity	.804	.283	.207	2.84	<.002*	.953	.253	.265	3.76	<.001*	1.14	.334	.25	3.42	<.001*	.841	.278	.22	3.03	<.003*
R^2	.073					.135					.061					.111				
F	6.11					12.07					4.98					9.69				
Sig.	<.001*					<.001*					<.002*					<.001*				

Note: * $p < .003$

Based on the analysis, all four model tested using physical activity intensity on WHOQOL-BREF domains showed significant results with varying variance of 7% on physical health ($F(3, 233)=6.11$, $p<.001$), 13% on psychological ($F(3,233) = 12.07$, $p < .001$), 6% on social relationship ($F(3, 231) = 4.98$, $p < .002$) and 11% on environment ($F(3,233) = 9.69$, $p < .001$). Light and moderate intensity was not significantly related to any WHOQOL-BREF domains. Vigorous intensity was related to all domains at Time 1; this indicates there was a relationship between performing vigorous-intensity physical activity and all components of quality of life at Time 1.

5.7.2 Relationship between the intensity of physical activity and WHOQOL-BREF domains at Time 2

A standardised multiple regression was used explore the relationship between the intensity of physical activity conducted and WHOQOL-BREF domains at Time 2. Table 55 presents the results from the multiple regression analysis.

Table 55: Summary of multiple regression analysis for physical activity intensity predicting WHOQOL-BREF domains at Time 2 (*n* = 134)

Variables	Physical health					Psychological					Social relationship					Environment				
	B	SE B	β	t	Sig.	B	SE B	β	t	Sig.	B	SE B	β	t	Sig.	B	SE B	β	t	Sig.
Light Intensity	.235	.514	.037	.458	>.648	.356	.471	.06	.76	>.451	-.082	.59	-.01	-.14	>.889	-.02	.47	-.004	-.05	>.963
Moderate Intensity	.716	.375	.153	1.91	>.058	.483	.344	.11	1.41	>.162	.438	.43	.09	1.01	>.311	.31	.35	.07	.91	>.367
Vigorous Intensity	1.83	.304	.466	6.01	<.001*	1.69	.279	.47	6.05	<.001*	1.26	.35	.31	3.61	<.001*	1.60	.28	.45	5.72	<.001*
R^2	.250					.244					.103					.214				
F	13.97					13.52					4.85					11.42				
Sig.	< .001*					< .001*					< .003*					< .001*				

Note: * $p < .003$

Based on the analysis, all four models tested using physical activity intensity on WHOQOL-BREF domains showed significant results with varying variance of 25% on physical health ($F(3,126) = 13.97$, $p < .001$), 24% on psychological ($F(3,126) = 13.52$, $p < .001$), 10% on social relationship ($F(3,126) = 4.85$, $p < .003$) and 21% on environment ($F(3,126) = 11.42$, $p < .001$). Vigorous intensity was related to all domains at this time point. In a pattern that is similar to Time 1, both light and moderate intensity did not show significant associations with any of the WHOQOL-BREF domains. Time 2 results also suggest an association between performing vigorous-intensity physical activity and all domains of quality of life.

5.7.3 Relationship between the intensity of physical activity and WHOQOL-BREF domains at Time 3

Multiple regression was used to explore the relationship between the intensity of physical activity conducted and WHOQOL-BREF domains at Time 3. Table 56 presents the results from the multiple regression analysis.

Table 56: Summary of multiple regression analysis for physical activity intensity predicting WHOQOL-BREF domains at Time 3 (*n* = 119)

Variables	Physical health					Psychological					Social relationship					Environment				
	B	SE B	β	t	Sig.	B	SE B	β	t	Sig.	B	SE B	β	t	Sig.	B	SE B	β	t	Sig.
Light Intensity	.473	3.83	.110	1.23	>.220	.677	.369	.18	1.83	>.069	1.60	.458	.32	3.50	<.001*	.578	.419	.13	1.38	>.171
Moderate Intensity	.420	.505	.070	.831	>.407	.154	.487	.03	.32	>.753	.406	.604	.06	.67	>.503	-.136	.552	-.02	-.25	>.806
Vigorous Intensity	1.99	.372	.488	5.36	<.001*	1.27	.358	.35	3.55	<.001*	1.40	.444	.29	3.15	<.002*	1.95	.406	.45	4.80	<.001*
R^2	.313					.205					.270					.263				
F	17.20					9.71					14.07					13.47				
Sig.	<. 001*					< .001*					< .001*					< .001*				

Note: ** $p < .003$

Based on the analysis, all four models tested using physical activity intensity on WHOQOL-BREF domains showed significance. The variance explained by the model was 31% on physical health ($F(3, 113) = 17.20$, $p < .001$), 21% on psychological ($F(3,113) = 9.71$, $p < .001$), 27% on social relationship ($F(3, 114) = 14.07$, $p < .001$) and 26% on environment ($F(3, 113) = 13.47$, $p < .001$). Light-intensity was significantly associated with social relationship but not with other domains. There was no significant relationship between moderate-intensity and any components of quality of life. Vigorous-intensity was related to all domains of quality of life.

5.7.4 Relationship between the intensity of physical activity and WHOQOL-BREF domains at Time 4

A standardised multiple regression was used to explore the relationship between the intensity of physical activity conducted and WHOQOL-BREF domains at Time 4. Table 57 presents the results from the multiple regression analysis.

Table 57: Summary of multiple regression analysis for physical activity intensity predicting WHOQOL-BREF domains at Time 4 (*n* = 105)

Variables	Physical health					Psychological					Social relationship					Environment				
	B	**SE B**	**β**	**t**	**Sig.**	**B**	**SE B**	**β**	**t**	**Sig.**	**B**	**SE B**	**β**	**t**	**Sig.**	**B**	**SE B**	**β**	**t**	**Sig.**
Light Intensity	.043	.038	.089	1.13	>.263	-.869	.783	-.09	-1.11	>.270	1.24	.986	.11	1.26	>.211	-.648	.858	-.06	-.76	>.452
Moderate Intensity	.167	.030	.468	5.64	<.001*	.209	.418	.04	.50	>.619	.492	.527	.09	.94	>.352	.213	.458	.04	.46	>.644
Vigorous Intensity	.403	.098	3.43	4.13	<.001*	2.86	.388	.61	7.36	<.001*	2.21	.489	.43	4.53	<.001*	3.05	.425	.60	7.18	<.001*
R^2	.441					.407					.226					.391				
F	23.69					22.69					9.62					21.21				
Sig.	< .001*					< .001*					< .001*					< .001*				

Note: ** $p < .003$

Based on the analysis, all four models tested using physical activity intensity on WHOQOL-BREF domains showed significant result with variance explained by model at 44% on physical health ($F(3, 90) = 23.69$, $p < .001$), 40% on psychological ($F(3, 99) = 22.69$, $p < .001$), 22% on social relationship ($F(3, 99) = 9.62$, $p < .001$) and 39% on environment ($F(3, 99) = 21.21$, $p < .001$). At individual intensity of physical activity, vigorous-intensity was significantly related to all four quality of life domains. Physical health was significantly related to moderate-intensity at this time points. No significant relationship between light-intensity and any quality of life domains was found at Time 4.

5.8 Structural Equation Modelling

The TPB variables were first tested for measurement model validity through CFA before proceeding into structural model validation analysis. All analyses were carried out using AMOS Version 21.

As SEM is sensitive towards sample size, Time 1 data were used in the analysis. Missing data were dealt by conducting a missing value analysis using the multiple imputations technique. The values from the fifth imputation were used for the analysis.

The TPB variables were subjected to model validation analysis as devised by the researcher. Validation analysis was not conducted on the ESE and WHOQOL-BREF scale as both were reliable and validated measures. Analysis for ESE scale was published by Shin, Jang, and Pender (2001), Everett, Salamonson, and Davidson (2009), Noroozi et al. (2011), Heijden, Pouwer, and Pop (2014) and the WHOQOL-BREF by Ohaeri, Awadalla, El-Abassi, and Jacob (2007).

5.8.1 Justification to test the data using CFA

Using factor analysis procedures such as EFA and CFA to confirm latent variables has become more common in areas such as instrument development, longitudinal data analysis and for comparing group means (Schmitt 2011). In the present study, the Time 1 data were subjected to EFA (see Section 4.3 – Development of TPB questionnaires). At that point, the factor analysis was used to investigate influencing variables (Yong & Pierce, 2013) based on the TPB. According to Van Prooijien et al. (2001) the same data set used to derive a factor model by EFA, could be subsequently tested using CFA. The CFA on Time 1 data is detailed as follows.

5.8.2 Measurement model validation

To establish a measurement model fit, a CFA was carried out on the TPB variables. Figure 10 presents a diagram of the CFA of the TPB model.

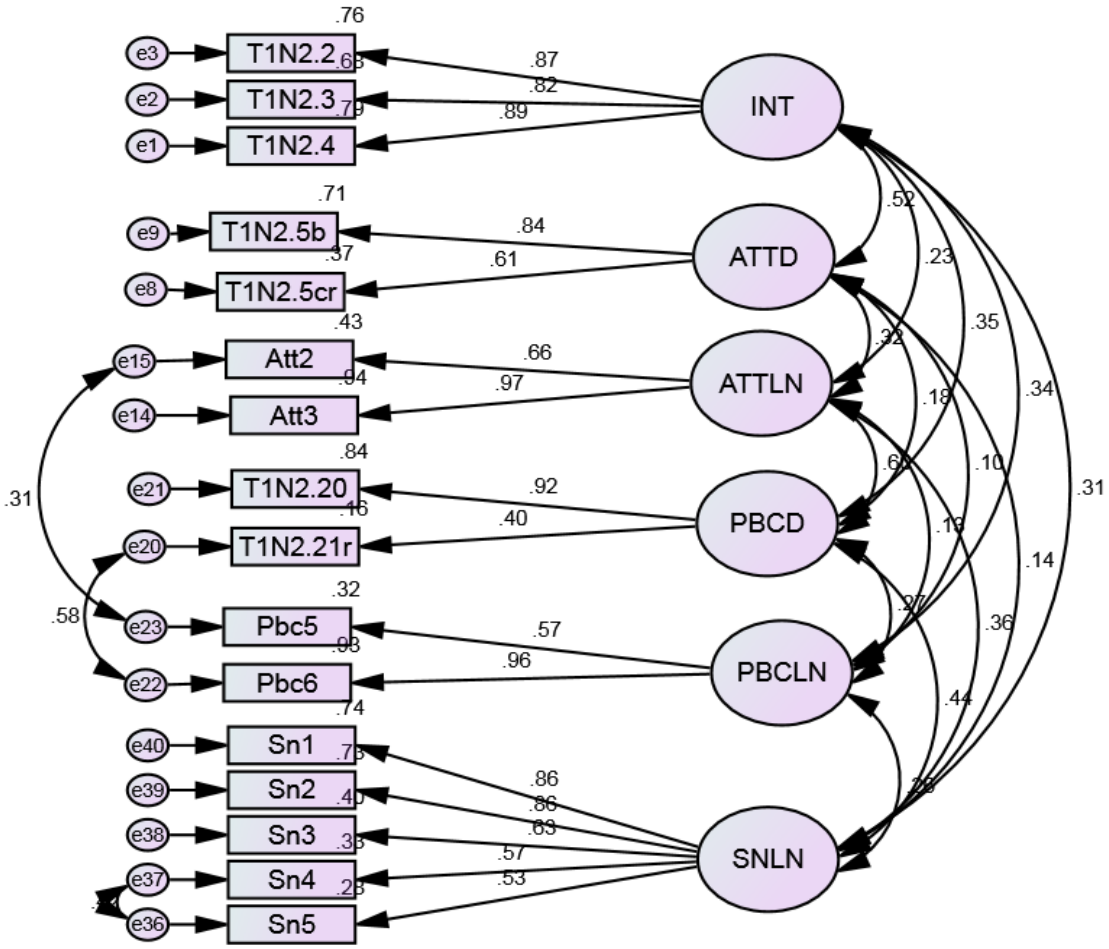

Figure 10: CFA model of the TPB variables

All factor loadings were found to be significant (0.4 to 0.97). The CFA model fit was at a satisfactory level as shown by the following criteria: root mean square error of approximation (RMSEA): .058 (confidence interval .043 – .072); comparative fit index (CFI) .956; Tucker-Lewis index (TLI) .938; parsimony CFI (PCFI) .685 and CMin/df 1.817. The chi-square value was χ^2 = 156.253, *df* = 86, *p* = .000. The model was accepted and used in the next structural assessment with ESE and QOL scales.

It is also important to establish the convergent and discriminant validity as well as the reliability of the model after obtaining a satisfactory fit for the model before moving onto the structural model stage. In the Section 4.3.3, one of the concerns of the present study's TPB measures was the low alpha value of PBC and SN. However, Cronbach's alpha assumes that all indicators are equally reliable and due to this and

other Cronbach's alpha limitations, it is more appropriate to use composite reliability as it takes into account the different outer loading of indicator variables (Hair, Hult, Ringle, & Sarstedt, 2014). Table 58 below presents the composite reliability, average variance extracted (AVE), maximum shared variance (MSV), average shared variance (ASV) and correlation of the variables.

Table 58: Summary of composite reliability, AVE, MSV, ASV and correlation for Time 1 TPB variables

	CR	AVE	MSV	ASV	SN IM	Intention	Attitude DM	Attitude IM	PBC DM	PBC DM
SN IM	0.83	0.50	0.20	0.11	**0.70**					
Intention	0.90	0.74	0.25	0.13	0.33	**0.86**				
Attitude DM	0.70	0.54	0.25	0.08	0.15	0.50	**0.74**			
Attitude IM	0.81	0.69	0.36	0.13	0.36	0.24	0.31	**0.83**		
PBC DM	0.63	0.50	0.36	0.16	0.45	0.36	0.18	0.60	**0.71**	
PBC IM	0.76	0.63	0.11	0.06	0.27	0.34	0.10	0.13	0.28	**0.79**

Note: Values on the diagonal and bold are square root of AVE
CR – Composite Reliability
AVE – Average Variance Extracted
MSV – Maximum Shared Variance
ASV – Average Shared Variance
DM – Direct measure
IM – Indirect measure

Based on the validity analysis above, all variables were able to achieve the threshold value of 0.6 for composite reliability. As for convergent validity, none of the values is lower than the threshold of 0.50. All square root values of AVE were also greater than the values of inter-constructs correlations. Therefore, it could be concluded that the measurement model was satisfactorily valid and reliable and could be used for model validation analysis.

5.8.3 Structural model validation

Structural model validation was conducted in a model combining the TPB model, ESE, WHOQOL-BREF scales and physical activity behaviour. For TPB, both second-order Attitude and PBC comprised direct and indirect measures, respectively. The ESE was entered as a single observed variable in the model. The WHOQOL-BREF comprised of five domains/observed variables which were Overall health (T1Ov), Psychical health (T1D1), Psychological (T1D2), Social relationship (T1D3) and Environment (T1D4).

As for the physical activity behaviour, data of total minutes per week spent on physical activity were used. The total minutes spent on physical activity was converted into a continuous scale before being entered into the model for analysis. The total minutes spent on moderate-intensity ranged from 0 minutes until maximum of 870 minutes and for vigorous-intensity it ranged from 0 minutes to 600 minutes. For moderate-intensity, a scale of 5 was created with each score having a range of 150 minutes for each unit. For vigorous-intensity activity, a scale of 5 was also created with a range of 60 minutes for each unit. A threshold of 150 minutes of moderate intensity and 60 minutes of vigorous intensity was used as it was the minimum recommendation to achieve a significant health benefit by the American College of Sports Medicine (ACSM). Light-intensity was not converted nor used in the analysis as no minimum threshold was recommended to achieve any health benefit. As more moderate and vigorous-intensity activity is beneficial for health, the same concept could not be applied to light-intensity. Figures 11 and 12 present the scales for moderate and vigorous-intensity physical activity.

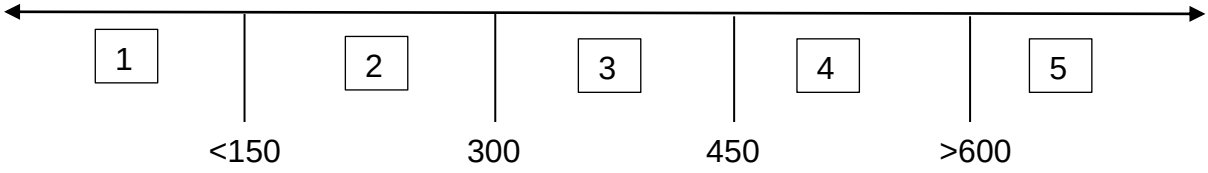

Figure 11: Scale for conversion of minutes spent on moderate-intensity into continuous scale

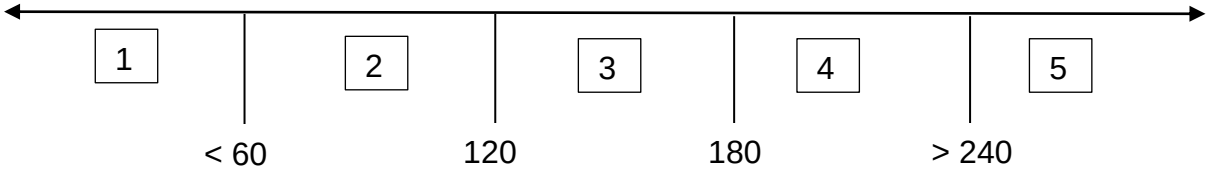

Figure 12: Scale for conversion of minutes spent on vigorous-intensity into continuous scale

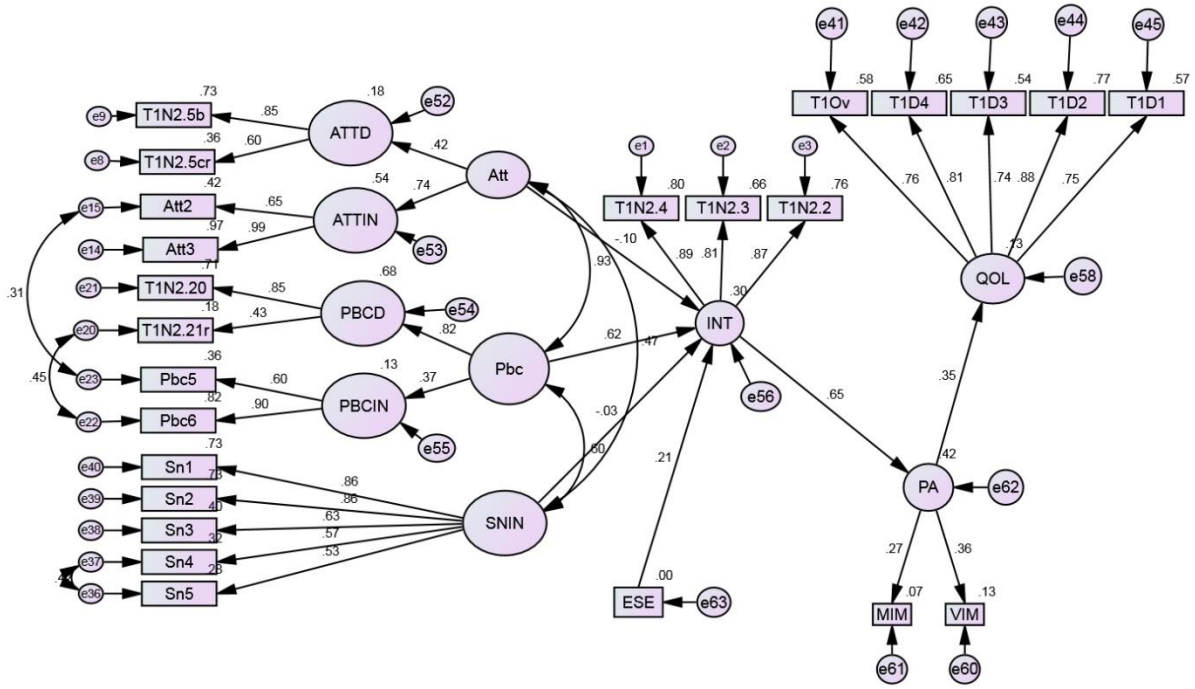

Figure 13: Structural equation model output diagram comprising TPB, ESE, QOL variables and physical activity behaviour

Note: Int - Intention
AttD – Attitude direct measure
AttIn – Attitude Indirect measure
PBCD – Perceived behavioural control direct measure
PBCIn – Perceived behavioural control indirect measure
QOL – Quality of Life
PA – Physical activity

Figure 13 shows the standardised estimates path diagram between TPB variables and ESE and QOL as well as physical activity behaviour. The model fit was at an acceptable level as shown by the following criteria: RMSEA .073; CFI .874; TLI: .853; and PCFI .750. The chi-square value was $\chi^2 = 547.466$, $df = 237$, $p < .001$.

From the model, the TPB and ESE predicted the Intention to perform physical activity with 30% of the variance explained. This was lower than 47% of the variance explained by using hierarchical regression (refer to Table 24) as SEM takes error in analysis into account. Comparison of the standardised regression weight of the TPB variables and ESE showed that the strongest contribution to the explained variance of Intention came from PBC (.62) followed by ESE (.21). This result further supports the role of PBC in the TPB particularly in the prediction of exercise Intention. The

ability of PBC and ESE to independently predict intention was supported by the high amount of regression weight of PBC and ESE. This further supports the suggestion of the unique contribution of perceived control and self-efficacy to physical activity and both components should be separately studied in future studies (Armitage, 2001; Armitage, 1999).

Intention predicted 42% of the variance explained in physical activity behaviour. The analyses using logistic regression at Time 1 showed that of the moderate and vigorous intensity model, only the latter model was statistically significant. The factor loading of vigorous intensity (VIM) was higher at .36 compared to moderate-intensity (MIM) at .27. Therefore, we could suggest that Intention predicted more vigorous-intensity behaviour compared to moderate-intensity behaviour. The standardised regression weight of Intention of .65 also indicated a large amount of change in physical activity behaviour that was attributable to a single *SD* unit worth of change in Intention. This suggests the strong influence Intention has over physical activity behaviour.

Physical activity behaviour contributed 13% to in the explained variance of quality of life. There is considerable evidence of the benefit of physical activity to physical health, such as strengthening of musculoskeletal system and prevention of cardiovascular disease, obesity, type 2 diabetes, osteoporosis and even cancer. This relationship suggests that engagement in physical activity, contributes not only to the normal physical functioning of the body but also to the overall quality of life of a person.

5.9 Attrition

Like any other study, this study suffered from an attrition rate where participants dropped-out or did not return the questionnaire. The Table 59 shows attrition from Time 1 to Time 4 of this study.

Table 59: Attrition from Time 1 to Time 4

NGO	Time 1	Time 2	Time 3	Time 4
KESUMAT	42	16	11	8
Dynamic	35	11	6	5
RIKMAS	22	10	8	2
PKSM	38	11	7	3
Tobiar	75	74	74	74
KK	17	12	13	13
BSW	15	0	0	0
	244	**134**	**119**	**105**

The largest drop-out was between Time 1 and Time 2 and the numbers remained fairly stable between Time 2, Time 3 and Time 4. The NGO with the largest attrition was BSW and the NGO with the least attrition was Tobiar.

5.9.1 Assessment of attrition bias

To assess the attrition bias, participants were divided into two groups: those who provided Time 1 data only (group A – drop-outs) and those who provided Time 1 and follow-up data on at least one other occasion (group B – completers). Time 1 data from both these groups was then compared to ascertain whether there were any differences at baseline between those who dropped-out and those who continued to provide data. Table 60 shows the mean and *SD* for group A and group B.

Table 60: Variables mean and standard deviation values of group A (drop-outs) and group B (completers)

Time 1 Measures	Variables	Group	*n*	Mean	*SD*
TPB	Generalised Intention	A	104	19.62	3.94
		B	139	22.41	3.72
	Attitude direct measure	A	104	33.20	4.63
		B	138	34.80	4.45
	PBC direct measure	A	105	21.57	3.44
		B	138	20.64	3.66
	SN direct measure	A	104	22.11	2.94
		B	138	20.64	3.66
WHOQOL-BREF Assessment	Physical health	A	105	14.15	1.67
		B	138	13.93	2.13
	Psychological	A	105	14.38	1.63
		B	138	14.29	1.93
	Social relationship	A	103	15.09	2.06

		B	138	14.62	2.41
	Environment	A	105	13.50	1.60
		B	138	14.17	2.14
ESE	ESE	A	76	90.97	14.63
		B	37	98.30	22.84

The test showed that there were significant differences for TPB scores on Generalised Intention (t = 5.66, df = 241, p<.001), Attitude (t = 2.71, df = 240, p < .007) and PBC (t = -2.02, df = 241, p < .044) but no significant difference was found for SN. As for WHOQOL-BREF, all domains were found to be not significant except for domain 4 – Environment (t = 2.77, df = 240.95, p < .006). The result for ESE scale showed no significant difference between the two groups.

For the variables that showed significant difference between the two groups, it was important to check for the effect size of the difference to establish the magnitude of the differences. The effect size for Generalised Intention was 0.12 and 0.02 for both Attitude and PBC, 0.03 for Environment and 0.10 for ESE scale. It could be summarised that although *t*-test result were reported to be significant, the effect sizes were actually small. This also indicates that there was no large difference between those who replied to Time 1 only and those who continued to reply after Time 1. This further suggests that participants who continued to reply in this study were not statistically different from those who dropped-out and that the bias from missing values due to attrition was negligible.

5.10 BMI of the Participants

Participants were also asked to provide their height and body weight at each time point to measure their BMI. BMI is used to quantify a person's muscle mass and categorise them as underweight, normal weight, overweight or obese. A BMI reading is obtained through the following formula: Weight (kg)/Height $(m)^2$.

Table 61: The categorisation of Body Mass Index

Body Mass Index	Category	Time 1 (*n*)	Time 2 (*n*)	Time 3 (*n*)	Time 4 (*n*)
18.5 and below	Under weight	-	-	-	-
18.5 – 24.9	Normal weight	17	21	12	10
24.9 – 30	Overweight	18	15	14	13
30 and above	Obese	10	10	9	5

Note: Adapted from Ahmad, J., Wahab, S., Hamid, A. & Pardi, M. (2012, April 19). *Body Mass Index*. Retrieved from www.myhealth.gov.my/en/bmi/

A one-way repeated measures ANOVA was conducted to compare the BMI from Time 1 to Time 4. Results from the analysis showed there were no statistically significant change of BMI across the four different time periods.

One limitation of the BMI results was the interpretation and the generalisability of the findings alongside other results in the present study. The number of participants who provided data such as height and weight for BMI calculation was small: 45 at Time 1 (18%), 46 at Time 2 (34%), 35 at Time 3 (29%) and 28 at Time 4 (26%). Discrepancies in self-reporting of height and weight data were reported in another study (Sutin, 2013) and in the present study most of the participants did not provide their height and weight data in their questionnaire return, therefore these results should be treated with caution.

5.11 Summary

Participants who took part in the study were predominantly female, of Malay ethnicity, and aged between 40 and 59 years. The sample was from seven NGOs that received support from the Health Promotion Board Malaysia to run physical activity-based programmes. The NGO with the largest number of participants was Tobiar and the NGO with the least number of participants was BSW. Tobiar had the least attrition rate of all the NGOs maintaining a 99% return rate from Time 2 to Time 4 while BSW had the largest attrition rate with 100% drop-out from Time 2 onwards. Potential bias originating from attrition was examined and the effect was found to be small. Therefore, it can be concluded that the results from this analysis can be generalised to a population with similar characteristics.

5.11.1 Physical activity behaviour

Based on the analysis of the physical activity behaviour of the participants, it was found that the participants had increased their light and moderate-intensity activities throughout the study period. The minutes and days spent on light and moderate-intensity activities had increased significantly. No significant changes were noted for vigorous intensity which included aerobics and badminton, which are the two main activities carried out by the NGOs in this study. A possible explanation for this finding was the participants maintained the time they spent on physical activity and the NGOs did not change their activity schedule. The time spent on light-intensity activities, which mostly revolved around household chores, or moderate-intensity, such as walking, were easier to change compared to vigorous intensity which involved group exercise in this study. The researcher also found that participants who replied that they performed aerobics exercise were a small number although six out of seven NGOs involved in this study were running aerobics-based programmes. During interaction with the participants while collecting data in Malaysia, some participants referred to their activities not as aerobics exercise but instead as exercise-dance and *poco-poco* (a type of dance and song that originated in Indonesia). Situations in which participants joined an activity for reasons other than exercise benefit, such as social support, were found in other studies (Berlin & Klenosky, 2014). This could have affected the way replies were provided in the questionnaire as some participants did not view an activity as aerobic exercise.

5.11.2 TPB model and the prediction of intention

At step 1 the model accounted for 43% of the variance of intention at Time 1, 44% at Time 2, 64% at Time 3 and 55% at Time 4. This showed that the TPB model using direct or global measure consistently predicted intention to perform physical activity behaviour.

When the indirect measures were entered at step 2, the TPB model accounted for 46% at Time 1 (R^2 change = .018) and 68% at Time 4 (R^2 change = .135). No significant changes were reported at Time 2 (sig. F change = .233) and Time 3 (Sig. F change. = .071). However, the results showed a significant statistical relationship of the model ($p < .007$) from Time 1 to Time 4.

The addition of ESE scale at step 3 only resulted in significant changes at Time 2 (Sig. *F* change= .000, R^2 change = .075) with the model explaining 51% of the variance of intention. No statistically significant *F* change values were detected at Time 1, Time 3 and Time 4.

One of the aims of the study was to evaluate the predictive utility of the TPB and its efficacy in predicting intention to perform physical activity behaviour. Pearson's correlation of the direct measures showed that all variables were significantly correlated with each other. Some instances of non-significant correlation were noted particularly at Time 1 and the indirect measures of PBC and SN. However, the correlation became significant at every subsequent time point, with only a few exceptions. The results from this study not only support the utility of the TPB as a theoretical framework for examining the determinants of intention to perform physical activity but also its usefulness in a cross-cultural population. This study was conducted among a Malaysian population with a specifically devised TPB questionnaire. The TPB model significantly predicted intention to engage in physical activity in at each time point. Analyses of the TPB model from Time 1 to Time 4 showed that the model had accounted for 42% to 65% of the variance of the intention to engage in physical activity.

5.11.3 TPB model and the prediction of physical activity behaviour

The study investigated the TPB model against the likelihood of engaging in physical activity behaviour on three intensity levels which were "light", "moderate" and "vigorous" intensity. On analyses of the TPB model on "light" intensity, results showed that two of four time points were significant. As for "moderate" intensity, only Time 4 analysis gave a significant result out of four time points. However, analyses using the TPB model on "vigorous" intensity showed significant results on all four time points.

On vigorous-intensity, the model explained 29% (Nagelkerke R^2) of the variance at Time 1, 49% (Nagelkerke R^2) at Time 2, 74% (Nagelkerke R^2) at Time 3 and 44% (Nagelkerke R^2) at Time 4. The present study was comparable to the study on the behaviour of self-monitoring of patient with type 1 diabetes where similar techniques

of logistic regression showed 57% of variance in self-monitoring (Shankar, Conner, & Bodansky, 2007).

The PBC is held to exert both direct and indirect influence via intention on behaviour (Armitage & Conner, 2001). In the indirect relationship, intention to engage in certain behaviour is formed by taking into account the amount of control we have over the behaviour (Manstead & Eekelen, 1998). PBC will, however, have stronger direct influence over behaviour when volitional control over the behaviour decreases (Armitage & Conner, 2001). The present study explored the relationship between the TPB model and physical activity behaviour particularly between attitude-behaviour and PBC-behaviour.

The results from this study show that over the four time points, the overall model was more useful in predicting vigorous-intensity physical activity compared to light or moderate-intensity. The model was only able to significantly predict light and moderate-intensity behaviour in two out of four time points. However, it also should be noted that the present study focused on a sample of the population that conducted vigorous-intensity physical activity with questions about their beliefs in relation to the activity.

From the models predicting vigorous-intensity physical activity, we could suggest that PBC is the strongest predictor as it significantly predicted behaviour in all four models. This is in comparison to Intention and SN that predicted vigorous-intensity physical activity three times out of four and Attitude which only once appeared as a significant contributor to the model. The finding that PBC was a significant predictor of exercise behaviour was consistent with other literature (Armitage, 2001). This demonstrates the efficacy of the constructs in the whole TPB model of exercise behaviour prediction. In a condition of very high volitional control, behavioural intention would be the strongest predictor of behaviour (Armitage, 2001). Volitional control comprises environment and personal constraint on behaviour (Armitage, 2001); in physical activity, a situation of total or extremely high volitional control of a person over the behaviour would not usually occur. As an example, in the present study, the participants would require at least a suitable place to exercise in a group and skills to perform the exercise. To engage in a behaviour, people need to have

the ability to carry it out and intention alone is not sufficient to actually conduct the behaviour (Notani, 1998).

In the present study, Intention was found to be significantly associated with vigorous-intensity exercise behaviour from Time 1 to Time 3. At Time 1, the variables reported a negative B with odds ratio of .87 which indicated for every score reported, there was a .87 likelihood of the participant not reporting engaging in physical activity. As the odds ratio was less than 1, it could be suggested that at the beginning of the study, the participant with an intention to exercise would not necessarily translate the intention to actual exercise behaviour. At Time 2, the B value was .210 and the odds ratio increased to 1.2 with B value remaining positive at Time 3 (B = .623) and a further increase of odds ratio to 1.7. This suggests that from Time 2 to Time 3 the likelihood of the participant engaging in physical activity with every increase of score in Intention improved. A possible explanation for this was that as the grant sponsorship from the Health Promotion Board ran throughout Time 2 and Time 3 and all other factors remained constant, the influence of Intention on behaviour became stronger; however, at Time 4 when the grant was due to expire, assuming all other factors remained constant, the influence of Intention over behaviour weakened. The relationship between Intention and PBC in the present result was consistent with a suggestion by Armitage (2001), where behavioural intention accounts for a smaller amount of variance of behaviour, PBC would be independently more predictive of the behaviour. This relationship was found in the present study, such as during Time 1 where PBC, B = .261, p = .000 with odds ratio of 1.3 as compared to Intention with B = −.140, p = .006 and odds ratio of .87. At Time 3, the PBC had B = .391, p = .025 with odds ratio of 1.5 as compared to Intention with B = .623, p = .000 and odds ratio of 1.7.

Analyses in the present study found a significant relationship between attitude and intention to engage in physical activity. As for the relationship between Attitude and behaviour, a significant contribution of Attitude to the model was only found in Time 1 with B = .261, p = .050 and an odds ratio of 1.1. However, the B value was low at Time 1 and Attitude also did not emerge as a significant contributor to the model from Time 2 to Time 4. Therefore, we could suggest that Attitude does not independently stand as a contributor towards behaviour. This finding was consistent

with the original TPB model by Ajzen (1991) where attitude influenced behaviour mediated by intention.

Normative pressure, a component of SN, strongly affects behaviour and there is substantial evidence that people conform to the judgement and behaviour of others (Manning, 2009). However, the constructs of SN did not perform well in the TPB model and rarely or inadequately predict intention (Armitage & Conner, 2001). The finding of the present study is consistent with other literature where SN has a weak relationship with intention. However, this study also found that SN was significantly associated with engagement of vigorous-intensity exercise behaviour at two time points: Time 2 and Time 3. The odds ratio increased from Time 2 to Time 3 but SN became insignificant at Time 4. A similar pattern was found but with social support by Rhodes et al. (2002). The ability of SN to exert a direct significant effect on behaviour was possibly consistent with the finding of Rhodes et al. (2002) due to overlapping beliefs between social support and descriptive norms or injunctive norms tapped by the measures in the present study. Another explanation for the direct effect was that exercise was not a completely volitional behaviour and was influenced by assistance of others (Rhodes et al., 2002). A study by Manning (2009) also found a large magnitude of direct effect of descriptive norms on behaviour, which suggested that intention may not be the main vehicle that mediates descriptive norms to actual behaviour. The present findings further support the suggestion by Manning (2009) on the potential utility of a direct path of SN to behaviour and the call for further research on the relationship as well as other constructs, such as social support (Courneya, Plotnikoff, Hotz, & Birkett, 2000) and self-identity (Armitage & Conner, 2001).

5.11.4 ESE scale

Suggestions for TPB constructs to be researched in multiple context received wide support (Rhodes & Courneya, 2003a). For PBC, two components were suggested which were controllability (personal control over behaviour or appraisal whether the behaviour is completely up to the individual's control) and self-efficacy (ease/difficulty and confidence in undertaking a behaviour) (Rhodes & Courneya, 2003a). With recent reviews indicating that the components of self-efficacy and controllability can

be reliably distinguished in the domain of exercise (Rhodes & Courneya, 2003a), the present study included the ESE scale (Bandura, 2006) in addition to the PBC measure developed by the researcher.

In the present study, the ESE scale was entered as step 3 in hierarchical regression with TPB variables as step 1 and step 2. From the results at four time points, the ESE scale contributed to a significant difference in adjusted R^2 at Time 2 model. The adjusted R^2 increased from .431 at step 1 to .511 at step 3 (F-change = 20.18, $p < .001$). The ESE scale, however, did not make a significant contribution to the model at other time points which was possibly due to missing values of the data. The issue of fatigue of the respondents could also have led to replies to this study that did not reflect the true opinion of most of the participants.

5.11.5 WHOQOL-BREF assessment

The WHOQOL-BREF assessment was included in this study to explore the relationship between physical activity and quality of life. In the present study, the three types of intensity of physical activity were regressed against the WHOQOL-BREF to examine the relationship between different types of intensity and the domains. A pattern emerged from the results in which vigorous-intensity consistently had a significant association with all four domains in at every time points. This result indicates that there was a link between performing vigorous-intensity physical activity and changes in quality of life. This suggestion is consistent with the literature that associated physical activity with health benefits, particularly vigorous-intensity (Lee & Paffenbarger, 2000).

This study had also intended to examine the relationship between Quality of Life domains and intention to engage in physical activity using multiple regression. However, there were issues with multivariate outliers and multicollinearity in the analysis which led to the deletion of an ESE factor and some WHOQOL-BREF domains. As several WHOQOL-BREF domains had to be deleted, this would affect conclusions drawn from the results; therefore, from a methodology and statistical angle, the analysis was no longer viable and thus aborted.

5.11.6 Limitations of the study

Consistent with other research, the present study also had some concerns that need to be acknowledged and discussed. One issue with the study was that many participants did not indicate that they were conducting an aerobics type of physical activity. Many of those who indicated the exercise they performed failed to clearly state the number of days and time they spent on the activity. This affected the scores for activity.

There were a total of 137 items in this study; the sequence in the questionnaire was physical activity behaviour (7 days of physical activity), followed by TPB items then WHOQOL-BREF assessment and lastly ESE scale. The large number of questionnaire items could have possibly caused the participants to feel fatigue by the time they reached the ESE scale. This was evident by the considerable number of missing values on the ESE scale where participants did not fill in the items or simply provided monotone answers. Some “almost monotone” answers could also indicate that those participants who responded fully to the ESE scale were not providing “honest” answers as they were also driven by fatigue. The present study acknowledges this limitation and therefore interprets the results on the ESE scale with caution.

Like any other study with a repeated measures design, the present study also experienced attrition in replies over time. The attrition rate for Tobiar was the lowest with only one participant drop-out from Time 2 onward while BSW had the largest attrition with 100% drop-out since Time 2. The researcher did not explore the reasons for the attrition as it was not part of the study objectives. However, the researcher was of the opinion that the 99.9% reply rate for participants from Tobiar was possibly because they were happy with the financial and material support they received from the Health Promotion Board Malaysia and the health department. As the researcher works with the Ministry of Health Malaysia and approached them via the local health office, the organiser and the participants gave strong and continuous support for this study even after they had been advised that participation in the study would not influence their future chances of securing assistance from the government. On the other hand, the cause of the 100% attrition rate of participants from BSW from Time 2 onwards was probably because of, as the organiser indicated to the

researcher during data collection, the participants' "lukewarm" support. The researcher also understands that only one member of the BSW committee was from the participants' local community. An analysis of attrition bias was conducted and the results indicated that there was no significant difference between the drop-outs and the participants who remained in the study.

Chapter 6

6.0 QUALITATIVE STUDIES

Chapter Outline

This chapter includes three separate studies. The first study (QS1B) was the re-analysis of the elicitation study conducted for TPB questionnaire development. The elicitation study (QS1A) was described in Chapter 4. The second study (QS2) comprised qualitative interviews that were conducted during baseline data collection in 2013 in Malaysia. The third study (QS3) was the follow-up conducted approximately 1 year later on the attendees interviewed during QS2. A summary of all three is presented in Section 6.4.

6.1 Views on Physical Activity: Re-analysis of Elicitation Study Data (QS1B)

6.1.1 Analyses and results

The analysis of the codes identified five themes (see Figure 14) which are: types of physical activity I do, why I do, why I don't do, what motivates me, and what they think about physical activity and health. There were 17 sub-themes that emerged from the main themes. Each main theme and sub-theme are discussed as follows.

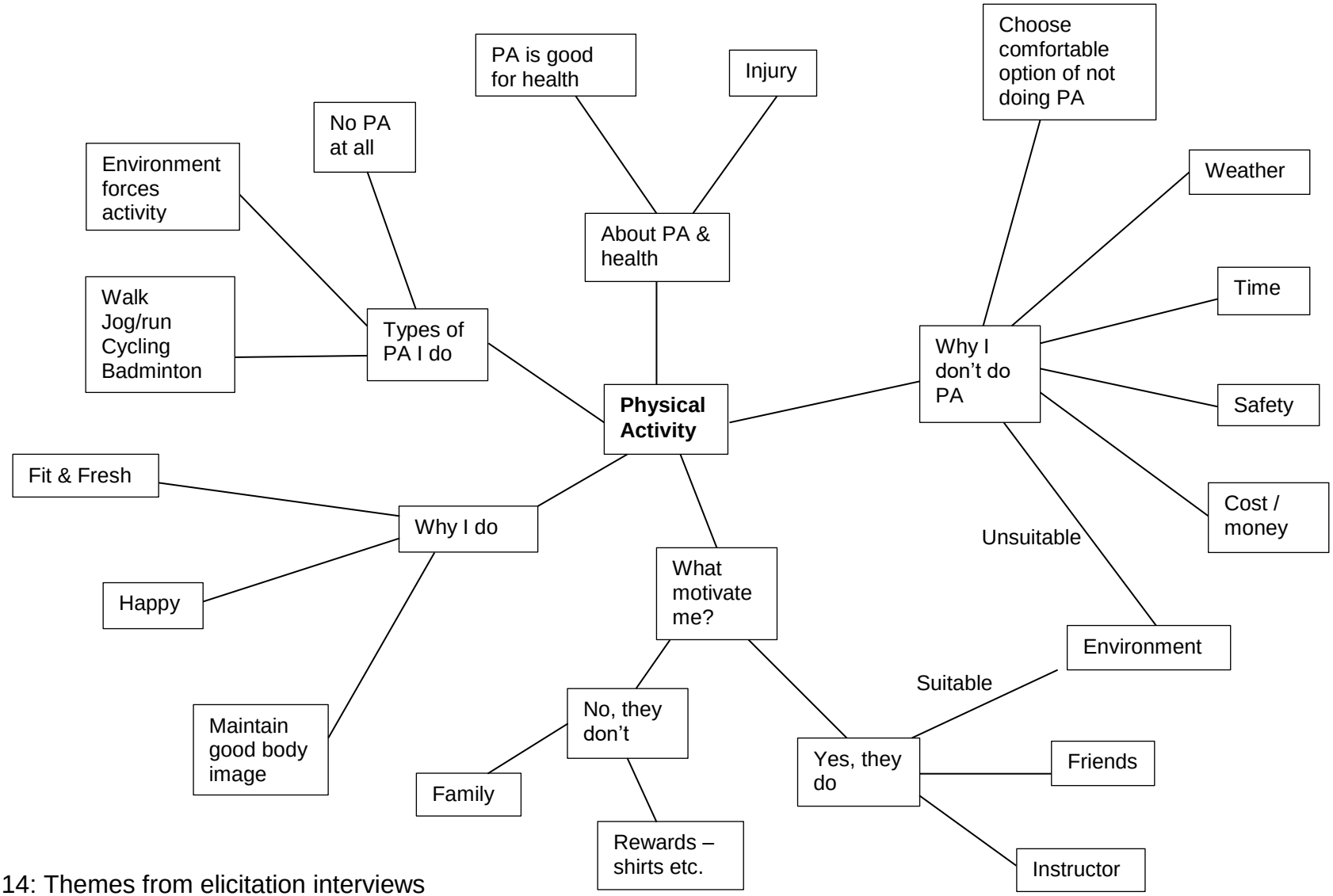

Figure 14: Themes from elicitation interviews

Note: PA – physical activity

6.1.1.1 Types of physical activity I do

The participant could be generally divided into 2 types. The first being those who did physical activity and the second those who did not do any form of physical activity. A group of participants reported to do some form of physical activity whilst in the United Kingdom but not in Malaysia were also included in the overall analysis. For those who reported doing physical activity there were two types of activity common among them which were walking and jogging. Other less common activities were cycling and playing badminton.

6.1.1.1 (a) Doing physical activity

Of the participants, 10 mentioned that they did some physical activity. As the aim of the study is to elicit their beliefs about physical activity, questions about the duration and intensity of the activity were not asked. Participants who mentioned some form of activity were categorised as doing physical activity.

"In Malaysia I play badminton, twice a week. Each session for about 2 hours. I play over here too but only once a week" (P37, 1:12-13)

"I mean, I went to jogging, swimming and play badminton" (P36, 1:10)

"Every week I play badminton" (P48, 1:12)

"Basically I cycle to Uni every day" (P39, 1:6)

"In Malaysia I'm more active. In Malaysia, every day after work, every evening, I'll jog around every weekday" (P35, 1:13-14)

6.1.1.1 (b) No physical activity

There were six participants who reported not doing any physical activity.

"Not really for me. I don't do any exercise" (P32, 1:26)

"Well I don't do anything" (P49, 1:16)

"I did not do anything. Here or in Malaysia" (P35, 1:35)

"Rarely, not frequent" (P42, 1:15)

There were two participants who mentioned they were more active in Malaysia as compared to time spent in the UK.

6.1.1.1 (c) Environment forces activity

During the analysis, the researcher noted that four participants reported that they were doing some form of physical activity but only whilst they were in the UK but not in Malaysia. The researcher found that the participants experienced lifestyle changes due to their environment, such as walking to work or campus, sending children to nursery and shopping. In Malaysia all these activities were carried out using personal vehicles such as cars.

> *"Ermm.. On average I walk to the nursery UK, to send my kids to the nursery at least twice a week. And apart from that I also walk to the nearby shop for grocery shopping" (P40, 1:10-12)*

> *"It's not comfortable walking there. I don't really walk there other than just going a few hundred metres to the shop nearby. It's not something we do. I think it's not our habit and there are some safety concerns" (P40, 1:39-42)*

In the above conversation, P40 considered that she did physical activity as part of her routine in the UK as she walked to the nursery as well as to a nearby shop to do her chores. However, she did not walk often in Malaysia, other than an occasional visit to the nearby shop, due to safety concerns and she felt that commuting on foot is not part of Malaysian culture.

> *"Err.. yes, every day I go to work, I walk. Arrr… from Monday till Friday" (P38, 1:17)*

> *"In Malaysia I drive to and from work, so it's a lot different" (P38, 1:21)*

> *"Activities like exercise, it makes you feel tired and if I could I would just avoid it. If I could drive, I'd drive. But I have to walk, Il try to procrastinate" (P38, 1:39-41)*

During the interview with P38 above, she mentioned she walked to work whilst in the UK but drove to work when in Malaysia. P38 cited tiredness and having the option to drive as the reasons for not walking to work in Malaysia, an option she does not have in the UK.

> *"I don't do exercise in Malaysia" (P46, 1: 37)*

"Yeah I did run a marathon 10 kilometres" (P46, 1:41)

"I run very often in the park" (P46, 1:45)

"Safety problem in Malaysia" (P46, 1:49)

Similarly, P46 said she did not do any physical activity in Malaysia because of safety concerns. However, P46 said she often runs in the park and participated in a marathon whilst in the UK.

Participant P43 was a postgraduate student doing a PhD in Malaysia and he continued his research in the UK. During the interview, P43 mentioned he did not do any physical activity in Malaysia but played badminton and walked more often whilst in the UK. Participant P43 attributed his inactive lifestyle in Malaysia to his workload, the weather and air quality.

"Well, before I came here I didn't really exercise. Especially, when I was doing my PhD. I spent all my time in the laboratory. When I come here I do exercise, I walk a lot first thing, and I also play badminton. And I also walk a lot in the city. So there is a change in lifestyle" (P43, 1:28-32)

"First is the workload. Then second is the weather, I don't really like to go out under the sun. I will walk in the shopping centre but not in the park" (P43, 1:36-38)

"Yeah, and the air quality as well. It's not so good [in Malaysia]*, except if you live in some better place, more outskirt area. I was in KL, the city centre" (P43, 1:42-43)*

The four participants above experienced a drastic change in lifestyle after coming to the UK. Although the participants cited many reasons for such changes, such as safety, weather, tiredness or time, an important point to note is that all four participants did not have the alternative to drive in the UK. Motoring costs in the UK, such as insurance and fuel, were prohibitive when compared to Malaysia. The circumstances of the participants could have contributed to their changed lifestyle.

6.1.1.2 Why I do

Participants who were physically active were asked about what made them want to continue to engage in physical activity or the benefits they obtained from being active. The answers they provided were categorised into three sub-themes

which were “feeling fit and fresh”, “feeling happy” and “maintaining good body image”.

6.1.1.2 (a) Feeling fit and fresh

The participants mentioned feeling fit and fresh as a result of physical activity. The fit and fresh feeling as reported by participants was probably the result of being more energetic and having better stamina as a result of regular exercise. The feeling of fit or fresh was probably participants’ way of expressing their experience of enhanced stamina or less fatigue and was not the same as the fresh feeling after a cold drink during a hot day. All answers about feeling energetic or having better stamina were included under this sub-theme as well.

“It gives me, it makes me feel fresh, your brain, you can think different ways” (P46, 3:135-136)

“…it makes you feel healthier and it can also make you feel, make you feel more energetic and younger” (P35, 2:71-73)

“Yeah, first if we do exercise we feel fresher and healthier body. So we get fitter this way” (P42, 1:24-25)

“I feel fresh. Yeah, especially when I finish sweating. I really feel fresh instead of stress.” (P36, 2:85-86)

“Most important, if we exercise we feel fresh. Our body constantly moving.” (P37, 2:75)

“But what we feel when we do exercise is we feel healthier, we feel fitter and better stamina to do our work. That is what we can see. OK” (P50, 3:114-116)

6.1.1.2 (b) Feeling happy

The participants mentioned that they felt happy, cheerful or physical activity relaxed their mind. Physical activity is known to have benefits for mental health and the feeling of happy and relaxed is linked to other sub-themes such as friends and environment.

“And I think people who do exercise are more cheerful” (P46, 4:158)

“It also relax your mind and body while you walk or while you are doing something that doesn’t need you to focus on” (P40, 1:20-22)

“Well it does have an impact, when we feel healthier, we feel happier” (P42, 1:44)

"Oh I feel happier and healthier. My body lighter. If I don't go exercising I don't feel good" (P34, 5:225-226)

"And I think people say you live longer, but if you can keep yourself like happier, then, of course, you can live longer. Yeah, yeah, negative" (P46, 4:163-166)

6.1.1.2 (c) Maintain good body image

Physical activity is known to be a good way to control body weight and give good body image. Some participants mentioned that physical activity helped them to maintain a healthy body image.

"OK, to keep my body figure" (P36, 1:23)

"In my opinion, exercise is good because it helps to control our body weight…" (P35, 2:70-71)

"Well, errmm.. I think exercise is good because I can get thinner" (P43, 2:58)

"If we look at people who don't really exercise, we can see it from their body" (P37, 2:73-74)

6.1.1.3 Why I don't do physical activity

There were six sub-themes under the theme of why I don't do physical activity, which were "choice", "weather", "time", "safety", "cost/money" and "environment". These were reported by participants who did not do physical activity.

6.1.1.3 (a) Choice

Participants lamented about the uncomfortable feeling of doing physical activity and naturally they were inclined to choose the more comfortable option of not doing it. Among the uncomfortable feelings associated with physical activity as mentioned by participants were pains, tiredness and sweat. By choosing not to do physical activity, participants escaped from those feelings of pain and fatigue.

"Yeah, not really like the feeling of sweat too much, tired" (P32, 2:61)

"Activities like exercise, it makes you feel tired and if I could I would just avoid it. If I could drive, I'd drive. But I have to walk, I'll try to procrastinate" (P38, 1:39-41)

"Of course right, we will choose the more comfortable option, instead of sweating" (P38, 1:45-46)

"So, I don't get the feeling. I don't like the feeling of getting so exhausted after, you know, doing some physical activity" (P32, 1:47-48)

6.1.1.3 (b) Time

Time was mentioned as the main barrier that prevented some participants from doing physical activity. Participants mentioned that most of their time was spent on their work and family. The participants' time was less flexible in Malaysia as most of them were working in Malaysia but studying in the UK.

"Yeah, like those problems I said earlier, it is not that we do not want to exercise, but when we have a vehicle that makes it easier and saves time for us, so we just use it" (P42, 2:49-51)

"In Malaysia, I'm very busy with my work and after work I go back straight to my house on a journey which takes about an hour….So when I arrive home it's late evening and besides over the weekend I did nothing too" (P35, 1:39-45)

"Err… I'm busy with my work" (P49, 1:29)

"And the time, for example when you are very busy you don't have time for exercise. If you have time for exercise, you don't have time to work the whole day" (P43, 2:83-85)

"…If we want to exercise indoors then you need to pay gym's fee, we haven't talked about time. So all these things are so troublesome" (P38, 2:84-86)

6.1.1.3 (c) Safety

Most of the women participants interviewed mentioned that safety was a concern that prevented them engaging in physical activity. They cited news reports of crimes happening in their areas and felt they were more likely to be targeted by criminals if they exercised in open areas.

"Because there are several cases near my house [in Malaysia]*, I mean they rob, kidnap. Yeah, kidnap. Like there was a… was a teacher and was killed and thrown in the lake. That's the problem, so that's why we don't do much activity" (P46, 2:53-56)*

"But it's not something we do. I think it's not our habit and some safety concerns…..Like the criminal records, those bag snatching. Things like that" (P40, 1:40-46)

"In Malaysia we have good parks, but whether they are is safe or not is questionable" (P39, 3:127-128)

"Yes, it concerns me as well, that's why I go where they are many people" (P44, 5:223)

"Yeah. That is a concern for me so I think we should go to a gym. I mean, I walk on campus, so that's why." (P43, 5:227-228)

In the above conversations, both P43 and P39 said they were concerned about their safety when walking in the park in Malaysia. They chose to walk or exercise where there were many people around or in a gym. Bag snatching crimes by passing motorcyclists that targeted women, as reported by P40, were common occurrences in Malaysia (Australian High Commission Malaysia, 2015).

6.1.1.3 (d) Cost

Cost was identified as a barrier to physical activity by the participants. Whilst doing physical activity at public places, such as a park, could pose a safety concern, going to indoor areas, such as a gym, would mean paying a membership fee. A participant also mentioned it would be a waste if he had paid for a fee and failed to fully utilise the facility. Apart from membership fees, the cost of physical activity also covers money spent on equipment or clothes which were always seen as a luxury by participants in this study.

"Here it is too cold and gym is expensive…" (P44, 6:259)

"So if they impose fee and I don't go, then I will feel I lose out right" (P48, 4:171-172)

"Err…well of course I will look at the cost, we look at our affordability, if the cost for exercising here is reasonable with our income and the outcome we get is not too expensive, if reasonable" (P50, 5:203-205)

"Gym? Er…No go to gym because of need to pay" (P31, 2:62)

6.1.1.3 (e) Weather

Participants also mentioned that the hot and humid weather in Malaysia is a barrier to them engaging in physical activity. Malaysia is a tropical country with

average rainfall between 2,000mm and 2,500mm and temperature ranges from 21ºC to 32ºC. Generally, physical activity would not be carried out during the afternoon to avoid the hot and scorching sun.

"Yeah, obviously if we exercise under the sun, it's hot. I don't like my skin to be darker" (P38, 2:83-84)

"… From the place I come from the temperature is so hot, so warm" (P32, 1:42-43)

"… Then second is the weather, I don't really like to go out under the sun. I will walk in the shopping centre but not in the park" (P43, 1:36-38)

"For me the weather does have a significant impact on me to exercise, for instance if it's cold, even I swim in the pool but if it's cold or rain outside, I don't get the mood to swim. If I cycle then its rain, I can't go out" (P49, 4:176-179)

6.1.1.3 (f) Environment

The environment could be a barrier to physical activity. During the interviews, some participants mentioned an unsuitable environment put them off physical activity.

"When people go to the parks [in the UK] *you see everybody running, everybody doing exercise, you will feel eh, I want to exercise here because everybody is doing it. But if you go to Malaysian parks, there are people who exercise but not many; the structure, the road is uneven, dangerous for people to walk. And you don't see more people doing exercise at the park but you see more couples there" (P39, 3:132-137)*

"…place where I jog must be no people around, I mean err.. not too many people. So the environment must be supportive of me…." (P35, 3:120-121)

"But I think what is more important than that is er…your environment, you are surrounded by healthy people and people who do activity. You go, you know, you talk to another consultant, another person, you know, or friends you meet. They don't talk, like, which is the best "gerai" [food stall] *to eat this, which is the best place to, you know, to buy this thing. You know, people here talk about sport" (P47, 2:75-81)*

"You need to see the environment. If the environment is suitable and comfortable, I think I will join it, but if the environment does not totally reach my expectations, then I don't think the reward will attract me" (P36, 3:144-146)

"I often, but the, but the swimming pool is not clean. The rain water and people pee there ha, ha, ha" (P31, 4:174-175)

6.1.1.4 What motivates me?

Participants were asked about factors that motivated them to engage in physical activity from various angles, such as family's and friends' support, giving out material rewards and the provision of a coach or instructor service. The findings revealed that friends, an environment conducive to physical activity and having an exercise instructor would motivate them to do more physical activity. However, contrary to the researcher's belief, giving out incentives did not really entice participants to engage in physical activity. Participants also reported that family support also did not have much influence on their decision to be physically active or inactive.

6.1.1.4 (a) Yes – Friends

Participants mentioned that friends did have an impact on their decision to go out and do physical activity. Most participants enjoyed the socialisation process when doing physical activity.

> *"But friends do influence me a lot in exercising. Those days before I get married, we stayed in a house of two, three or four persons, so one person asks you to go out to play badminton, I just go out. So that way it gets me to go out, influences me to exercise." (P37, 3:110-114)*

> *"Definitely. You need a gang of people to play football so it doesn't matter how late, 5 o'clock. If I miss it or I am a bit late, and someone comes to my house and says "come on laa.., let's go play football" it's like friends as well" (P45, 5:240-242)*

> *"But friends, like friends say to you let's go and play futsal, let's go and play badminton. I like to play badminton and futsal so I'll join them" (P42, 2:68-70)*

> *"Friends have more influence but more on aggressive sport instead of walking in the park." (P43, 3:126-128)*

> *"Yeah. Sure. Alone is so suffering" (P31, 3:108)*

In the above conversation, P31 said she thought doing physical activity alone was depressing.

> *"err.. I'll do physical activity. And another thing about exercise is you can't do it alone" (P39, 2:65-66)*

6.1.1.4 (b) Yes - Instructor

Participants also mentioned that they would feel more motivated to do physical activity by having an instructor or coach who could guide them in the activity.

"For me is good way" (P37, 3:146)

In the above conversation, P37 agreed that providing an instructor would motivate him to do more physical activity.

"I think this is the best way to do it. Eh… maybe not the best but a good way is to provide instructor" (P37, 3:142-143)

"Yeah, I think so if we are gonna have such a support system that would encourage them and probably eliminate the laziness" (P40, 3:137-138)

"Yeah. I agree. I think I will learn something from the instructor about how to exercise" (P40, 4:182-183)

"I think it will encourage me because I'm with an expert, it will make me feel that I'm doing the right thing and what…" (P44, 4:185-186)

"But coaching in terms of warming up, stretching… you need an instructor for that. When you start something, if you don't do stretching, nobody to teach how to do it right, your muscle will cramp and you will feel pain. So an instructor is important here" (P42, 3:102-106)

6.1.1.4 (c) Yes – Environment

The sub-theme "environment" is shared between the themes of "What motivates me" and "Why I don't do". Environmental factors were mentioned as motivating factors and as barriers to physical activity. Environment as a barrier was discussed in Section 6.1.1.3(f) above. The following are quotes from participants who related that an environment conducive to physical activity motivated them to engage in physical activity.

"If I have all those things at home like dumbbell or treadmill, maybe it will motivate me a little bit to exercise. Mmm…" (P38, 4:152-154)

"If you can provide good parks, green parks and everything. Yeah, I think it's a good way to motivate people to do that" (P40, 3:112-113)

"In fact to run in the park you need to have a good park, you need to have a safe parks" (P39, 3:126-127)

6.1.1.4 (d) No – Family

Participants mentioned that family support has little influence on their decision to engage in physical activity. Although participants who reported to be still doing physical activity in this study had a history of doing physical activity with their family when they were young, they insisted that family support no longer influenced their current habits.

"Not family because my family is quite busy" (P44, 3:112)

"Family influence is not much. Sometimes discourage, like "oh the sun is so hot don't go out" (P43, 3:124-125)

"In my family, we rarely exercise together" (P37, 3:108)

"But I don't deny that in term of family it doesn't have very much influence" (P42, 2:67-68)

"If I want to talk about my personal history, then my brother and father are both active in sports. But I'm older now, I'm no longer influenced by them anymore because we don't stay with family anymore. Now everything is on my own initiative" (P41, 2:63-66)

6.1.1.4 (e) No – Incentives

Participants were asked whether incentives such as a certificate, tax relief, t-shirt or training shoes would encourage them to engage in physical activity on a sustainable basis. Participants mentioned that they would enjoy the gift but would not engage in physical activity because of receiving those items alone.

"I don't mind about the rewards…" (P35, 4:168)

"For me, even with the reward given there are still barriers because of time" (P48, 2:57-58)

"… as for this question on reward, actually we already got it from the government in form of tax relief for purchase of sports equipment. But I never take any advantage of it…." (P49, 2:66-68)

"I don't want" (P34, 4:166)

In the above conversation, P34 say he does not want any reward for physical activity

"But if the environment does not totally reach my expectations then I don't think the reward will attract me" (P36, 3:145-146)

"Err.. it won't work for me because I don't really care ha, ha, ha" (P43, 4:167)

In the above conversation, P43 said having a certificate as an incentive would not encourage him to maintain physical activity.

"It is good to encourage people to go. But people do just because they want those rewards. That also means that once those rewards stop, those people will stop going too" (P41, 3:105-108)

6.1.1.5 What I think about physical activity and health

The results of the analysis indicated that all participants understood that physical activity contributes to improved health. Even participants who reported not doing any form of physical activity agreed on the health benefit of regular physical activity. However, participants also mentioned adverse effects, such as excessive physical activity could result in injury.

6.1.1.5 (a) Physical activity is good for health

All participants were of the view that physical activity helps in maintaining health. From the interviews, participants agreed that physical activity does contribute to good health. Some of the answers given on health benefit were about cardiovascular system or stamina, such as fitness, strength and agility and even mental health.

"I agree that exercising contributes to many benefits to our body" (P37, 2:72)

"Of course there is some, you know, benefit from exercise. For your health, even some say that it is, you know, psychologically, for social being, you know, and all that" (P32, 2:95-97)

"However I exercise because of, I felt that exercise will make me more healthy" (P39, 1:24-25)

"I know that it will keep us fit and healthy and it also relaxes your mind and body…" (P40, 1:20-21)

"What I know is that jogging is good for your stamina. Because it is related to your heart. Generally, when you jog, you get healthier, so your heart get more active. So chances to get diseases like asthma will be less." (P41, 1:33-35)

"Good for blood circulation. Err…healthy" (P31, 1:28)

"Good thing as you know right, keep you healthy, live longer, keep you fresh all the time" (P45, 3:127-128)

6.1.7.5 (b) Injury

One of the disadvantages of physical activity that could affect our health is injury. During the interviews, participants mentioned that injury is a disadvantage that could happen due to physical activity. Injury caused by physical activity is common and most minor injuries could be easily treated at home through over-the-counter medication.

This disadvantage did not necessarily prevent participants from doing physical activity but rather they thought it a negative element connected to physical activity. For instance, participants who reported not doing physical activity chose not to engage due to reasons described under the themes "Why I don't do" described in Section 6.1.1.3".

"So sports can cause injury to our body. Like exercise, you try to convert exercise to sports, so it gets a little pressure here and it can cause injury too, so our body don't feel healthy there" (P42, 1:38-40)

"We are prone to getting injured" (P34, 2:78)

"The negative aspect, I would say you know, if you are not careful, one thing it can damage you physically if you play too much not according to your age or ability and it start to hurt" (P47, 3:131-133)

"What I can see is injury, yeah injury. This is what I see with badminton but that happens when you don't do it the right way" (P37, 2:90-92)

"Yeah, pain. I played badminton last Sunday and now my whole body is pain" (P43, 2:82-83)

"Yep. Well, vigorous exercise with no structured programme will definitely bring about negative impact such myocardiac infarction err… heart attack or people who get over-use injuries especially orthopaedic injuries" (P39, 1:37-40)

6.1.2 Summary

The present study was conducted based on the TPB to gain insight into beliefs related to physical activity. Past research established that underlying beliefs play an important role in health behaviour decision making including in relation to physical

activity (Hamilton & White, 2010a). The present study tried to gain insight into the factors that underlie the participants' decisions to engage in physical activity by applying the TPB as a theoretical framework.

From the TPB perspective, the study showed that behavioural, normative and control beliefs underpinned the decision-making processes to engage in regular physical activity. The participants in the current study were able to identify the physical and social benefits of performing physical activity. In addition, the participants were able to identify benefits and disadvantages of exercising. Through the interviews, motivating factors and barriers were identified and analysed based on the TPB.

From the analysis, it was found that the participants who reported doing physical activity primarily engaged in outdoor activities. Walking, jogging and, to a lesser extent, cycling were mentioned by participants involved in the interviews. These activities were expected as they can be carried out whilst going to and from the campus or work and during evening exercise in the park. In a systematic review of qualitative studies of South Asian adults in the UK, it was also found that outdoor walking is the preferable activity due to accessibility and feasibility (Horne & Tierney, 2012). Football and badminton were two types of team sports mentioned by the participants. Both games are favourite sports in Malaysia (Bernama, 2015) and were possibly easier sports for the participants to get friends to play than other sports.

Participants related that by engaging in physical activity they felt fitter and fresher. Tendons and ligaments grow stronger with prolonged exercise and, as such, participants who did physical activity would experience enhanced stamina and agility resulting in them feeling less fatigue and better mobility. This would probably be experienced by the participants who claimed they felt fitter following consistent physical activity. While feeling fitter seems to be in tune with the outcome of physical activity, the feeling fresher could be confused with the feeling experienced after a hot bath or after a long day or a cold drink on a hot sunny day. People's cardiovascular and respiratory systems when challenged with physical activity will respond and become more efficient thus making them feel alert and energetic. In this study, the participants probably found the best way to articulate these improvements was as feeling fresh. This finding suggests that the participants were influenced by affective beliefs that underpinned their decision to engage in physical activity. The findings are

interesting because an immediate affective belief would be fatigue and the instrumental beliefs would be achieving good health. The researcher concluded that the feeling of fit and fresh was a positive affective belief and fatigue was a negative affective belief. However, the salient beliefs affecting the participants in the current study were the positive affective beliefs.

Participants also mentioned that they felt happy from engaging in physical activity. Feeling happy following physical activity is also in line with other studies that showed physical activity was able to produce feelings of pleasure following each bout or session (Bellows-Riecken, Mark, & Rhodes, 2013). In addition, the happy feeling could also be related to the process of socialising with friends whilst doing physical activity. Pleasure and enjoyment from social interaction during physical activity had been noted as motivators for continual engagement in exercise in numerous studies (Allender, Cowburn, & Foster, 2006; Hendry, Williams, Markland, Wilkinson, & Maddison, 2006; Jepson et al., 2012; Korkiakangas et al., 2011; Mancuso et al., 2006; Young, He, Harris, & Mabry, 2002). Analysing the result from the TPB angle, the finding of enjoyment as a reason for participation in physical activity is also consistent with other studies on the affective components of attitude (Lowe, Eves, & Carrol, 2002). Studies also had shown that enjoyment is a motivating factor for physical activity (Bellows-Riecken et al., 2013; Hamilton & White, 2010a). Hamilton (2010) concluded that the enjoyment is not specifically explained in the TPB and Bellows-Riecken et al. (2013) reported enjoyment from physical activity was without any underlying beliefs and could be a novel finding to add to the TPB model.

Physical activity is known to increase energy use, help maintain muscle mass and affect fat distribution in the body (US Department of Health and Human Services, 1996); this makes exercise when combined with a healthy diet a good way to control body weight. Maintaining a good body image was mentioned by the participants as one of the reasons they engaged in physical activity, which is consistent with other studies that found that improvement in physical appearance was a reason given for exercise participation (Lowe et al., 2002). Analysing this in line with the TPB framework, control of body weight is a consequence of regular exercise and thus could be classified as an instrumental belief. The theme of good body image is the only instrumental belief elicited as a motivating factor from the participants of the

current study. This finding has its own significance as other studies indicated that exercise behaviour was not usually influenced by an instrumental component of attitude (Lowe et al., 2002). However, a study among 217 Malaysian adults found that instrumental attitude was the strongest predictor of exercise intention (Yap & Sabaruddin, 2008).

Participants related that friends and environment are important motivators for them to continually engage in physical activity. By conducting physical activity with friends, participants were able to enjoy the socialisation process and build a network of acquaintances. Having friends to exercise with provides social support in which people with a mutual interest in exercising can support each other with acceptance of each other's habits (Korkiakangas et al., 2011). This way, participants do not see physical activity as a strenuous obligation but as an activity that gives enjoyment and a sense of belonging (Korkiakangas et al., 2011). Looking at these findings applying the TPB framework, the participants identified that the opinion and behaviour of other referents, in particular their friends, were important in influencing their physical activity behaviour. These findings are consistent with the descriptive norms component of the TPB where the opinion and action of significant others are used as referents in deciding their own actions (Rivis & Sheeran, 2003). It creates a situation where "if all of my friends are doing it, I want to do it too".

The environment seems to work both ways as a motivator and barrier to physical activity. Participants compared the condition of parks and the sports facilities in the UK with those in Malaysia. Parks in the UK or particularly in Liverpool are more in number and better maintained while sports facilities such as the local council's pool and gym charge affordable fees for students.

Participants also related that they would be more motivated to do physical activity if there were an instructor to guide them on their activity. Although at the time of study none of the participants was benefitting from instructor services, they found the idea encouraging. The idea of having an instructor to guide the participant in physical activity was also related to the control beliefs within PBC. By having an instructor, the participants could increase their confidence and ability to perform the behaviour. As having an instructor affects the confidence of performing the behaviour or the internal control, participants are more receptive to the idea.

In contradiction to this researcher's expectations, the participants indicated that rewards or gifts and family support do not motivate them to continually engage in physical activity. From the analysis, it was found that although the participants were happy to receive the rewards, it did not affect their decision to further engage in physical activity. The idea of incentives could not entice the participants to engage in physical activity probably because it failed to tap into the PBC beliefs of the participants in this current study. The participants did not link incentives such as shoes with improved performance of the behaviour; thus, incentives failed to incite any intention to engage in physical activity. This outcome was supported by other studies which showed intervention with monetary incentives had no effect on physical activity behaviour (Hunter, Tully, Davis, Stevenson, & Kee, 2013) .

An analysis of the interviews with NGOs' attendees of this study showed family support had little influence on their motivation to engage in physical activity. This is consistent with other studies where injunctive norms have little significance in influencing decisions to perform exercise. The injunctive norm or "what my significant others think I should do but probably they don't do it themselves" usually has weak influence over the motivation to comply of an individual. This is in contrast with descriptive norms, such as what our friends are doing, they got to do it too.

As with many other studies, participants cited poor weather as a reason that prevented them from outdoor exercising. In a study among participants of Pakistani and Indian origin in the UK with type 2 diabetes, it was found that cold weather was a barrier to exercising (Lawton, Ahmad, Hanna, Douglas, & Hallowell, 2006). A similar finding about the issue of climate was also found in a study among African American women, where poor weather was mentioned as a barrier to exercise maintenance (Kirchhoff, Elliott, & Chin, 2008). Another study, which was conducted in the United States among patients with asthma, also found that weather conditions such as humidity and wind impeded daily outdoor activity (Mancuso et al., 2006). In the current study, the participants found the hot and humid weather of Malaysia deterred them from doing physical activity. In Malaysia, physical activities are usually carried out in the morning or late afternoon and any outdoor physical activity in between these hours is difficult under the scorching sun. The barriers mentioned are the perceived difficulty within the PBC of the participants in the current study. The

external control of PBC is related to factors outside the individual, such as environmental or weather issues.

Safety aspects were mentioned by the participants as a concern that prevents them from engaging in physical activity. Similarly, a study among urban African American women also found that safety was a barrier to them engaging in physical activity (Young et al., 2002). While a study among rural and urban youth also found that danger and crime were causes for concern for them to exercise (Moore et al., 2010). In the present study, the participants discussed their concern for safety if they carried out physical activity in public places, such as running in a park or even in the city. Criminal cases such as bag snatching and robbery in Malaysia were cited by participants as factors that demotivated them from doing any physical activity. The safety aspect was also an external control within the PBC domain and, like the weather, no immediate intervention could address these concerns.

Participants also mentioned the difficulty of incorporating physical activity in their busy life with work and family commitments. Lack of time for exercise was also cited in other studies as a barrier to engaging in physical activity. In a study among 60 patients with asthma in New York City in the United States, the patients attributed their family and work obligations as barriers to engaging in physical activity (Mancuso et al., 2006). In a qualitative study among 74 patients with type 2 diabetes, the patients cited stress, fatigue and lack of time due to work and commuting to and from work as leaving them with no time for exercise (Korkiakangas et al., 2011). A review of a qualitative study by Allender (2006) also found time was the main barrier to physical activity. In a qualitative study involving 40 adults in South East Queensland, Australia it was found that the participants with children found it difficult to be active (Hamilton & White, 2010b). In a study of UK citizens of Pakistani and Indian origin with type 2 diabetes, participants pointed to the difficulty of incorporating physical activity, such as walking and swimming, into their busy lives (Lawton et al., 2006). In the present study, in which most of the participants were adults with family and had been working before coming to the UK, the findings were consistent with other literature.

Participants related that environmental factors in Malaysia that were not conducive to physical activity were barriers to their engagement in regular physical activity.

Among the environmental issues raised were parks not properly maintained, not many people doing physical activity and the scarce number of parks, making their location far from most residential areas. A study comprising 143 Latina women in California, United States found geographical distance from appropriate parks or fitness centres was a barrier to them engaging in physical activity (Juarbe, Turok, & Perez-Stable, 2002). Unlike most cities in the UK that have clearly marked, paved and wide pedestrian walkways, most cities or towns in Malaysia do not have such facilities, which makes the option of running in the city not viable. Most roads in Malaysia do not have a cycle path and are congested with motorcycles and cars making it dangerous to cycle on the road. Participants lamented that public places are not conducive to physical activity and indoor areas charge expensive fees.

All participants agreed that engaging in sustainable physical activity was important to maintain good health; this showed that instrumental beliefs had a weak influence over intention to engage in physical activity. The participants generally know the benefit of physical activity and lack of knowledge is not the main reason for not engaging in physical activity. Some participants also believed that diseases were partly a divine intervention and could not be totally avoided via an active lifestyle. Such thoughts in which illness was believed to exist outside their direct control and individual responsibility in shaping health was limited, was also found in other studies. In a systematic review of qualitative studies of physical activity uptake and adherence among South Asian adults in the UK, it was found that some participants were unlikely to change their lifestyle even when the benefits of physical activity were explained to them as they linked disease with fate (Horne & Tierney, 2012).

Some adverse effects of physical activity are musculoskeletal injuries, infection, allergic events and cardiac events. In the present study, participants related doing rigorous and unstructured activity to injury. The fear of injury was also probably the reason why participants seemed to like the idea of having an instructor to guide them on exercise.

6.1.3 Conclusion

This study provided the first platform to understand the underlying beliefs that guide the decision to engage in physical activity among Malaysians for the entire research.

Although the main objectives of the elicitation interview were to develop a questionnaire by qualitatively analysing the data, it yielded findings that added to the robustness of the overall conclusion.

From the analysis, several behavioural, normative and control beliefs were found that underpinned the participants' decisions in which some were physically active and some were sedentary. Salient beliefs among the participants from this study were more personal in nature, such as affective beliefs where participants felt happy and fresh or descriptive norms where participants sought to be in the group of their referents. Instrumental beliefs, such as being healthy, and injunctive norms, such as family pressure, however, did not have influence over the participants' decisions. Most of the barriers identified were related to external control of the PBC, such as time, environment, safety and weather issues.

6.1.4 Reflexive statement

My occupation as a Health Education Officer with the Ministry of Health Malaysia provided me with an opportunity to work with NGOs and, in many ways, shaped my views on them. I also realised that my occupation may also have shaped the NGOs' view of me, for example when answering my questionnaire and attending interviews. This created an awkward position because I approached the participants as an officer from the Ministry of Health Malaysia and as a researcher at the same time, but I expected a neutral response from them. My views on the NGOs, both attendees and organisers, were based on my experience and this would also affect my interpretation of their answers. On reading my thesis, one would probably say that themes such as funding could have emerged because of my bias when analysing the transcripts. I realised this too. For this reason, the study was designed such that I did not interfere with the delivery of the physical activity intervention. The NGOs were free to run their exercise programme as they had planned. They may have exercised harder during my presence but that is all, nothing changed. In addition, I positioned myself as a researcher rather than as an officer from the Ministry of Health when examining the transcripts and I included quotes from the interviews to support the themes. I verified my findings on themes using the existing literature. For instance, other studies also found that funding or cost were an obstacle faced by

individuals in performing physical activity (Shafieinia, Hidarnia, Kazemnejad, & Rajabi, 2016). Lastly, I shared my emerging analysis with my supervisors and they also checked the thesis to ensure the reporting was not biased but a reflection of the findings.

6.1.5 Limitations of study

As in other studies, the current study has several factors that may limit the scope of the findings. The questions asked during the interviews were developed based on the manual for developing questionnaires based on the TPB with the objective of constructing the questionnaire alone. As such, the researcher did not probe further into answers given by the participants to explore their underlying beliefs.

The participants in this study were mainly postgraduate students or their dependents. This meant that the participants had pre-conceived ideas that they are in the UK temporarily and being physically active was not a priority as they had to complete their studies before the end of their funding.

6.1.6 Suggestions for future research

From the analysis, some respondents mentioned religious and cultural barriers to physical activity Conner and Armitage (1998) suggested it was important to consider the influence of normative beliefs, such as moral norms, and these beliefs should be explored further. Some literature showed the weakness of SN in the TPB but a detailed study could provide an explanation of whether previous measures had failed to tap the appropriate norms. Moral norms are perceptions of the moral correctness or incorrectness of performing a behaviour and moral norms could differ from one society to another.

6.2 Understanding Participation and Promotion of Physical Activity in Malaysia: Analysis of Heterogeneous Viewpoints of Attendees, NGOs and Health Officials (QS2)

6.2.1 Analyses and Results

The analysis was divided into three sections which were the results for participants, organisers and health officials (Sections 6.2.1.1, 6.2.1.2 and 6.2.1.3). This was followed by a summary of each section (Sections 6.2.2, 6.2.3 and 6.24); the three summaries were then integrated into an overall summary.

6.2.1.1 Result for attendees

Seventeen themes were identified which are activity, money, health, feeling, time and social support. These themes are discussed below.

6.2.1.1.1 Activity

The types of activity chosen by the participant were important to maintain their interest. Sub-themes for activity were identified: familiar activities and held at convenient location.

6.2.1.1.2 Familiar

Participants tended to choose activities that they felt were easy or familiar and not something new. This was indicated by many participants who stated that they had been doing the activity or games for a long time. A familiar activity helped them to blend in the group that they were joining and thus maintain the activity.

"…I've been playing for 25 years" (P1, 1:13)

"Other types of sports like golf I'm not good at" (P2, 1:50)

"At this moment this is what I can .... I can.... It's easy" (P2, 1:40)

"Because since school days I've been, been, been playing for what… Since I'm small" (P4, 2:83-84)

"This is because since …. errr… since I'm small I've been playing badminton and I really like badminton….So until now I still keep on playing even at this age and I like badminton and I like sports" (P5, 1:9-11)

As most of the participants in this study were people of a mature age, they tended not to take up new activities with which they were not familiar.

A participant also mentioned that she chose to do aerobics exercise and not gym as she associated a gym with muscle building.

> *"For me I don't like women's gym, it's not because of anything, but I think of that you know... You grow all your muscle I don't want... I just do normal exercise. Ha, ha" (P17, 14:690-692)*

6.2.1.1.3 Location

The location where the exercises were held also seemed to be important; participants said they preferred an outdoor but discreet location at which they were not overly exposed to the public. Such a location provided the participants with some kind of privacy but at the same time they were able to enjoy the fresh air or outdoor activity.

> *"Err.. more comfortable if out-door. We can get what… fresh air….." (P8, 5:231)*

> *"Think better outdoors…" (P9, 5:236)*

> *"…like here, we enjoy different environment. For our eyes you know. The view, you know. We feel relaxed with these views you know" (P13, 1:34-36)*

> *"Venue like this is hidden, people can't really see you, your activity. They can only see us with red shirts" (P15, 13:610-611)*

> *"If they say anything about air-conditioning, I'm going to give a big cross" (P17, 12:600)*

The above was the reply by P17 to the researcher's suggestion of a venue that was located in an indoor air conditioned area. Waving her hand to make an "X" mark to signify her disagreement with the idea, P17 said she would protest if the organiser made such a suggestion to them.

Participants also shared that the location should be conveniently near to their house as this saved them time for travelling.

> *"Sometimes when I get back home they are still in their bed. Its just a short while right? It's near" (P15, 7:336-337)*

> *"Most stay in this village, some from neighbouring village but not very far" (P20, 3:101-102)*

6.2.1.1.4 Monetary

Cost was a primary barrier to physical activity (Moore et al., 2010) which was also seen as a luxury or self-indulgent activity that you could live without (Im et al., 2012).

6.2.1.1.5 Affordable

Participants mentioned during interviews that the activity needed to be affordable to them. The activity had to be affordable in terms of clothing or equipment required for the activity and the membership fee for the group. Although the participants enjoyed doing physical activity, spending on other things was just as important in their monthly budget.

> *"Err... Like we do not need to pay a lot of money, we only pay fee. Like racquet you just use as what you can afford. As long as you can isn't it?" (P2, 1:40-42)*

> *"For me it doesn't cost much here. Other places may be higher" (P2, 3:121)*

> *"We have given everybody free exercise, that is considered good you know..." (P15, 16:797)*

Participants mentioned that gyms are chargeable and for those who were not willing to pay they should just join the NGO that offers free exercise sessions.

> "*.....But it's payable you know. If you feel you can't, just come here"(P14, 15:711-712)*

> *"If you go to a gym you have to pay, you know" (P13, 4:154)*

6.2.1.1.6 Sponsor

Participants noted that a sponsor from the government had helped to ease some of the financial burden that otherwise would have been passed on to them. The government grant helped to keep the activity at an affordable level for them. Hence, finance is perceived as a barrier to physical activity.

> *"Government has given us funding, so Alhamdulillah [praise be to god], we got it*." (P6, 9:402)

".....But what is important is money, in term of funding, if we have the funding it strengthens our organisation aaarr..." (P1, 3:129-130)

"Better if we can ask for some help from our YB [state assemblymen]" (P4, 3:107)

"Because even this is under sponsorship from YB [state assemblymen] (P4, 3:111)

"So he ask from the government,…maybe state government. So the rental is only 5 Malaysian Ringgit if I'm not mistaken" (P2, 3:137-138)

6.2.1.1.7 Health

Participants mentioned that their reason for joining the exercise group was to maintain physical health. The participants described the quality of being in good health as when their body was feeling lighter, sweat after exercising, fit and in good mobility.

"For what… for… we know how to get healthy" (P19, 2:62)

"I want to keep my body healthy" (P12, 1:18)

"To get a healthier body" (P9, 3:103)

"My plan is just for my health alone. Health. Another reason is when I look at my body, if other people see me as young then I want to look even younger...". (P1, 2:52-54)

6.2.1.1.8 Sweat

In this study, participants associated feeling healthy following physical activity with sweating.

"I play badminton only to get sweat. Just to get sweat" (P3, 1:43)

"But I feel satisfied to do. You see. I sweat" (P17, 9:401)

"Like I don't sweat. So now I sweat more and I get more active" (P8, 3:127)

"For our health. For me, I've not done this many times but I can feel OK. When I get home I feel healthy. I sweat OK. My body feels light" (P16, 2:63-64)

"Like for me, everyday when I wake up. Even if I don't exercise, I will go round and round, find something to do to get myself sweating" (P17, 17:847-848)

"...But I don't want to care about that you know. I want to get sweaty. I want to turn my heavy body to lighter body. Yea" (P14, 7:302-303)

Sweating was an interesting point in this study as Malaysia is a tropical country with hot and humid weather all year round. This would make people sweat even with little activity especially during the afternoon. Participants in this study mentioned that sweating from doing physical activity is different from sweating from the hot afternoon temperature, although they could not explicitly explain the differences. However, relating physical activity with sweat has also been reported in another study (Johnson, Tillgren, & Hagströmer, 2009).

6.2.1.1.9 Light

As a consequence of doing physical activity, participants mentioned that they felt their body to be lighter. Although some participants said they had reduced their body weight since doing physical activity, this feeling of lighter was, however, different from reducing body weight.

> *"For our health. For me, I've not done this many times but I can feel OK. When I get home I feel healthy. I sweat OK. My body feels light" (P16, 2:63-64)*

> *"Body felt lighter. I like it" (P18, 6:279)*

> *"Difference yes. After we do exercise we feel lighter, ha, ha" (P9, 4:152)*

Participants also mentioned feeling happy with a lighter body but that does not necessarily link to reducing body weight. A lighter body probably referred to better mobility or less pain around the joints or increased muscle strength.

> *"For me, I don't…. Reduce weight. I see people with slim bodies...I don't. Most important my body is light and I'm healthy, that is enough" (P17, 10:458-459)*

> *"I have a heavy body you know. So after I follow this programme, I feels lighter. My waist pain is now OK" (P14, 7:307-308)*

Overall, participants seemed to be realistic in terms of body weight. Participants admitted that they would not be able to achieve the ideal weight and body curve but would be happy to see some reduction.

"It's different if you compare to like some clubs with all those Chinese, young and beautiful. Yeah. Those Chinese unties with slim bodies, OK there..." (P15, 13:621-622)

"For me, I don't... Reduce weight. I see people with slim bodies... I don't. Most important my body is light and I'm healthy, that is enough. If you want to reduce body weight, I think it can't reduce I'm large like this" (P17, 10:458-460)

Participants also reported fluctuation in their body weight. Exercise was reported to keep weight under control, although it was not an ideal solution.

"er… about body weight. Sometimes reduce err.. sometime it ran off-course but somehow it will go down again" (P12, 1:31-32)

"Last time our body weight… body weight is reduced, you know" (P19, 3:102)

6.2.1.1.10 Fit

Feeling fitter was also another benefit from physical activity related to health mentioned by the participants. One of the qualities of fitness was being able to move actively compared to their age or their peers who were physically inactive.

"Err…because every Tuesday and Thursday we have aerobic exercise. Feel healthier. Easy to get up in the morning. I'm fitter" (P8, 3:122-123)

"If you want to compare all their ages, I'm even more active. I move actively and fit" (P15, 9:407-408)

"Yes, I feel healthier and fitness improved. And I work every day" (P12, 1:26)

"Yes. Before this I can't jump, now I can jump. Yeah, like you know" (P19, 2:90)

6.2.1.1.11 Feeling/emotion

Positive affect was also discussed by participants as a reward resulting from doing physical activity. Feeling happy and fun were two of the emotions mentioned by the participants.

6.2.1.1.12 Enjoyment/Happy

Feeling happy is linked to satisfaction from doing physical activity and opportunity to socialise with friends. As this study involved group

exercises, members usually spent some time chatting before and after the exercise session. This enabled them to build a network of acquaintances with mutual interest on an issue. These friends would sometimes act as a support to each other, for example by providing emotional support for attendees with cancer.

"Yes. We feel more fun. Enjoy. More fun. We feel happy. When we feel happy, we are healthy" (P7, 3:147-148)

"Like me, I feel young again. Ha, ha. Because when you are young you don't do this. I feel happy and fun" (P15, 11:511-512)

"Oh I'm happy, fun, enjoy. Release tension. Yes" (P13, 1:29)

"I'm happy" (P11, 1:41)

"We just ask ourselves what we want. We feel happy here. We like it" (P18, 8:388-389)

"Yes, I achieve my objective. So I'm like what people say, happy" (P5, 1:48)

Participants also mentioned that they felt that exercising in a group with music created a fun environment. The feelings of happy and fun seem to be inter-related and overlapping when mentioned by the participants.

6.2.1.1.13 Time

The aspect of time management was an important factor that kept the participants coming to the exercise session. Within the theme of time, two sub-themes identified: time management and frequency of the exercise session.

6.2.1.1.14 Time management

Most of the participants in the interviews were women; consistent with other findings, family commitment was often cited as the reason for lack of time (Ball, Salmon, & Crawford, 2006). The participants could only join the exercise session if they were able to spare some time from their busy household chores. The participants also mentioned that most of their friends who dropped-out of the group were busy or unable to manage their time between their family and the group.

"One more thing with our club is it is more for senior citizens. So these people, so sometimes they come but sometimes they are busy taking care of grandchildren. ……... They still have interest but at the moment, if they have a baby, then they need to take care. That's it." (P1, 2:93-99)

"All of them… there are some.. if they are busy then they won't come" (P20, 3:123)

"So, that's why they can't come.... If they have time, all of them want..." (P13, 2:75)

"They usually said things like busy or things like that. Like that" (P14, 17:820)

"Maybe... we have to.... in the morning we need to send our children to school, to the market, send wife to hospital so maybe arr... all these things make them unable to come" (P1, 3:124-126)

Participants also shared that the exercise session they joined was held at a time at which they were able to participate. There were no common times for all participants but they mostly preferred morning sessions as the weather was cooler during that time of day in Malaysia.

"Arr... I can do bowling but... I seldom go. Maybe it's because of the time. This is all that I can play. That one they play at night" (P2, 2:54-55)

"Well because of children. You need to pick up children from school you know. We have morning and afternoon session school you know" (P13, 2:70-71)

6.2.1.1.15 Social interaction

The theme of social interaction covered two interrelated sub-themes which were friends and family support. Social interaction was an important theme from the interviews. Participants shared that friends and family were important in keeping them engaged with the exercise session.

6.2.1.1.16 Friends

Friends was an important factor that motivated the participants to go to the exercise session. The sub-theme of friends was also related to the theme emotion as participants enjoyed exercising with friends. Participants also shared that they learned about the group they were in from friends and some mentioned that the immediate benefit of being in the group they were in was meeting friends.

“Yes I did. I have lots of friends here. We can know each other here” (P2, 1:36)

“Because we can get a lot of friends here, even those people that we don’t know, we can know them here. So we have lots of friends” (P2, 4:181-182)

“Happy because I have a lot of friends here. And then we get to know people from health department, and our experience when we get to go to other places.. visits you know” (P11, 1:45-47)

“But now I meet friends I have more confidence in myself “ (P7, 3:137-138)

“Happy because we can group around and meet friends” (P20, 4:165)

“…and we can know things” (P19, 4:167)

“For me with this group Kesumat I can get friends, we get to know people, we get to strengthen our relationship with everybody no matter their race” (P5, 1:38-39)

6.2.1.1.17 Family support

Participants also shared that their family were supportive of them joining the exercise group, although most of the participants did not discuss their family in detail. Positive support from family members seemed important to the participants.

“No problem. They give.... they... they... support. They know us.... we just want to play sports here. For health. I even told them. I want to meet my friends. I can improve my health” (P2, 4:190-192)

“They like it. Err…ha, ha” (P3, 2:91)

“When we go out, they go out as well. But they are not here now, because we get short notice. They went to work” (P20, 5:246-247)

“For me its OK, husband he understand, every Friday morning I disappear. Saturday disappear. He doesn’t mind because he is disabled. He got into an accident. He can’t move a lot but he know about my routine everyday” (P15, 15:730-733)

“And our husbands are open-minded. They want their wives to be beautiful, ha, ha” (P12, 2:91-92)

“My husband is OK, supporting” (P16, 15:736)

“Oh my husband is crazily supporting. Ha, ha, ha. Really crazily supporting” (P17, 15:748-749)

6.2.1.2 Results for organisers

TA was used to analyse the transcribed data. Five themes were identified namely health, instructor, various activities, members and affordable activity. The themes are further discussed below.

6.2.1.2.1 Health

All participants interviewed related that the one of the objectives of their organisation was to promote activities which contributed to good health. They believed that the objective was achievable by doing physical activity on a scheduled regular basis. Among the sub-themes of health were health checks or screening and body weight.

6.2.1.2.2 Health checks

One of the requirements of the provision of a grant by the Health Promotion Board was health screening comprising blood glucoses, blood pressure test and body weight. The purpose was to have evaluative tools for both the Health Promotion Board and the individuals themselves. It also gave an opportunity for individuals to be flagged for participating in physical activity or advised for further checks if the results were worrying.

"This is all their names. We check BP [blood pressure] everything you know" (P24, 6:292)

"We will do health and fitness checks. For health checks we will do blood pressure and glucose checks and cholesterol, but sometimes it is quite difficult to do, because of clinic, you know…." (P23, 2:71-74)

"…So we, NGO, we do report on dengue, we do about cleanliness, and then we clean up our area together, and we do free health checks. We do such programme…." (P25, 1:47-50)

"We have no problems so far. All of us 30 persons here are what move this organisation, for aerobics. But for other programmes, there will be other persons come to join us. For example, when we do health screening, it will be carried out by Mrs F…..h and Mrs S….a. We do not need to be monitored by the health department anymore. We can do the blood pressure check and everything ourselves" (P26, 2:79-84).

6.2.1.2.3 Body weight

The participants mentioned that their activity was a way to control body weight. The participants were relatively realistic about the body weight

and did not specifically set a figure for each of their participants and relied more on the participants to set their own target based on BMI guidelines.

> *"Majority we can see reduction of 1 kilo or 2 kilos, like yesterday we get more than 2 kilos even I got a little shock. But in term of shaping, waist line get better". (P22, 3:132-134)*

> *"Yea. After that 3 months. We will do and we will look at their record and, at the same time we will tell them that we are going to do checks, and we hope along this 3 months anybody who fail to achieve this UKKK …err… body mass index.. we will tell them to try improve" (P23, 3:100-103)*

> *"For the public they can come here but for our members we make sure every month, must checks because we want to see they reduce their weight" (P26, 3:121-123)*

6.2.1.2.4 Instructor

As most of the exercise groups interviewed practised an aerobics type of exercise, the use of an instructor was an important component of the activity. All participants related that the instructor played an important role to keep the members attracted to the programme. They stressed that a good instructor must have knowledge and skill of not only doing the exercise but also choosing and mixing suitable songs, guiding suitable aerobic moves according to the age and ability of the participants and interaction with participants. Some of the sub-themes of the instructor are that participants preferred a trained and certified instructor and some believed that the instructor should be paid.

6.2.1.2.5 Trained, certified and paid instructor

Most participants mentioned that having a trained and certified instructor is important for their programme. A trained instructor seems to be more competent and credible as song mixing requires knowledge and experience. Only one group did not agree about using an instructor or coach, which was the group playing badminton.

As the participants believed that having a good instructor was important to their programme, they also believed that a competent instructor could only be acquired through paid services. Most of the urban-based groups used

paid instructors whilst the non-urban-based group relied on members who were trained by the health department as their instructors.

"The instructor must be very good. Instructor must be good at…" (P23, 4:164)

"Of course, I've not told you about this. She attended training for trainer course. She holds certificate" (P23, 4:168-169)

"I told them I want certified instructor. People with instructor's certificate. …….. I say sorry, we need people with certificate. We are very sorry, only somebody certified. Those people without certificate, they are all topsy-turvy, eh after this is what, what after this… that's the end of everything". (P24, 10:456-465)

"The health department organised an aerobic exercise instructor course. So five of us were selected to join the course. Later we complete the course with certificate. Upon our return here, we handle our own programme ourselves" (P26, 1:8-11)

6.2.1.2.6 Various activities

The participants seemed to realise that it was important to have various programmes in their organisation to keep their members and avoid drop-out. Many activities were carried out by the group in addition to the usual exercise sessions, such as travelling and trekking, swimming, walking and bowling.

6.2.1.2.7 Travel and trips

Travel and trips were among the activities that some groups organised to keep their members motivated and maintain their attendance. Most of the travel was within Malaysia whilst one group organised travel beyond Malaysia.

"Yea not boring, not boring. So when err… during those days when we have… we got… sometime they will go to, go to this… outstation, travel" (P24, 4:164-165)

"Yea. We been to Putrajaya twice. The first time we went there we brought all our members to Health Promotion Board" (P26, 5:210-211)

6.2.1.2.8 Others

Other activities that the groups organised were trekking, swimming and competition; besides adding to the range of activities the group offered to

their members, the other activities also gave the members opportunities to socialise with friends in the group through different activities.

> *"Yes we have, at Sik. For instance we go to Bukit Perak, we organise trekking and shower there, so OK. So they will ask where will we go next month. So now they have an objective in their mind. Only those who come frequently will get to go" (P25, 6:294-297)*

> *"We try to do it, sometime those people they will organise…organise… futsal, badminton. Outside activities. Swimming" (P24, 4:154-155)*

6.2.1.2.9 Members

All of the participants interviewed related that they were happy about other members and believed that they were happy too. No participants mentioned having any issues with other members.

6.2.1.2.10 Get new members through friends

All groups received new members through friends, and news about their programme was spread mouth-to-mouth among members. Some groups maintained Facebook accounts and websites but virtual communication was not their main mode of contacting each other. One group put up a banner about their activities.

> *"We get members through friends. They don't just come from nearby areas. They come from all over" (P24, 3:104-105)*

> *"Err… get member, we are an old association around here. So people know about us. So sometimes we put up banner, sometimes we go into newspaper" (P23, 3:127-129)*

> *"Our promotion is through Facebook and mouth to mouth" (P22, 1:49)*

6.2.1.2.11 Busy with work and family

When the researcher asked about drop-out among the members, all participants mentioned it could be due to lack of time or being busy with work and family. Most participants admitted that it was normal to have a few drop-out from the group but the numbers were not worrying.

> *"These people works at factory right? If factory you work on shift. If they are on morning shift then they can't come here" (P23, 4:194-195)*

"OK, OK. This. Maybe they have some work elsewhere, busy. But most stay, most stay" (P21, 3:126-127)

"All continue. But just some on and off. You know, sometimes family matter or sometimes Saturday morning they have events" (P22, 3:101-102)

6.2.1.2.12 Affordable physical activity

The interviews showed that the participants felt that keeping the physical activity programme affordable was important to maintain members. As such, all participants hoped they would get further funding from the government to support the cost of organising the programme. All participants believed that their group was well managed and received a good response and deserved to be considered for future funding. Some of the activities supported by the grant were health checks, services of instructors, exercise t-shirts and rental of the exercise venue and audio equipment.

"And we are providing exercise for free. So we felt a little, err… before this we err…we never get any assistance from any government agencies to run our exercise dance programme. Just recently we get grant from the Health Promotion Board Malaysia, even that is only for 3 months. So once the programme ends. We also face some difficulties because every Sunday we provide free drinks for our members" (P22, 4:151-157)

"That's all. We can't do other programme like health screening. Like talks. Those things cost you know. Like you need to rent the hall, even food you need to pay. You know". (P23, 8:385-387)

"But that is not payment to join the exercise, we get funding from Health Promotion Board" (P23, 5:246-247)

"Yes. During those days before we get any funding, we ask for fee from members" (P24, 9:407-408)

"The grant I heard full amount is RM100,000 but we didn't get full amount. We only get I think about RM30,000. And after we present at Putrajaya they will give further RM40,000 I think. It is given in stages and depends on our activity. But there are certain places that get full amount. Because it stopped the other day is because A.....n did not fully understand because we can't buy all these things with what they give. But we need other equipment as well and Dr A...h said there are things you do not need but actually there are certain things that we need. For example such as equipment for exercise. We need the additional exercise equipment here" (P26, 7:302-311)

"Ok, let's start with Mysihat. They had helped us by funding, we have a launching recently. I hope they are happy with the way we launch it, the way we manage it. We have been recommended for second funding. We will

submit report. In term of funding we are happy. We hope they can support us in a bigger way. We have multiple games". (P21, 8:354-358)

6.2.1.3 Results for health officials

TA was used to analyse the transcribed data. Five interrelated themes were identified namely funding, to engage with the community, to create supportive environment, to empower the community and to conduct capacity building in the community. The themes are further discussed below.

6.2.1.3.1 Funding

The researcher interviewed two officials from the Ministry of Health Malaysia: one from the Health promotion Board Malaysia and the other from the Health Education Division. An important theme that emerged from both interviews was funding. Both organisations carried out various health promotion activities but one of the main functions of the Health Promotion Board Malaysia was to provide grants to the NGOs.

"The third is capacity building. And of course we give some aid to them by giving some sponsorship to them or what we call in Malay bantuan kewangan but it is actually a grant. Because to initiate certain projects they need some money. Then we help to do that" (P, 2:96-100).

"Decision must be of certain standard, certain rules.. for example err.. they cannot simple give the grants to anybody, any NGOs. Second, what is the division of the grants, for example.. we decided that at that time.. for example.. just for example, not more than 15%.. of the grants approved should be allocated to…to pay for allowances or.. allowances to the instructors for example. That's the way we control" (P28, 2:62-69)

"But of course err.. the complaint is that err… to them you know. To the NGOs they must get the grant as fast as possible, without regulations" (P28, 16:784- 788)

The Health Education Division carried out various activities at national level such as media advertising, at community level such as at community health promotion centres and hospital level. To carry out the activities, the Health Education Division depended on federal government funding.

"Because I think we need to mobilise other people to help us. I think that is better strategy. Of course we need .. we need more money for us to really do promotion, right?" (P29, 13: 629-632)

6.2.1.3.2 Engage the community

An important theme that emerged from the interviews was engagement with the community. Both officials recognised that to make a physical activity programme appealing, acceptable and sustainable to the community it was necessary to engage the community in the process. The engaging process seemed to be in the form of talking to them and providing different activities for different target groups.

> *"Second one to sustain a project, the project… the community must say that, that project is their project. So, I always go to community based you know. So the community.. one component of the community.. is the NGO. We work with the NGO, and the NGO must be from the local community. So we hope by doing that first they said that this project belong to them. When they said it belongs to them they will do it right, you know" (P28, 7:350-8:351-357)*

> *"Because they want to help their community. Second one.. we think that by doing in the community the project will sustain, you know" (P29, 8:361-363)*

> *"Yeah. And on top of that we also have got carnivals... all these things.. In fact since last year we started direct involvement of our target group. Irrespective of where they are, you know. Because we want them to really join us and involve themselves and so on. Yes, yeah" (P29, 3:128-132)*

6.2.1.3.3 Create supportive environment

The interviews indicated that both officials realised that providing a supportive environment was not the work of a single agency but a combination of many agencies. The supportive environment included providing facilities supportive of physical activity uptake, policy of other agencies and safety. As such, both mentioned that they were working with multiple agencies to promote healthy lifestyles.

> *"Of course first we make a lot of friends. Then by… err…when I say friends, first of all we go to Ministries, certain Ministries" (P28, 5:225-226)*

> *"OK, what we do is actually we err.. had meetings with other agencies, with NGOs, community organisations too, you know" (P29, 1:47-48)*

> *"I must say that we have got good team work. I must have a good team work. Another thing is also I think is because of our relationship with other agencies, I think it is easy for us to get things done" (P29, 13:621-623)*

"That's I always believe, knowledge, skills, confidence. And that supportive environment. These are the four things that are very, very important..of course there should be back-up by policy" (P29, 17:803-805)

6.2.1.3.4 Empower the community

Both officials related that it was important to empower the community to take control of their health for their programme to be successful. The empowering the community process came in the form of giving ownership of a programme to the community and providing aid in terms of resources to them.

"Yes. That's our main objectives. How to empower? Through projects, they must do the projects, health promotion projects based on our guidance" (P28, 2:90-92)

"Yes. We know that. That's why now we have already gone to the community and now our strategy is to really the mobilise community. In other words we want them to be really responsible for this, you know. We want them to own the programme" (P29, 5:210-214)

Because our idea is part of their life. And I think that is their responsibility. Because to me community has got resources, they have got their leadership there. They have got their…. What do you call that... the talent, the skill, you know. It's just a matter of you know. They need maybe in terms of motivation" (P29, 5:235-240)

6.2.1.3.5 Conduct capacity building

Capacity training for the community was another important theme from the interviews. The officials mentioned that it was important to provide training to the community to build their skill and enhance their confidence in doing physical activity.

"So you need to do a lot of capacity building. So this empowerment can be successful. Otherwise it can't" (P28, 3:121-122)

"OK. Capacity building we do either by training, we trained them, like doing workshop, whatever, you know. And second, we produce modules" (P28, 3:130-132)

"OK, these two we are going to train them and they will become our agent" (P29, 13:599-600)

6.2.2 Summary for attendees

This section summarises the result for attendees and Figure 15 provides a summary of the themes for attendees.

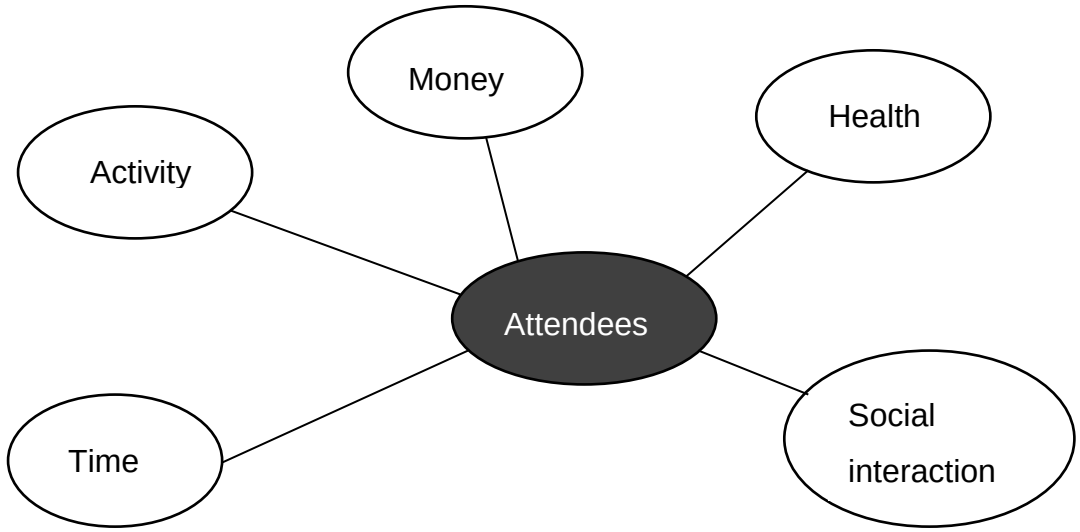

Figure 15: Themes from attendee's interviews

Encouraging the community to be physically active is an important public health priority. Studies to understand the factors that motivate or obstruct a sustained physical activity uptake are crucial. In the current study, analysis of the interviews among the attendees generated five main themes to be discussed in this section. By focussing on the attendees of the exercise group, this section of the study sought to understand the motivators and barriers to maintaining physical activity from the participants' point of view.

The qualitative interviews involved six NGOs running structured physical activity as part of their programme with five NGOs conducting aerobic types of exercises and one conducting badminton. From the interviews, it was revealed that the attendees chose types of physical activity that were perceived as easy and familiar to them. The degree of familiarity of a behavioural task under PBC could impact the motivation that translates behavioural control into behavioural intentions (Notani, 1998). The relationship between familiarity and behaviour was explained by Notani (1998), where past experiences and knowledge of engaging in the said behaviour

will result in greater confidence in the beliefs held. This is in contrast with unfamiliar behaviour whereby without adequate past experience and knowledge, the perception of people's control over performing the behaviour could be inaccurate rendering lower confidence and the perception of difficult barriers (Notani, 1998). Other than the issue of an unfamiliar activity itself, going into an unfamiliar setting or environment of the activity was also a barrier as found in another study (Allender, Cowburn et al. 2006).

The relationship between money and leisure exercise participation also played a role in motivating the participants to engage in physical activity (Moore et al., 2010). A study on the relationship between time, money and regular participation in physical activities by analysing Canadian time use data collected in 2005 found that household income was positively associated with participation in sports particularly organised physical activity (Spinney & Millward, 2010). The study opined that lower income and time would result in lower participation in structured physical activity due to money and time requirement to engage in such activity. In the current study, data about the attendees' income was not collected but the cost of maintaining the physical activity emerged as an important theme which also lends support to the above study's findings. Two important issues from the analysis of the current study were that the attendees thought that the funding given by the Board was important and physical activities undertaken by them were perceived to be within their budget. Linking the current findings to TPB showed that money affects the perceived control the attendees had over their ability to overcome the barrier to engaging in physical activity. The attendees continued to engage in the activity as long as they felt they were able to overcome the barrier, which is their ability to afford the cost to join the activity.

The attendees in the study mentioned that they were motivated to engage in physical activity for physical health and fitness reasons. For the attendees, good health resulting from being physically active was related to conditions such as sweating, feeling lighter in body, improved mobility and increasing stamina as well as alertness. Control of body weight was also found to be important but the attendees appeared to be realistic and did not aim to achieve an ideal body shape. The attendees in the current study perceived health as more intrinsic, such as physical health and fitness,

and they claimed to have achieved a better health and fitness level after joining the activity. It was not possible, however, for the researcher to objectively evaluate the health and fitness level of the attendees to confirm their claims using standardised tests such as body composition, muscular endurance and strength tests, cardiorespiratory test or any other test due lack of relevant resources for those tests. The researcher was based in the UK whilst all attendees were in Malaysia. The NGOs did provide data on their progress; however, they were insufficient for the researcher to conclusively report on in this thesis. The study did collect data on the height and weight of the attendees which allowed for analysis of BMI and it was reported in an earlier chapter of this thesis.

The attendees claimed that by joining the physical activity programmes it translated into better health but their lay concepts of health, such as sweating or feeling lighter, were intangible and incomparable. The researcher suspects that it was actually the positive self-esteem and the thought that they were healthier that made them feel better about themselves and motivated them to further participate in the physical activity. The findings of other studies could substantiate this opinion; for example, a study among South Asian women who participated in outdoor exercise and reported an increase in self-esteem (Jepson et al., 2012). Another explanation could be linked to the increased status afforded to them by non-exercisers who saw them as fit and healthy as reported by Allender, Cowburn, et al. (2006). Findings from another study also indicated that regular exercise was positively evaluated by others especially by non-exercisers (Vocks, Hechler, Rohrig, & Legenbauer, 2009). These non-exercisers are friends of the attendees who lament about their health or fitness in comparison to the attendees. The feeling of pride that they are fitter compared to their non-exerciser friends could drive the attendees to further engage in physical activity.

Enjoyment from engaging, such as feeling happy, was commonly mentioned as the key emotional reward for most attendees in the current study. Similar to other studies, undertaking physical activity for the opportunity for enjoyment and the social interaction it provides was identified as a significant motivator to physical activity (Hendry et al., 2006; Jepson et al., 2012; Siddiqi, Tiro, & Shuval, 2011). In fact, a review of qualitative studies covering 24 papers published from 1990 to 2004 by Allender, Cowburn, et al. (2006) found that fun, enjoyment and social interaction

were reported more often as predictors of participation and non-participation in physical activity than perceived health benefits itself. In the current study, it was evident that the enjoyment came from the opportunity to socialise with friends, feeling of belonging to certain groups as well as participating in various activities such as travelling. The results from the present study also highlighted the importance of the affective components within the TPB and mirrored other finding such as those by Lowe et al. (2002), where it was found that enjoyment was an important aspect of physical activity maintenance. Affective beliefs which were also a component of attitude within TPB were also found to have a strong relationship with intention to exercise in a meta-analysis of 31 studies from 1975 to 1997 by Hausenblas, Carron, & Mack (1997).

Availability of leisure time is important because it is required to balance the stresses of work and life when spending time on physical activity and socialising or entertainment (Spinney & Millward, 2010). In the current study, availability of time was related to opportunity to exercise and this is in line with other studies where issues with lack of time were cited as a barrier to physical activity (Hamilton & White, 2010a; Siddiqi et al., 2011). However, the concept of time poverty is a less familiar phenomenon for studies in relation to physical activity as opposed to income poverty (Spinney & Millward, 2010). As a result, there are public health interventions to help those on a low income, such as the funding by the Board in the current study, but solving the issue of time poor is left to the community themselves. Contrary even to the researcher's initial belief, the issue of time poor is not a matter of inefficient time management or one's choice but it is a public health concern. Logically, one might think that technological advancement would result in less time spent on performing daily tasks or household chores, thus allowing us to have more free time. However, the opposite is happening to our lives (Spinney & Millward, 2010). In the current study, some of the attendees mentioned that they could join the activity because the exercise session schedule did not conflict with their work or family time. Some of the attendees mentioned that they were not in full-time employment or had grown up children and, as such, they had time for exercise and leisure. The attendees further also said that their friends dropped-out of their exercise group because they were unable to allocate time due to work or family commitments. The current study supported the finding of Spinney and Millward (2010), who indicated that time

poverty has a significant impact on physical activity engagement just as income poverty does.

Social interaction was an important factor that motivated participants to take up a physical activity. Friends were the most mentioned factors by the participants involved in the interviews. The attendees joined the group through friends and enjoyed the physical activity because they were able to meet and make new friends. The social interaction here is also related to the culture within each NGO. Culture here refers to the social norms created by the other members of the groups and organisers and it was perceived as a consequence of the behaviour patterns and attitudes of these individuals (Crone, Smith et al., 2005). The language that the attendees spoke, the issues that they found interesting and talked about, coming from a similar socio-economic background, same religion or ethnicity and sharing similar political ideas would all affect the attitudes that formed the culture. If an individual found they could fit into the culture they were more likely to stay in the group.

This study also showed that participants found it easier to relate to referents who were also their friends, instructor or somebody within their community rather than athletes, celebrities or those whose work depends on physical activity. These findings also showed the role of descriptive norms because the attendees found it easier to copy what their referents were doing. It is more acceptable to copy a referent who is also part of the community. This is consistent with the findings of Jepson et al. (2012) where their South Asian participants related that they would appreciate referent activity among their own community (Jepson et al., 2012). In all, having a realistic referent, enjoyment of socialising, ability to fit in the group, feeling good about oneself and reasonable cost is what made them continue to engage in physical activity.

6.2.3 Summary for organisers

This section summarises the result for organisers and Figure 16 provides a summary of the themes for organisers.

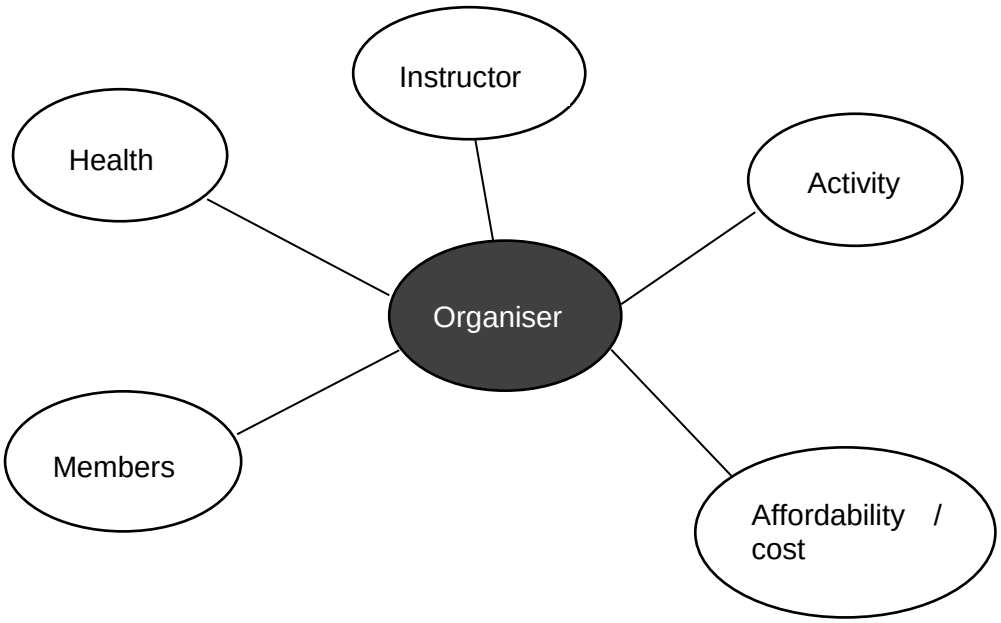

Figure 16: Themes from the organisers

Physical inactivity is said to be the leading cause of numerous chronic diseases and disabilities. In contrast there is strong evidence that habitual engagement in physical activity contributes to good physical as well as mental health (Faulkner & Biddle, 2001). Empowering the community to address this issue is important, however, a clear understanding of the determinants of physical activity from multiple angles, such as community leaders, relevant government departments and policy-makers as well as the community themselves, is needed. The following analysis tried to understand the impediments and enablers of leaders of community-based NGOs in running physical activity programmes.

The objectives of all the groups involved in this study were associated with promoting physical health. By joining the group, attendees benefited from having a basic health screening as part of the condition of receiving grants. Even though mental health benefits were not mentioned as part of the group's objectives, the organisers noticed the fun and enjoyment of their participation.

In the interviews, the organisers mentioned that the objectives of their groups were to promote active lifestyles that contributed to good health. Apart from the exercise sessions, among sub-themes associated with health were health checks and body weight control. All organisers interviewed said they organised health checks for their members. The health checks, which covered BMI, blood glucose, blood pressure and endurance tests, were carried out at the beginning and end of the grant period. The results from the tests were used by the members to check the improvement of their health and fitness level. It is also important to note that health checks were a requirement for NGOs to receive grants. The organisers also mentioned that they aimed to reduce the body weight of their members to achieve an ideal weight according to BMI guidelines. Some NGOs even organised monthly body weight checks on their members as checks on their progress. The organisers were expected to mention measurable improvements such as BMI, blood pressure or glucose as an achievement of their programmes.

As most of the NGOs involved in this study were conducting aerobic types of exercise, having an instructor to guide the session was an important part of the programme. An important issue to highlight is that most chose to engage the services of trained and certified instructors. For the NGOs based in the countryside where a services instructor can be difficult to locate, the organisers mentioned that they appreciated the training and certificates given by the health department. During the interviews with the attendees, the topic of instructors was also mentioned albeit briefly; this was probably because a good instructor who is able to handle the exercise session and relate to the attendees is important to the organisers. The organisers were responsible for running the exercise sessions but they relied on the instructor for that purpose.

All NGOs in this study were local organisations and new members joined them through word of mouth or through friends who were already members. On the issue of drop-out, the organisers interviewed mentioned that the casual drop-out of a few members was a norm within any group and they thought that the drop-outs probably could not spare time for the activity. The organisers did not have any plans for major changes to the way the groups were run.

The organisers were also asked about their opinion on how the health department could help to improve their organisation and they suggested periodical training for them and attendees. They had previously received training in the management of health programmes and some on aerobics instructing. Having training was important to update the knowledge and increase the confidence of the organisers in managing their organisation.

On the management of the organisation, the organisers interviewed thought that the programmes had been well managed. Citing the continuous attendance of the participants to prove their point and that a poorly handled programme would not be sustained. On their future plans, the organisers said they did not have any plans to change and will continue to run the NGO with the same format. However, the organisers cited an organisation that depends solely on government funding and public contributions to run their programmes, they hoped the Board would consider giving them funding again once the current funding term expired.

6.2.4 Summary for health officials

This section summarises the result for health officials and Figure 17 provides a summary of the themes for organisers.

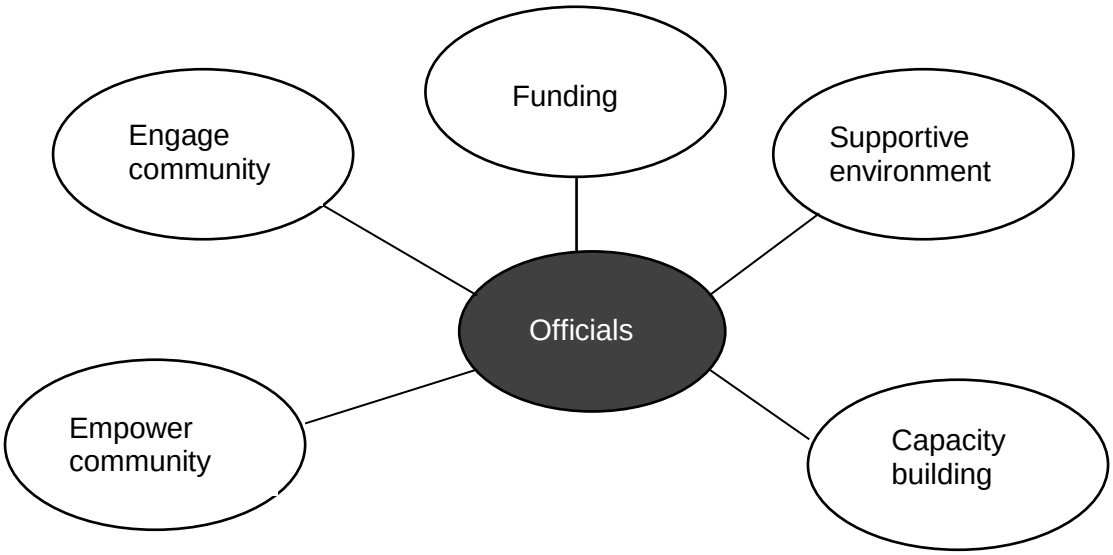

Figure 17: Themes from the health officials

Improving the health of the population through daily physical activity is a goal for health departments all over the world. However, health authorities face many challenges in persuading the community to adopt a healthy lifestyle which includes being physically active. In both interviews, the officials acknowledged the importance of a holistic approach to promote a healthy lifestyle and being physically active. A holistic approach to promoting physical activity would mean supportive policies, environments conducive to physical activity, such as accessible and affordable facilities and safety. For instance, in Malaysia, constructing a sports hall would fall under the authority of a state government or the Ministry of Youth and Sports, parks come under the authority of local municipality and state government, safety and policing under the police department while policies on healthy cities are under the state government and Ministry of Housing. The jurisdiction on policy-making which promotes health within the community is outside the responsibilities of Ministry of Health Malaysia. The relationships between state government and the federal government and between different ministries of the federal government are also complex, making working together sometimes difficult. To address these issues the health department, where the officials are at the helm, is working closely with other agencies to deliver solutions to the people.

From the interviews, both officials related the importance of engaging with the community for sustainable physical activity promotion programmes. Both officials also mentioned that the community needed to feel that they owned the programmes rather than them being just another government programme. From the interviews, it was found that both employed a different approach to engage the community in their programmes. One department provided funding and training and another organised programmes with the involvement of a target group at their locality. Both departments were promoting physical activity in the community but targeting different groups or community organisations. Some community organisations were able to independently organise programmes and only needed minimal training; however, they did need funding to run physical activity sessions. However, there are some organisations that are inexperienced; however, they wanted to start running health promotion or physical activity programmes, such as corporate firms or other government agencies that run workplace-setting programmes. These organisations

would require training on how to manage health checks, basic physical activity and where to get instructors and how to manage funds received.

Another theme that related to the engaging the community theme was empowering the community, which was mentioned by both officials in interviews. Empowering the community referred to developing the skills in running physical activity programmes and giving ownership to the community groups; thus, raising the likelihood of sustainability. One official's approach to empowering was to have the NGOs run programmes based on their guidelines. Another official took the approach of providing support, such as consultation, material or equipment and training, but not direct funding to the programmes run by the community.

Conducting capacity building was another theme that arose from analysis of the interviews of both officials. Both departments conducted training in the community to enable them to handle health promotion programmes within their community. The capacity-building process took place through workshops, modules and involvement in actual programmes conducted with the health department to build experience and confidence.

Examination of the interviews also yielded themes on funding. The Health Education Division does not provide grants for NGOs, but carries out activities for both communicable and non-communicable diseases. The Health Promotion Board carries out various activities at community level with a focus on prevention of non-communicable diseases. One of the important functions of the Health Promotion Board Malaysia is to provide grants to NGOs to run health promotion activities.

Themes extracted from both officials were quite similar with differences noted in the approaches taken by their respective departments. This is expected as they were both from the same Ministry and were influenced by the same tenets of health promotion within the Ministry of Health. Both departments also needed to establish different approaches and target groups to avoid overlaps of function within the same Ministry.

From all interviews conducted, there was an overlap of one theme among attendees, health officials and the organisers which was funding, money and affordability. The organisers and the attendees required funding to carry out and keep the activities

affordable. The health department required federal funding to carry out its own activities and provide funding to the NGOs.

On analysing the themes from the interviews with organisers and officials, other similarities were noted, which were training, attending various programmes organised by the health department and assistance with resources especially funding. The organisers were appreciative of the training given to them and various programmes organised by the Ministry of Health or other agencies they attended. Members of the NGOs were particularly happy with attending various programmes as it allowed them to travel to different places. The assistance provided by the health department in terms of resources, such as exercise equipment, t-shirts and funding, kept the exercise affordable for their members.

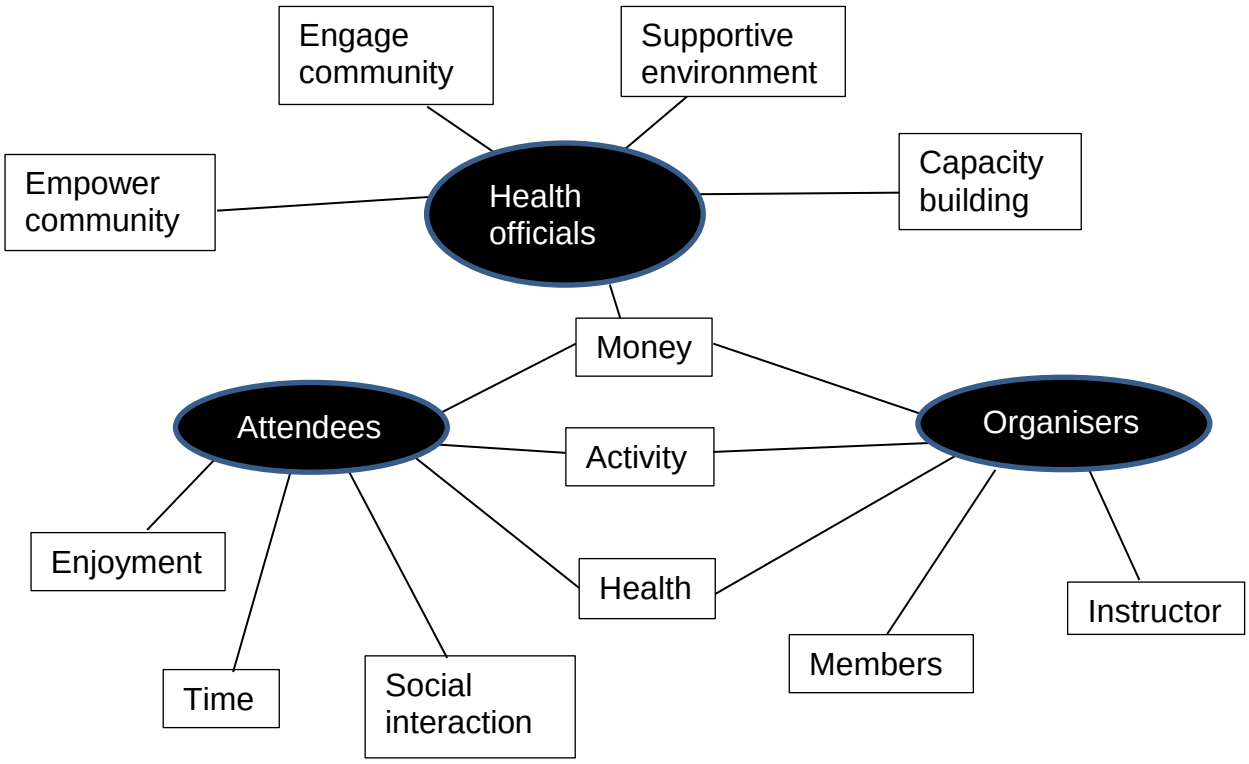

Figure 18: Combination of themes from attendees, organisers and officials from the Ministry of Health Malaysia

When all themes were combined (see Figure 18) it showed that there were multiple themes that influenced physical activity and some of them were similar. The shared themes for participants and organisers were health, money or affordability and activity. The shared themes are the common ideas that bring all of the attendees as well as the organisers together in an NGO. An implication of this result was that for the community to form an NGO conducting physical activity programmes, members and organisers need to share the themes of activity, money/cost and health concern at least. To assist the community to carry out physical activity programmes, the health authority needs to take these three themes into account for the community group to be sustainable.

The themes also reflected the barriers and motivators for the studied population to engage in physical activity. For instance, a lack of an instructor or suitable time could result in the attendees no longer going to the group for exercise. On the other hand, the presence of an instructor would motivate the attendees to continue their involvement in the group.

The themes that did not overlap were instructor and member for organisers whilst for attendees they were enjoyment, time and social interaction. As for themes from the health officials, except for funding, the themes were broad and non-specific and did not overlap with any themes from either attendees or organisers.

6.2.5 Triangulation

Physical activity is one of the key components in maintaining health and quality of life. Despite the well-known health and psychosocial benefits of physical activity, encouraging people to have a sustained habit of being physically active is a challenge for public health. The qualitative part of this study was divided into three sections of interviews with the attendees, organisers and health officials as sponsors and policy-makers. This summary section will endeavour to unite all the findings from the three categories of participants into one cohesive narrative explanation.

Health benefits associated with physical activity were motivating factors for both participants and organisers to engage in physical activity and were a common finding in most interviews. Among the health benefits mentioned in the interviews with the

participants were preventing illness, improved fitness and weight loss. This finding is consistent with other literature such as Siddiqi (2011), where positive health benefits were identified as major individual enabling factors. Brunet (2013) identified experiencing improved health and weight management as contributing factors to physical activity maintenance. Health was also the reason that drove the organisers to run the NGO and provide a platform for the participants to exercise.

This study found the types of activity that had an impact on the participants' desire to continue engaging in physical activity: participants in this study wanted to engage in physical activity that was suitable for their age and non-challenging. This could be seen by the types of activity that most of the group were doing, which was aerobics. This could be further linked to other themes, such as the provision of an instructor by the organisers. Aerobics exercise has easy to follow steps guided by instructors and moves according to different music played in the background. Minor mistakes are forgivable as many participants make these and most attention is focused on the instructor and the music. To help a group to hire a certified instructor, the Health Promotion Board provides a grant to the group and the health department provides training to non-urban-based groups. The Ministry of Health as well as Youth and Sports Department also provide aerobics instructor training as part of their capacity-building effort.

Another finding of the study was the various activities mentioned by the participants. Most of the groups involved in this study offered various activities for their members, such as travels with exercise, as their main activity. Members enjoyed the activities and the group organisers planned these activities to keep their members motivated. The members' enjoyment of the activities could be linked to themes such as social support and enjoyment. Social support was the central and important contributor to physical activity maintenance in this study. Friends were the most mentioned theme throughout this study, showing the influence that contacts and acquaintances have on the participants to continue going to the activity. In this study, social interaction and enjoyment were identified as the key motivators for participants to continue to be in the groups where participants mentioned they enjoyed participating in all activities with friends. Others have shown similar findings (Siddiqi, 2011) where exercising for fun and personal enjoyment was identified as a motivator. A study by Brunet (2013)

reported that the participants experienced enjoyment and fun as factors that motivated them to continue physical activity.

Time was an important barrier to physical activity and the findings related to time in this study were consistent with other literature. In this study, lack of time was cited as a reason for some participants to drop-out of the group or be unable to attend every exercise session. As the sample of this study were adults, lack of time due to work and family commitments was the common reason given. In a study by Hamilton (2010), participants with children found it difficult to be active. In a study by Im (2010), Hispanic participants rated family as their top priority and they could only do what they wanted, including physical activity, after they had addressed the needs of everyone else in their family. Another study that also found time and family commitments to be barriers to physical activity was that of Olsen (2013), where demands on time and the need to adapt to childcare responsibilities and lack of energy due to family needs were common findings. In the current study, most participants said that a priority was placed on their family and many were busy taking care of their household chores. Besides family, busy with paid work was another common reason that prevented participants from physical activity.

The existence of exercise groups provided opportunities to reach out to the community to promote sustainable physical activity. The Ministry of Health and the Health Promotion Board Malaysia intervened to make physical activity more accessible and affordable by providing capacity training and empowerment as well as supportive policies: health campaigns to promote physical activity, training to enhance skills and working with various agencies to run programmes on physical activity. To sustain the activity, the Health Promotion Board Malaysia provided funding in terms of grants to these groups.

6.2.6 Conclusion

This study provides a better understanding of how participants make sense of their physical activity behaviour. It is clear that the participants in this study engaged in physical activity for social and enjoyment reasons, while organisers provided the platform for that purpose. The participants also obtained secondary gains such as better health and weight control. To continue providing such platforms the organisers

required interventions in terms of resources and enhancement of their skills and it is the duty of the government to fill in the gaps of these NGOs through the allocation of resources and training.

6.2.7 Reflexive statement

The organisers were asked about their opinions or issues they faced with the attendees but none were mentioned in the interviews. Similarly, the attendees were asked about issues they faced with the organisers and I received the same response. The participants were interviewed in the presence of the organisers and these circumstances may have affected the reliability of their accounts. Reflecting on this issue, there are things that I would approach differently if I were to start this study again. I would separate out questions that I anticipated to be sensitive and ask the participants if they could provide answers by telephone, text messaging or email.

Another issue that required reflection was the recruitment of participants for the qualitative interviews. I approached the organisers as gatekeepers to assist the data collection during the repeated measures survey as I needed their help when I returned to the UK. I did not wish to be seen as an authoritative figure trying to audit their work and I asked their help to identify people for me to interview. This kind of sampling inevitably raises the question of bias as they may have purposively selected particular people. However, in mitigation, participants were fully informed about the study and their answers would have no effect on any future applications for funding.

During the interviews sessions, I also asked the NGOs about the issues they faced with the Ministry of Health Malaysia or the Health Promotion Board Malaysia. All but one preferred to comment on this question off-record and asked that their answers be summarised: they faced layers of bureaucracy to get the funding, the Board was insensitive towards their needs and the terms and conditions were too restrictive. The bureaucracy is too much if an application fails and they are unable to buy equipment and so on. I worked in the Health Education Division and was involved in the core-team to set up the Health Promotion Board Malaysia. When we developed the guidelines for the NGOs to apply for funding, we made requirements that the NGO must provide the relevant papers, use evidenced-based interventions,

programmes run by NGO must be impactful and restrictions must be placed on where they can spend the money given to them by the Health Promotion Board Malaysia. After all, it was tax payers' money we were giving. On analysing the transcripts, I began to reframe my own ideas on the terms and conditions for the NGOs to get and spend the funding; for example, more flexibility on certain things such as allowing them to buy equipment or to spend more on an exercise instructor would be beneficial. We talk about creating an environment that supports their behaviour and if that needs money, then why not? After all, tax payers' money includes their money too.

6.2.8 Implications

6.2.8.1 Practice/policy

These findings can contribute to the design of future health promotion activities on physical activity. Traditionally, the promotion of physical activity has focussed on persuading people of the health benefits of physical activity. Programmes aimed at sustaining physical activity should also emphasise the social context of the activity which includes enjoyment, fun and a feeling of belonging in the community. Activities that are easy to learn and do not require much equipment should be promoted, such as aerobics or walking. Usage of celebrities or sportsmen or women as promotional icons should be reconsidered if the majority of the population see them as unrealistic models to emulate. Government intervention such as training, funding, equipment and facilities should be continued but given to targeted groups to make physical activity affordable and accessible.

For the community to engage in and sustain physical activity, policy that steers towards the provision of environments conducive to physical activity is important. Future policy should continue to give training and funding to community-based NGOs to run physical activity programmes. In addition, safe environments should be provided, for example public places such as parks, recreation centres and community health centres should be built where such groups can organise exercise sessions.

6.2.8.2 Research

Existing studies generally concentrate on two groups which are the attendees and organisers of physical activity interventions. Hence, it is recommended that, as in the present study, officials from relevant authorities be included in future studies in greater numbers. Through such an inclusion, it is hoped that any recommendation proposed from the findings will be acceptable and realistically implementable for the authorities. As well as a sample from the government department, the sample sizes of both attendees and organisers should also be increased and gathered through random sampling techniques. Finally, future studies should also include a bigger variety of physical activities, such as walking, tai chi, running and gymnasium.

6.2.8.3 Limitations

As with other studies, the researcher acknowledges the limitations of the sample. The methods employed in recruiting participants, especially the attendees, were not random. The convenience and snowball techniques, although necessary in this study, may have allowed the organisers to choose participants that in their opinion would give the best answers for the NGOs.

Another limitation of the present study, mentioned in the Introduction section, was that the researcher works for the Ministry of Health Malaysia. An effect of this was that the attendees and organisers tried to provide answers that in their opinion would increase their chances of getting future grants. Anticipating this implication, the researcher declared to the organisers and attendees that their transcripts would be kept confidential and no officials from the Ministry of Health Malaysia or the Board would have access to them and that their answers would not affect their chances of receiving future grants. However, the researcher acknowledges that participants may have considered the above assurance did not prevent the researcher from talking about them verbally to the researcher's colleagues. Thus, even with assurance from the researcher, there may be a limited bias in the answers provided by the participants in the present study.

6.3 Analysis of Follow-up Interview of the NGOs' Attendees (QS3)

6.3.1 Analyses and results

6.3.1.1 Analysis of interview transcripts

Having perused the interview transcripts and analysed the motivations for the attendees to continue engaging in the NGOs and physical activity, three key themes emerged which were: maintaining types and frequency of physical activity, facilitating factors and advantages of physical activity. There were nine sub-themes from the main themes which were: easy and suitable for age with the main theme of maintaining types and frequency of activity; the sub-themes of skills and knowledge, time and facility which were with the main theme facilitating factor; and the sub-themes of social interaction, happy, travels and health which were associated with the main theme of advantages. The sub-theme of health, however, could be further broken down into three smaller themes which were feeling healthy, lighter body and fitness. The themes are illustrated in Figure 19.

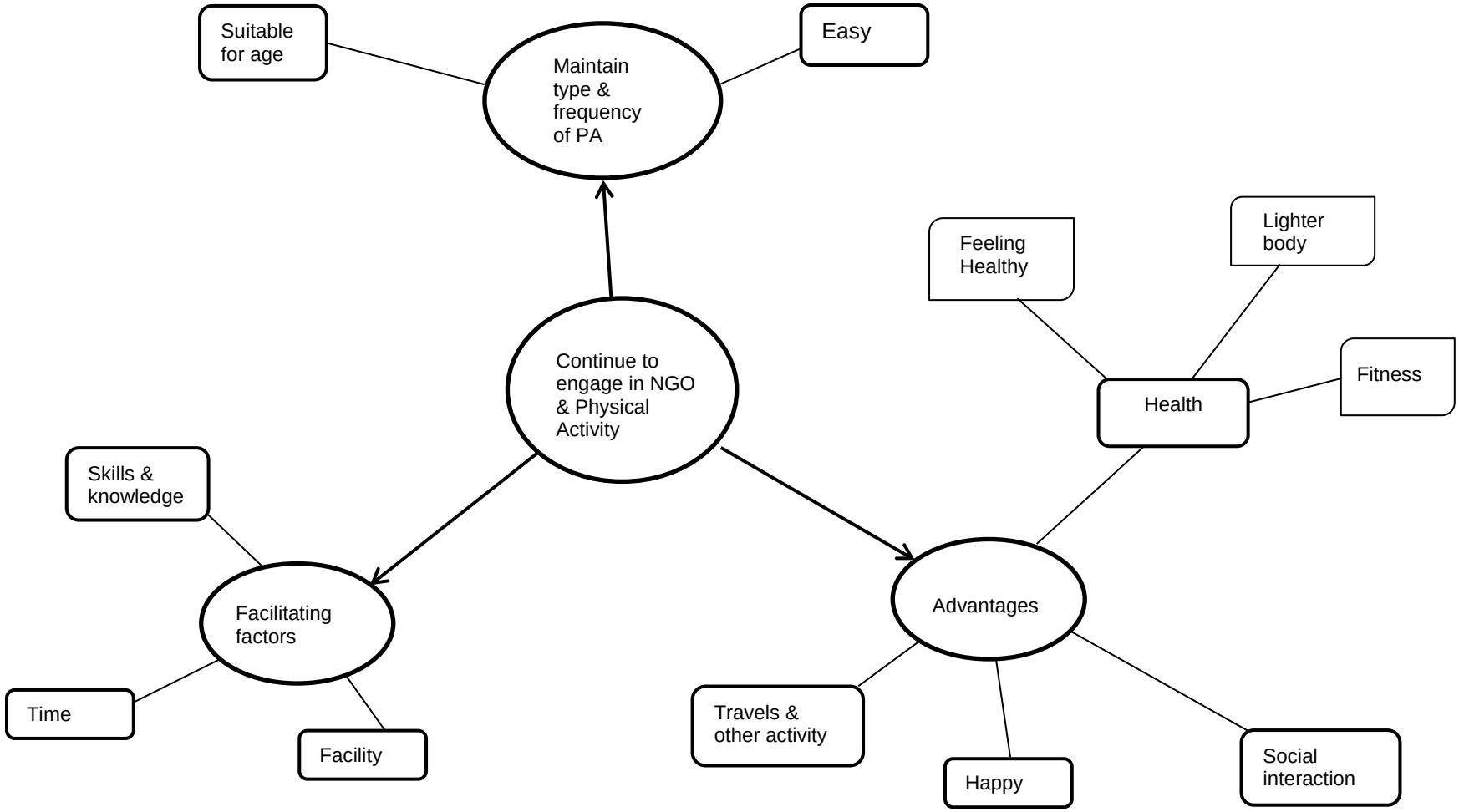

Figure 19: Thematic map of themes from telephone interviews

Note: PA – physical activity
NGO – non governmental organisation

6.3.1.2 Results of telephone interviews

6.3.1.2.1 Maintaining types and frequency of physical activity

All attendees who were interviewed reported that they maintained the types, frequency and duration of the time they spent on physical activity. The physical activities they engaged in were aerobics exercise with some other activities conducted to add variation such as walking.

6.3.1.2.2 Suitable for age

The attendees were asked the reasons they continued to be engaged in the activity as well as the NGO. As for the types of physical activity, the attendees mentioned that they felt that aerobics exercises were suitable for their age.

> *"We don't have the energy to run, we are old now. We choose exercise suitable for senior citizen" (P19, 4:187-188)*
>
> *"Yea, this is what we can do" (P19, 4:196)*
>
> *"For our age I think these activities are suitable for us" (P20, 15:729)*

6.3.1.2.3 Easy

They also perceived aerobics as easy.

> *"For me aerobics exercise is the easiest" (P12, 15:738)*
>
> *"Easy..yes it's easy because we also have gone through training to be instructor" (P11, 6:258-259)*

6.3.1.2.4 Advantages

An important theme that emerged from the analysis of the interviews was the advantages from participating in the NGOs. There were four sub-themes that arose from this main themes which were:

i. health
ii. social interaction/friends
iii. happy
iv. travel and other activities

The NGOs carried out many activities with health and physical activity being the core activity. Each sub-theme is explained further below.

6.3.1.2.5 Health

The attendees claimed that health benefits were the main reason they joined the NGOs. The study explored in more detail what the attendees meant by health benefits; thus, this theme was broken down into three smaller sub-themes which were feeling healthy, light body and fitness.

The attendees linked being healthy as a result of being physically active to feeling lighter and fit. To emphasise and substantiate the health improvement, they claimed to experience less muscle pain and better agility. The attendees supported their claim of improved fitness by saying they won an aerobics competition against much younger teams.

> *"From exercise we get a lot of benefits... One of them is we are able to maintain our health" (P11, 6:268)*
>
> *"I feel my body healthier, I feel my body lighter" (P19, 2:89)*
>
> *"mmm…. Body lighter. Even my veins are not painful anymore" (P20, 14:658)*
>
> *"Ha, ha, ha. Whenever I sweat I will be healthy… and fit. I feel very light" (P12, 14:650)*
>
> *"Yeah, I feel fitter. Fitter" (P12, 16:748)*
>
> *"Even body is big but it is fit and healthy. We can do work quickly, not slowly or weakly. Yeah. For me that's it" (P12, 17: 841-842)*
>
> *"We are the first runner-up…. Once….err… at Baling…..We compete against young school teenagers but still manage to do it even though we are mothers. With our age you know" (P11, 3:113-118)*

6.3.1.2.6 Social interaction/friends

An important advantage of exercising with their respective NGOs was social interaction or what the attendees described as meeting friends. By conducting physical activity through the NGOs, it offered them the opportunity of social interaction, such as chit-chatting, doing things together or catching up with the latest issue in the community. Members usually shared several similarities, such as being from the local area, socio-economic groups or status, which made bonding of friendship easier.

"The most important thing is we get to strengthen our friendship with everybody here" (P11, 7:304)

"The benefit is that you get to meet lots of friends. If we just sit at home, we got no friends we will feel lonely right?" (P19, 5:236-237)

"Yeah, yeah. We can meet friends. If we don't join any activity, I mean… we are not working, who are we going to meet?" (P19, 7:305-306)

6.3.1.2.7 Happy

From the analysis, feeling happy or positive emotions were associated with the advantages of engaging in physical activity with the NGOs. When probed further about feeling happy exercising in groups, the attendees cited the feeling of excitement, entertainment and being relaxed.

"I feel happy… I get friends here. We feel boring staying at home" (P20, 18:871)

"Of course I'm happy, I now have even more friends" (P12, 16:786)

"Yeah it's different, we have many people, we do it with music, we do it in synchronised exercise, it makes you feel happy!" (P20, 18:866-867)

"People say good things but there are some that say… it usual for some people to say something but if they join us and they will feel happy" (P20, 18: 891-892)

"If we don't do any activity we don't feel happy" (P19, 5:231)

"My feeling? My feeling is like…excited and happy" (P19, 6:296)

"Yeah, happy" (P11, 8:352)

"In term of health… mmm... and then we fell relaxed" (P11, 6:273)

"Furthermore our children have grown up, so with all these activities it is like entertainment for us" (P19, 5:241-243)

6.3.1.2.8 Travel and other activities

Although physical activity is the main focus of activity in the NGOs, there are peripheral activities that include cooking healthy food, trips to other places, health checks and tea party for members.

"After we finish all our activities, at the end of the year we will do some travelling" (P19, 4:169)

"Yeah, because I really like it here. Without all tea party we still do other activities" (P19, 4:180-181)

"And then we also get to travel to see other people. You know" (P20, 16:781)

"We even cook over there. We cook and eat there. We cook healthy food. We get all those vegetables. We feel happy" (P20, 17:825-826)

"We will help out around the party, we also clean up the village or the road around here. We do all that" (P12, 17: 807-809)

The additional activities were just as important as the physical activity to the attendees. This could be demonstrated from their replies to the question as to whether they would still participate in the group if all non-exercise activities were ceased.

"errmm…maybe not…(inaudible).. if we don't eat how can we exercise, we don't have any energy to do that" (P12, 17:820-821)

"hish!… I think they need all those things…I think…. Because… sometime we do exercise together and travelling together and doing other activities together, that can make us feel relaxed and ease our stress. If they just do those thing only or just focus on those things (physical activity), maybe it doesn't … you know.." (P20, 15:701-705).

6.3.1.2.9 Facilitating factors

Facilitating factors could be described as the perceived control that facilitates or inhibits the attendees from engaging in physical activity. Three control factors were identified from the analyses which were time, facility, and skills and knowledge"

6.3.1.2.10 Facility

An essential point the attendees mentioned was that they were satisfied with the facility where they exercised. There were two NGOs in this study where the gym equipment and training were provided by the health department. These two NGOs were located in the countryside, where no commercial gym services were available.

"Our facility. Er…all our equipment is given by the health department. All exercise equipment is given by the health department" (P19, 10:451-452)

"I think, for me, facility is enough. If we know how to use them. I mean if we have a lot of these equipment but we do not use them, it's not useful either right?" (P12, 20:962-964)

"The place for us to do exercise is sufficient" (P11, 10:465)

6.3.1.2.11 Time

The attendees also related that they were able to participate in the exercise organised by the NGOs because they had spare time. They cited that being housewives with grown-up children gave them spare time for leisure activities. However, some attendees also cited that they would get busy with social events at year end and would not go for their exercise session if it coincided with those events.

> *"Actually my problems is that I have too much free time or time for rest" (P19, 3:137-138)*
>
> *"…I don't have any barriers. All my children are in school… in secondary school now" (P20, 14:690-691)*
>
> *"We feel bored staying at home" (P20, 18:871)*
>
> *"There are times when we are busy like at the end of the year we are usually busy with lots of ceremonies. So we have problems with lack of time" (P11, 2:73-75)*

6.3.1.2.12 Skills and knowledge

The health department trained some attendees to become instructors. The training also resulted in attendees having more confidence in performing the aerobics rhythmic movements. Some attendees even volunteered as local school exercise instructors after the training.

> *"Easy..yes it's easy because we also have gone through training to be instructor" (P11, 6:258-259)*
>
> *"We do what people do in front and above.. (inaudible)…after we attend the course it's like we know the steps and all the steps and we don't feel unsure when we do it" (P11, 10:452-454)*
>
> *"When she is not around, we are actually pretty good. If she can't come to the session, we will do it ourselves" (P19, 9:407-408)*

6.3.1.3 Analysis of postal questionnaire replies

The postal surveys were received from 5 attendees (refer to Appendix 10 and 11 for sample of postal survey form). Having examined the replies, four themes were identified depicted in figure 20 which were health, social interaction and control factor.

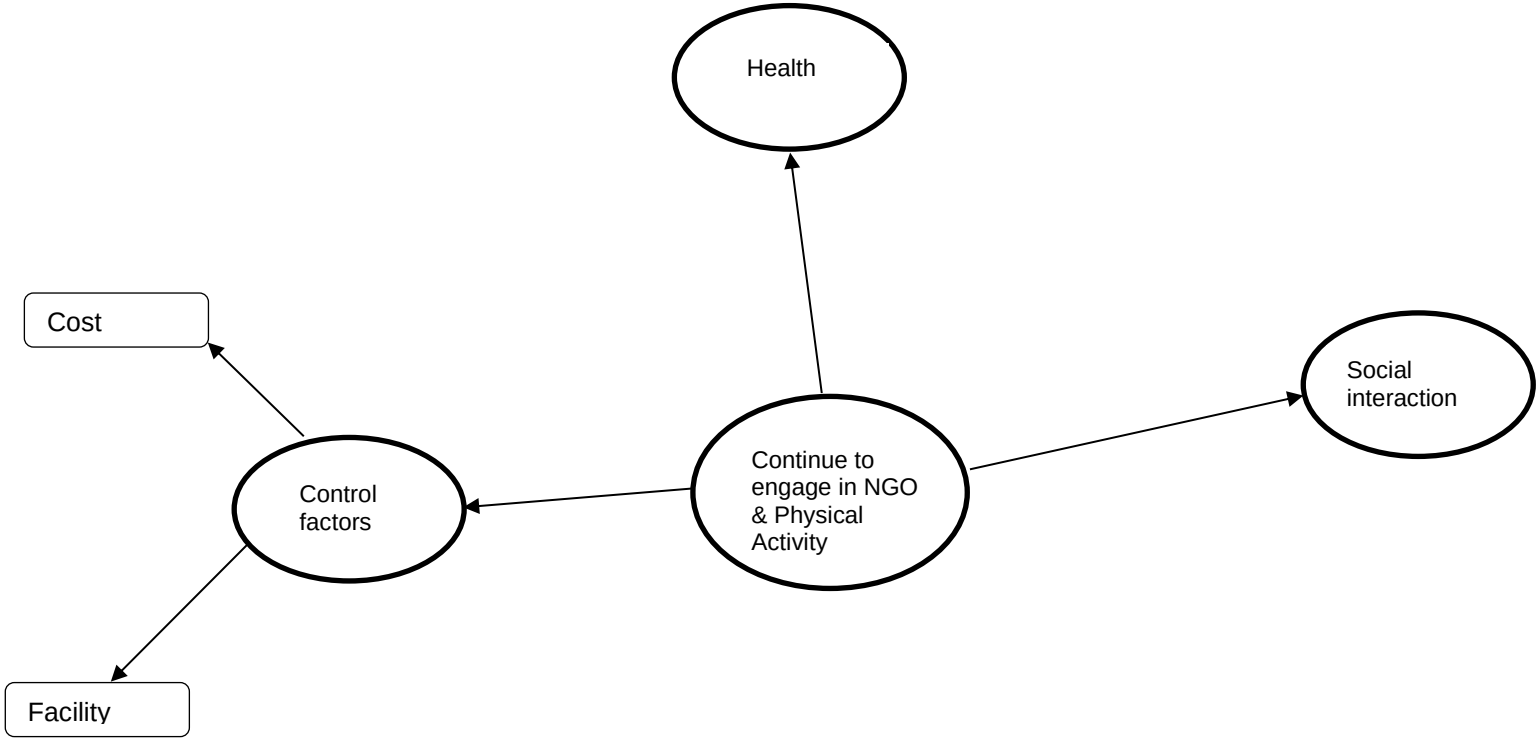

Figure 20: Thematic map of themes from postal replies

6.3.1.4 Results of postal replies

All attendees who replied to the postal survey indicated that they still continued conducting physical activity with the same frequency and duration as they did at QS2 interview.

6.3.1.4.1 Health

All five attendees responded that they felt their health had improved as a result of physical activity. The attendees cited that they experienced a better fitness level; one attendee stopped smoking tobacco and one attendee stated he was still free from developing chronic disease.

"I'm fit" (P1, question 4)

"Fitness" (P6, question 4)

"I've stopped smoking" (P2, question 4)

"I never experience health problems" (P3, question 4)

"I prioritise my health" (P13, question 10)

6.3.1.4.2 Social interaction

The attendees reported that advantages gained from the NGOs were meeting friends, travel, religious class and exercise activity. They also claimed to have good support from their family about their participation in the NGOs. The attendees were also asked to state what they perceived they would "lose" if they stopped attending the NGOs activities. Based on the replies, the attendees thought that they would no longer enjoy good health and social interaction.

The attendees also reported they received positive comments from friends outside their NGO circle about their participation in the NGOs. It is also possible that the attendees felt that they were regarded as referents for their friends and this reinforced their self-confidence.

"Making friends and get new friends" (P13, question 5)

"Making friends among NGO's members" (P6, question 5)

"Get to work together with other members" (P1, question 5)

"I would be no longer able to carry out activity with my friends" (P2, question 8)

"I can't exercise very well anymore and my social interaction will be limited" (P6, question 8)

6.3.1.4.3 Control factor

Analyses of the replies identified two control factors which were cost/financial factor and facility. These two factors were grouped into the theme of control factor as it is an external factor that had influence over the attendee's ability to perform physical activity behaviour.

6.3.1.4.4 Cost

Cost or financial factor was a theme analysed in the interviews at QS2 previously. The attendees were asked again in the postal survey about the cost they spent on physical activity. Although they stated that the costs they spent on exercising were reasonable in question 13, analyses of other questions, such as questions 18 and 19, revealed that cost and funding from government were important to them.

"RM40/month is very reasonable" (P1, question 13)

"Not expensive" (P13, question 13)

"The rental cost for venue and instructor is cheap" (P6, question 13)

"Some members are questioning why we should pay for the instructors, when we didn't before" (P6, question 12)

"If we could get sponsors on shuttlecock…….This would help us to get active" (P1, question 18)

"Continue to support in terms of funding, courses and encouragement etc" (P13, question 19)

6.3.1.4.5 Facility

Access to proper facilities was important to maintain engagement in physical activity. In the replies, four attendees cited that they thought the facilities were sufficient in question 17 but cited problem with weather on question 18 about barriers to exercise. The problem with weather and lack of places to exercise were related to question 17 where the attendees

cited as satisfactory. The contradictory replies were probably because the attendees thought they still could conduct their activity when the weather is good but not when it rains.

"We have lack of places to practice" (P3, question 18)

"Not many except for weather and time" (P13, question 18)

("physical activity session affected) If there are no resources" (P2, question 14)

"If we could get sponsors on ….sports complex every month. This would help us to get active" (P1, question 18)

"Whenever it rains, we do not have hall to exercise" (P6, question 18)

Attendees were also asked about their personal view as to what they thought the NGOs should change or improve. Based on the replies received, three of the attendees thought that the NGOs did not need any improvement and one attendee suggested his NGO should carry out more promotions to attract new members. On the questions about how the health authority could further assist the NGOs, the replies showed that the attendees hoped for continued financial aid.

6.3.2 Summary

6.3.2.1 Summary of telephone interviews

From the telephone interviews, it could be suggested that the participants continued to engage in physical activity due to a combination of advantages and facilitating factors. In discussing the themes of facilitating factors, the analyses of two interviews showed that the control beliefs may have had an influence on intention and behaviour. Consistent with another study, behaviour was perceived to be easy when participants were in control or relatively unaffected by external factors, such as family or facility (Armitage, 1999). In the present study, all three sub-themes of facilitating factors, which were facility, time, skill and knowledge, were within the control of the attendees. The NGOs had suitable places and equipment for exercise, activities were conducted at times that suited them and the attendees had sufficient skills and knowledge to perform the exercise.

Having control of the facilitating factors, the attendees were attracted by the advantages they gained from joining the NGOs. The advantages were linked to the perceived outcomes and evaluation of the outcomes itself. In essence, the attendees strongly believed that by joining the NGOs they would gain the advantages of health improvement, social interaction, travel and other activities as well as positive emotions. When they valued these advantages as important to them, the attendees formed a pleasurable attitude towards the NGOs and the activities they organised.

6.3.2.2 Summary of postal questionnaire replies

Summarising the postal replies, four main themes were identified which were social interaction, enjoyment, health improvement and control factors which were also consistent with themes from the telephone interviews. The themes of social interaction and enjoyment were closely related as the enjoyment the attendees experienced was a result of social interaction whilst conducting physical activity. The group exercise and parallel activities, such as outings, provided platforms for the attendees to interact and socialise which resulted in enjoyment and positive emotions. This positive emotional feeling, consistent with the finding of Bellows-Riecken et al. (2013), formed the effective beliefs that enhanced attitude towards the behaviour.

With regard to control factors, the importance of PBC as a predictor of intention was parallel with attitudes and SN (Armitage, 1999). The current findings provided additional support to the view that control factors, such as time, facility, family support, skills and knowledge, are related to adherence to performing physical activity. The control factors in the current study also had an impact on the decision of the attendees to maintain their types of activity as well as the frequency of performing physical activity. When the attendees suggested they were maintaining their types of activity because they were easy and suitable, the underlying rationale was that they were able to manage the control factors.

Barriers identified were mainly funding followed by weather and venue. Weather and venue were related to each other because the NGOs involved in this study exercised in open-air areas.

6.3.3 Conclusion

By examining both results, telephone and postal, it was found that there were shared themes: health, social interaction and facility. The themes of social interaction, health and funding were also identified during QS2 which was conducted among the same participants about a year apart from the QS3 qualitative study. The attendees interviewed by telephone were located in the countryside and their NGOs received more assistance from the government compared to the NGOs of attendees who replied by post. Community hall and equipment for exercise were provided by local government and health authority to the NGOs of attendees who did telephone interviews. Whereas the respondents of the postal survey were from urban areas and their NGOs received less support from the government. Even with differences of location and assistance from the government, this study revealed that the attendees shared some beliefs about factors that were important for them to continue to engage in physical activity.

6.3.4 Reflexive statement

There are two sides to the coin working with the Ministry of Health when conducting such a study. I reflected on the bias that could occur from my occupation and the measures taken to mitigate it. On the positive side, I had expected the attrition rate to be high for both quantitative and qualitative studies. My questionnaire booklet was so thick that folding it into an envelope was hard. I also thought that nobody would want to talk to me at QS3 study. It turned out that the attrition rate was not as low as I thought it would be. I think it must have been because of my occupation, otherwise they would not care to be interviewed by me again via telephone from the UK and answer the same set of questionnaires four times in a year.

Finally, I also wanted to express my feeling of gratitude for the opportunity to conduct my study in the UK. The different environments of Malaysia and the UK provided me with an opportunity to carry out a cross-cultural study. While in the UK, I found that well-maintained parks were near to residential areas, something that is lacking in Malaysia. Many roads in the UK have a designated cycle path. The experience of living in the UK allowed me to make observations from different angles, compare

between the two countries and make constructive criticism and suggestions for the improvement of public health policy in Malaysia.

At this point, I have conducted three stages of interviews for my study and I am analysing the third. From my experience of carrying out this study, I have found that “physical activity” is a bigger thing than I could have imagined, despite my occupational background. Physical activity has always been linked to certain words like “healthy”, “fit” and “agility” but from this study I learned about the other side of those words. Many of the participants mentioned that they felt healthy and fit. I looked at them and I began to guess their BMI. At that moment I was thinking they could not be really healthy or fit. I guessed their BMI and their agility based on my own observation but my observation was biased. Not everything must be measured objectively. Many of them do not look like they have an ideal BMI but they feel healthy, they feel fit, they feel good about themselves and that is important. Now I begin to shift my opinion, it is my job to make exercise fun and accessible and when you do it you feel good about yourself. You keep doing that and everything else like good BMI will follow.

6.3.5 Implications

6.3.5.1 Research

In the present study, distance prevented the researcher from locating and interviewing the participants face to face. If geographically viable, future studies should prioritise interviewing the participants face to face because researchers could build trust by being physically present. Exchanges of views in group interviews were also easier compared to telephone conversations where only one person talked at a time.

6.3.5.2 Practice/policy

There are implications for future health promotions of physical activity among community groups and the provision of support on the themes of facilitating factors, such as skills, knowledge and improvements to facilities. These are aspects that could be subject to intervention by the health authority or council compared to advantages such as social interaction and enjoyment. Health

promotion that just focused on disseminating health messages to increase health concern would not result in continued maintenance of physical activity as it is only a sub-theme within bigger themes. An enhanced knowledge needs to be supported with feelings of enjoyment and good social interaction. A community-run exercise programme could only be maintained once the participant was able to enjoy all the qualities within the advantage theme complemented by elements of the facilitating factor theme.

6.3.8.3 Limitations of study

For the telephone conversation, two attendees used a mobile for the interview which resulted in poor recording due unsatisfactory reception and loud background noises. Even the landline telephone when recorded had some inaudible words that made analysis difficult. There were some words that were just the researcher's "best guess" when transcribing the interviews. As for the postal replies, to increase the response rate, the survey questions were devised to be as simple as possible and the attendees were only required to write short answers. This resulted in the study having limited data for analysis purposes.

The sample for the present study was small with only four telephone interviews and five postal responses. The small sample size could affect the range of the analysis and the findings.

6.4 Summary of Qualitative Study

Sports psychologists have used qualitative methodologies to provide in-depth analyses of athletes by gaining greater understanding of the athletes' subjective experiences (Munroe-Chandler, 2005). The growth in qualitative research in physical activity may be due to the limiting interpretation derived from conventional quantitative methods when investigating people and their situations (Munroe-Chandler, 2005). Qualitative studies continue to contribute to the knowledge and understanding of physical activity and its maintenance.

The present research combined three qualitative studies which were views and beliefs on physical activity, understanding physical activity and health promotion programme and follow-up on interviews with attendees of NGOs. The first qualitative study was conducted among a Malaysian population in the UK while the second and the third were conducted among Malaysians participating in NGOs running physical activity programmes in Malaysia.

To review, the findings can be categorised into three different factors, which are socio-economic, physical environment and personal factors. The socio-economic factor comprised themes such as cost and time. Issues pertaining to cost, such as fee paid to NGOs, cost of exercise attire and equipment, and cost of travelling, food and drinks affected the decision of an individual to engage in physical activity. Apart from the cost spent, the "lost" cost, which was what the participants could have done with the money spent on physical activity, would also be considered by the participants. In the present study, participants cited that they felt that the cost they spent on physical activity was reasonable but still acknowledged that sponsorship from the government helped towards the cost.

The time spent on physical activity correlated with the time spent on work and family. The literature found changes in physical activity habits with the presence of children among working parents (Hamilton & White, 2010b). A qualitative study among patients with hypertension in Malaysia found that they found it difficult to change their sedentary lifestyle citing reasons such as being busy (Shima, Farizah, & Abdul Majid, 2014). In the present study, the participants reported that they had spare time and

the exercise sessions were conducted at suitable times and this helped them to continue to engage in physical activity.

The physical environment involved issues concerning the facility or suitable places to carry out physical activity. The participants in the present study cited lack of parks as well as poor upkeep of existing parks. There are not many roads in Malaysia with designated cycling paths or pavements with cross-slope. Most of the roads are designed specifically for motorised vehicles causing cyclists having to dismount every time they need to cross a road (Siok Hui, 2013). Safety issue was also a concern for participants because of the poor maintenance of parks and incidents of bag snatching by passing motorcyclists (Department of Diplomatic Security, 2015), which affected their decision to exercise outdoors. An implication of this study is that the government should consider building more well-maintained parks and reduce crimes by having more police on the streets.

The personal factors encompass three themes which were health, activity and feeling happy. Participants in this study reported maintaining good health as a reason for them to engage in physical activity. The types of activity organised by the NGOs in this study were aerobics and badminton, which the participants considered easy and suitable for their age. An explanation of why aerobics was considered easy was that some NGOs hired instructors to lead the exercise session and, with a proper guide, the participants felt it was easy and they were confident to perform the moves.

Social interaction and feeling happy from participating in group exercise sessions consistently emerged as themes from interviews with participants from QS2 and QS3. The results also showed that enjoyment and social interaction were more important motivations for the participants than health improvement. This possibly reduced the number of participants dropping-out of the exercise sessions because physical improvement would slow down or stop at a certain point; this situation, also known as plateau, would discourage participants from continuing the exercise session if they only had physiological targets to achieve.

Chapter 7

7.0 DISCUSSION

7.1 Introduction

Health research includes investigations of complex, multilevel processes and systems that require both quantitative and qualitative forms of data. Integration of quantitative and qualitative data can enhance the value of the research (Fetters, Curry, & Creswell, 2013). This chapter aims to integrate the results from quantitative and qualitative analyses and summarise the findings according to the objectives of the study.

7.2 Interpretation of Results

7.2.1 Objective 1: To investigate the predictive utility of the TPB in relation to physical activity behaviour in a Malaysian population setting

The TPB has been successfully applied to a wide range of behaviour and meta-analytic reviews support findings that TPB can predict behaviour (Rivis & Sheeran, 2003). Consistent with the literature and the research hypotheses, the findings from this study supported the utility of the TPB as a theoretical framework to examine the determinants of intention to engage in physical activity (Conner, Rodgers, & Murray, 2007). The TPB model significantly predicted the intention to engage in physical activity and physical activity behaviour. The following paragraphs will discuss the interpretation of results in relation to the TPB model and the prediction of behavioural intention, future intention, and physical activity behaviour, as well as the role of each of the TPB constructs.

7.2.1.1 The TPB model and the prediction of behavioural intention

Overall, results from the present study showed that the TPB model accounted for variance from 43% to 64% in behavioural intention when using direct measures

from Time 1 to Time 4. These findings aligned with previous literature; for example, Armitage (2005) observed gymnasium participants over a 12-week period and the findings indicated that the TPB model accounted for 49% of the variance explained in behavioural intention. A meta-analytic review carried out by Hagger et al. (2002) found that the TPB model explained 44.5% of the variance of behavioural intention. In the present study, analyses using indirect measures showed the TPB model accounted for variance of 46% at Time 1 and 68% at Time 4. There were no significant changes in the variance with the addition of indirect measures at Time 2 and Time 3. At Time 4, all three indirect measures made significant contributions to the TPB model.

Analysis using SEM, however, showed a lower explained variance of 30% at Time 1. As the SEM only used Time 1 data, it should only be compared to other analyses of Time 1 data. The result from SEM was also comparable with other literature, for instance, a meta-analytic review of 185 studies found that the TPB model accounted for 39% of the variance of intention (Armitage & Conner, 2001).

An increase in the explained variance was observed from Time 1 to Time 4 and this pattern could possibly be due to a combination of TPB and non-TPB factors. For TPB factors, the sustained physical activity by the participants contributed to improved beliefs related to physical activity and enhanced personal mastery experiences or feelings of successful performance of a behaviour (Armitage, 2005). This suggestion of improved beliefs related to physical activity was supported by the finding of a significant relationship between all indirect measures and behavioural intention at Time 4. By Time 4, the participants' skills and knowledge of the physical activity had improved and this successful performance of the behaviour resulted in an increase in behavioural intention. As for non-TPB factors, they are discussed in Section 7.3.

Examining the results of the hierarchical regression, of the three direct measures, attitudes consistently showed a significant relationship with behavioural intention at steps 1, 2 and 3 from Time 1 to Time 4. This result is congruent with other studies (Cooke & French, 2008; Hagger et al., 2002), where attitude appears to be the strongest predictor of behavioural intention. This also supports the suggestion of the mediation of attitudes on behaviour via intention (Blue, 1995;

Godin, 1993; Hagger et al., 2002). This relationship suggested that the participants were making the decision to perform physical activity based on their attitudes towards physical activity.

7.2.1.2 The TPB model and the prediction of future intention

The present study also investigated the utility of TPB in relation to maintenance of physical activity behaviour by predicting future intention. In these analyses, the independent TPB constructs were used to predict the dependent construct of intention of the next time point. It was reasoned that the intention to perform physical activity was affected by past TPB beliefs. Based on this reasoning, three analyses models were examined with the independent TPB construct of Time 1 used to predict intention at Time 2 (model 1), the independent TPB construct of Time 2 used to predict intention at Time 3 (model 2) and independent TPB construct of Time 3 used to predict intention at Time 4 (model 3). Analyses using regression showed significant relationships between the variables and intention. In model 1 which accounted for 14% of the variance explained, PBC direct and indirect measures were significantly related to intention. At model 2, only PBC direct measure showed a significant relation with the model accounting for 34% of the variance. In model 3, no variables were significantly related to intention to perform physical activity behaviour.

Comparing these results with other literature, the second model of 34% explained variance of intention was comparable with the study on participants at a gymnasium which had 49% explained variance of intention (Armitage, 2005). A higher proportion of the variance was explained in the study using a gymnasium because it involved a sample of people highly motivated to attend gymnasium activities (Armitage, 2005). When each of the TPB constructs was examined, PBC was found to be the dominant predictor of exercise maintenance and this is consistent with prior research on TPB and maintenance of behaviour (Armitage, 2005; Sallis, Buono, Roby, Micale, & Nelson, 1993).

The PBC was found to be significantly related to future intention to perform physical activity in the first two models. In the first model, both the PBC direct measure and indirect measure were significantly related to future intention while

in model 2 only the PBC direct measure was related to future intention. These findings corroborated results from other studies in the literature. In a study by Marta (2014) that examined the maintenance of volunteering using TPB, Marta (2014) found that PBC contributed significant additional variance in predicting maintenance of volunteering activities over time. Similar findings were also found from a study by Armitage (2005) which demonstrated that PBC was the dominant predictor of exercise maintenance among gymnasium participants. While a study on self-monitoring of blood glucose of diabetic patients using TPB found perceived difficulty as the most significant predictor of intention to self-monitor (Shankar et al., 2007).

These findings were further supported with themes from the transcribed qualitative interviews. Analyses of the interviews found themes related to PBC which showed the importance of PBC to the participants in continuing their physical activity behaviour. Themes such as facility, time, skill and knowledge, activity considered easy, cost and environment were generated from the interviews. These themes recurred at QS1B, QS2 and QS3 of the qualitative study which showed the significant roles of these themes in motivating the participants to sustain their physical activity behaviour.

Results from this study add to the support of findings from other studies that the TPB as a whole was able to account for the maintenance of behaviour. A study by Sheeran, Conner, and Norman (2001) examined attendance, non-attendance and pattern of attendance of health-screening behaviour and their results showed that TPB was predictive of screening attendance and frequency of attendance. Another study on maintenance of behaviour by Armitage (2005), which involved gymnasium participants, also showed that the TPB was predictive of exercise maintenance. Shankar et al. (2007) found TPB to be predictive of maintenance of frequently repeated behaviour.

7.2.1.3 The TPB model and the prediction of behaviour

The present study also investigated the relationship between the TPB model and physical activity behaviour. Based on the results, the model only significantly predicted light intensity of physical activity at Time 1 and moderate intensity at

Time 4. However, the TPB model significantly predicted vigorous intensity of physical activity at all time points.

Three possible explanations could be posited for the weak relationship between the TPB model and light-intensity and moderate-intensity physical activity. The first explanation was that the NGOs involved in the study were organising vigorous-intensity physical activity. The questionnaire was given to the participants after their physical activity session and this could have influenced them to provide answers within the context of their exercise programme. This could have affected the results of light and moderate-intensity physical activity. The second explanation could be the overall effect of the exercise programme, which had successfully made the participants adopt an active lifestyle and consequently less time was spent on light and moderate-intensity activities. The last explanation was the methodological approach taken in this study. In the first section of the questionnaire, participants were requested to indicate the activities they did in the past 7 days from a list of 12 activities. However, there were only two activities of light intensity as compared to five activities for moderate and five activities for vigorous intensity. The limited choice of activities for light intensity could have affected the results of the analyses.

The relationship between the TPB model and vigorous intensity was then scrutinised for a pattern and it was found that PBC made significant contributions at Time 1 and Time 4. Behavioural intention and SN were both significantly associated with vigorous intensity at Time 2 and Time 3. In TPB, the constructs of attitude, SN and PBC exerted their influence on behaviour mediated by intention except for PBC which could have a direct effect on behaviour. However, in the present study at Time 2 and Time 3, SN had a direct effect on behaviour along with intention. The issue of TPB beliefs predicting behaviour over and above intention has been reported elsewhere (Araujo-Soares, Rodrigues, Presseau, & Sniehotta, 2013; Conner, Godin, Sheeran, & Germain, 2013; Sniehotta, Presseau, & Araújo-Soares, 2014) and this was suggested to be a concern about the validity of TPB itself.

On SN and behavioural intention predicting behaviour, another study with comparable findings by Prapavessis, Gaston, and Dejesus (2015) found that SN

and behavioural intention were the strongest predictors of behaviour. An explanation that could be provided for this pattern was probably that at Time 2 and Time 3, the participants were at a volitional phase and SN exerted most of its effect on behaviour (Okun, Karoly, & Lutz, 2002). At this time point, the participants were no longer at the initiation stage and acting on a decision influenced by social support and friends. At Time 1 the physical activity programme was at an initiation stage and at Time 4 the financial support of the Board was due to end. The participants probably felt a higher degree of subjective control over their ability to engage in physical activity at this time point and this may have contributed to the significant relationship between SN and behaviour (Hagger et al., 2002). Another explanation for the significant relationship between SN and behaviour was suggested by Okun et al. (2002). In their study on the effect of SN on leisure time physical activity, descriptive norms were found to have a small effect on behavioural intention but high beta weight with behaviour. This suggested that having friends that exercise also increased an individual's engagement in exercise behaviour (Okun et al., 2002). In the present study, participants exercised in groups with friends who were all members of their respective NGOs.

The PBC was found to have a direct effect on behaviour at Time 1 and Time 4. In TPB where the condition was not in complete volitional control, the PBC would be independently predictive of behaviour (Armitage & Conner, 2001; Hausenblas et al., 1997). A relationship between PBC and behaviour was found in other comparable studies. A study on gymnasium participants showed strong predictive utility of PBC on actual exercise behaviour (Armitage, 2005) and a systematic review of TPB and dietary pattern revealed that behaviour was strongly associated with intention and PBC (McDermott et al., 2015). In the present study, the significant relationship between PBC and behaviour at both time points indicated higher perceived barriers by the participants to regular exercise participation (Hausenblas et al., 1997). An explanation for this circumstance was that the participants may have perceived higher barriers at the start of the exercise programme funded by the Board, but the feeling subsided as the programme progressed. The feeling of lack of volitional control possibly increased again at Time 4 when funding for the programme was about to end.

The findings on the relationship between intention and vigorous intensity of physical activity using logistic regression were also in symmetry with results from SEM analysis. Results showed a higher factor loading which indicated a strong influence of intention over physical activity of vigorous intensity. These findings were also comparable with other literature. A study among working adults on intention to exercise revealed strong predictive validity of intention, which explained 25% of the variance of exercise behaviour (Budden & Sagarin, 2007). Another study to evaluate the utility of TPB in predicting leisure time physical activity among patients with kidney disease found that behavioural intention but not PBC predicted exercise behaviour (Eng & Ginis, 2007). A meta-analysis on the effect of SN on behaviour in TPB also found a significant direct relation between descriptive norms and behaviour (Manning, 2009).

The analyses on the relationship between the TPB model and physical activity behaviour of vigorous intensity also revealed that attitude was not a significant predictor. Similar results were also observed in other studies where attitude did not show a significant relationship with actual behaviour. In a meta-analysis examining articles published in English from 1995 to 2011 for exercise adherence among patients with cancer, attitude was found to be a non-significant contributor (Husebø, Dyrstad, Søreide, & Bru, 2013). In another meta-analysis examining nutrition-related behaviour, attitude also did not emerge as a strong predictor of behaviour and the overall strongest predictor was intention followed by PBC (Riebl et al., 2015).

The present findings on behaviour may have an impact on future interventions as well as add knowledge to the existing literature on TPB. From the present study, it was found that intention does not consistently predict behaviour at all time points. In addition, the results from the present study corroborated the findings of De Bruijn and Van den Putte (2012) where having intention alone would not necessarily translate into behaviour. There seems to exist an intermittent gap between intention and behaviour which is determined by other factors.

From the present study, it was found that PBC had a direct relationship with behaviour during the first and last time points. From this finding, it is

recommended that interventions on physical activity should start with strategies to address the PBC, such as the perceived barriers and perceived control of the participants. The intervention should also end with strategies to address the PBC as participants would probably be concerned whether they would be able to independently sustain the physical activity programmes. This was discussed in more detail in Section 7.2.1.6 – The role of PBC.

During the intervention period, the intervention should focus on developing intention and building social bonding between participants as intention and SN were significantly related to behaviour in intervening periods. To develop a positive intention to engage in physical activity, the intervention should focus on attitude as it is the most prominent construct which predicts intention. Suggestions to promote positive attitudes would include making physical activity programmes fun, enjoyable, easy as well as providing information on the health benefits of physical activity.

7.2.1.4 The role of attitude

The findings from the present study were in line with other literature which found attitudes have the most pervasive influence on intention with regards to physical activity behaviour (Blue, 1995; Downs & Hausenblas, 2005b; Hagger et al., 2002; Hausenblas et al., 1997). In the present study, attitude was found to be the single strongest significant predictor of intention, followed by PBC and SN.

The findings on the relationship between attitude and physical activity behaviour were also supported by results from the analyses of the qualitative interviews. Themes such as enjoyment, feeling healthy, feeling fit and fresh, happy and maintain good body image were all related to affective attitude.

The construct of attitude has been conceptualised as having both a cognitive (instrumental) and an affective component (Lawton, Conner, & McEachan, 2009). However, recent studies identified affective attitudes as stronger predictors of intentions and decisions than cognitively based attitudes. (Kraft, Rise, Sutton, & Røysamb, 2005; Lawton et al., 2009; Van Den Berg, Manstead, Van Der Pligt, & Wigboldus, 2005). The influence of affective attitude appears to be strongest for those behaviours that have a more immediate impact on the senses or

psychological state, such as tobacco smoking, drinking alcohol or exercise, and weakest for behaviour such as self-examination and vitamin use for which the impact is less immediate (Lawton et al., 2009). Certain affective qualities are attributed to behaviour as a result of experiencing an emotion when enacting the behaviour, for example eating or drinking and feeling energised when we exercise (Lawton et al., 2009; Russell, 2003). These affective qualities that we attribute to behaviour may motivate further enactment of the behaviour (Lawton et al., 2009; Russell, 2003).

The present study also found interesting patterns with regard to attitude and could add to the existing knowledge. In the present study, all four time points showed a similar pattern where attitude significantly predicted intention to perform physical activity. However, attitude, when used to predict future intention did not show a similar strength or significant association. This indicated that whilst attitude was significantly associated with intention at each time point, it had weak influence over future intention to exercise. This result suggests that a strong attitude towards physical activity for an individual would only translate into immediate intention to perform physical activity but it would have a low effect on maintenance of the behaviour. This result supported the findings of a study by Armitage (2005) which found that attitude was not a consistent predictor of exercise maintenance. However, a unique contribution of the present study was that it distinguished between immediate intention and future intention. More research must be conducted to conclusively distinguish the two types of intentions in TPB.

7.2.1.5 The role of SN

SN is defined as the perceived pressure to perform a behaviour and usually is measured as what others think one should do or would others approve of what one is doing (Ajzen, 1991). There are two types of perceived norms within SN which were injunctive norms and descriptive norms (Manning, 2009). An injunctive norms is social pressure to engage in a behaviour based on the perception of what other people want us to do whereas a descriptive norm is social pressure based on observed behaviour of others (Manning, 2009). Research has shown that SN is not a consistent predictor of intention (Armitage

& Conner, 2001; Biddle, Goudas, & Page, 1994; Bozionelos & Bennett, 1999; Brickell, 2006; Courneya & McAuley, 1995; Downs & Hausenblas, 2005a; Hagger, Chatzisarantis, Biddle, & Orbell, 2001; Hagger et al., 2002; Manning, 2009; Terry & O'Leary, 1995). In the present study, results also showed no significant association between SN and intention except for SN indirect measure at Time 4.

The pattern of results of the present study showed that SN was weakly related to intention to perform physical activity. One explanation of the weak relationship between SN and intention was that significant others had less influence on individual intention to exercise (Armitage & Conner, 2001; Downs & Hausenblas, 2005b). In the TPB, SN reflected social pressure with the measures of SN indicating the extent to which significant others pressured them to perform a behaviour (Ajzen & Madden, 1986); the present study showed that injunctive norms were the less salient beliefs in SN. Other studies have also shown injunctive norms to have a negative effect on behaviour particularly when the behaviour was socially approved, socially motivated or useful (Manning, 2009). Another explanation was the possible limitation of the measurement of SN where the breadth of the measure did not sufficiently capture the social influence of the participants (Chatzisarantis, Hagger, & Brickell, 2008; Courneya et al., 2000; Downs & Hausenblas, 2005b; Grube et al., 1986; Hausenblas et al., 1997).

The TPB posits that the relationship between SN and behaviour is mediated by intention (Ajzen, 1991). However, several studies found a direct effect of SN on behaviour (Christian & Abrams, 2003; Christian & Armitage, 2002; Christian, Armitage, & Abrams, 2003; Okun et al., 2002). In the present study, SN was found to have a direct association with moderate-intensity physical activity at Time 4 and with vigorous-intensity physical activity at Time 2 and Time 3. These results support the findings of Manning (2009) that norms affect behaviour unmediated by intention when there is social motivation underlying a behaviour. The themes from the qualitative study, such as enjoyment, friends, and members, demonstrated the role of social motivation has on the participants.

To increase the predictive power of the TPB, the present study also supports the suggestion for a review of SN to identify the actual component of beliefs that

contributes to intention and behaviour (Downs & Hausenblas, 2005b). It had been theorised that social support is a better predictor of intention to perform physical activity within the TPB framework because physical activity is a complex behaviour that requires significant internal and external resources (Cavallo et al., 2014; Rhodes et al., 2002). Even though knowing what others think or approve is important, it is unlikely to be a sufficient manifestation of social influence in the domain of physical activity (Courneya et al., 2000). The conceptual difference with SN is that social support is the perceived support or assistance received from others associated with a behaviour (Anderson, Wojcik, Winett, & Williams, 2006; Courneya et al., 2000).

Physical activity requires more than just knowing what significant others think and social support provides actual assistance to perform the behaviour in addition to influencing intention (Cavallo et al., 2014). The literature also showed that social support enhances psychological well-being, attitudes and motivates performance of social behaviour (Chatzisarantis et al., 2008; Deci, Koestner, & Ryan, 1999; Koestner, Bernieri, & Zuckerman, 1992; Williams, McGregor, Zeldman, Freedman, & Deci, 2004).

Another potentially important concept that has received less scientific attention in the research to identify variables that may facilitate enactment of behaviour is self-identity (De Bruijn & Van den Putte, 2012). Self-identity reflects the extent to which someone views him or herself as meeting the criteria for that social role (De Bruijn & Van den Putte, 2012) and when an individual has a salient exercise identity, he/she may be more likely to engage in physical activity (Reifsteck, Gill, & Labban, 2016). The concept of identity and social support are further discussed in Section – 7.3 Integration.

The result of the present study supports the suggestion that social support of important others and self-identity play important roles in the maintenance of physical activity (Courneya et al., 2000; Rackow, Scholz, & Hornung, 2015; Reifsteck et al., 2016). The implication of this finding is that to promote sustained physical activity behaviour, future interventions should consider the aspect of social motivation. Interventions should include group activities that promote interaction among members and not just physical activities alone.

7.2.1.6 The role of PBC

The pattern observed for the relationship between PBC-Intention and PBC-Behaviour was that at Time 1, PBC was not predictive of intention but predictive of behaviour. At Time 2, PBC was neither predictive of intention nor behaviour. At Time 3, PBC was predictive of intention but not behaviour and at Time 4 PBC was both predictive of intention and behaviour. PBC is held to exert both a direct and an indirect effect on behaviour and in a condition of complete volitional control, the intention–behaviour relationship should be optimal and PBC should not exert any influence on this relationship (Armitage & Conner, 2001). Under conditions where volitional control is low and behavioural intention would only account for a small amount of variance in behaviour, PBC should be independently predictive of behaviour (Armitage & Conner, 2001)

An explanation for the circumstances above was at Time 1, which was the start of the funded programme by the Board, the participants perceived they had low volitional control over their exercise programme. It could be argued that this may be due to the participants feeling unsure about fulfilling the terms and conditions of the funding from the Board, the facility available for exercise and were feeling anxious because of visits by officers from the Board and the researcher. The terms and conditions of the funding affected the overall activities organised by the NGOs, such as a minimum of 200 people exercising, and a cap on payment for instructors, rental of facility, rental or purchase of sound system as well as on food and drinks.

When the funding programme reached Time 2, the participants had increased their volitional control and their participation in the exercise programme was now motivated fully by beliefs related to attitude and SN. At Time 2, attitude and self-efficacy predicted intention to participate in physical activity. When perceived barriers were low, volitional control increased and consequently attitude became a significant predictor of intention; this is due to participants' perception that the barriers were low and they were motivated to engage in cognitive processes

when they formed intention to exercise (Kidwell & Jewell, 2010). Intention and SN were at Time 2 significantly related to physical activity behaviour.

As the study reached Time 3, the influence of attitude and PBC on physical activity behaviour was mediated through intention. This showed that the volitional control of the participants was still high and beliefs related to attitude continued to motivate them to participate in the exercise programme. At this stage, intention together with SN predicted physical activity behaviour. At Time 2 and Time 3, intention predicted behaviour but not PBC and these circumstances suggested that the participants at these time points had complete control over their behavioural performance and intention alone was sufficient to predict behaviour (Budden & Sagarin, 2007).

At Time 4 Attitude and PBC predicted behaviour; this showed that the beliefs related to PBC, such as the participants' perception of barriers, was increasing. This was possibly because the three months funded physical activity programme by the Board was about to end, thus the NGOs would have to cut their activities and look for sources of funding again or the participants would stop attending the NGO. A similar result was found in a study about the effects of physical activity intervention on employees where participants quit the programme when the financial sponsorship ended (Brand, Schlicht, Grossmann, & Duhnsen, 2006). An implication of these circumstances was for the Board or the health authority to build the capacity of community-based NGOs so that they could extend their funding network to other non-government sources, such as charities or private companies.

Meta-analysis demonstrated that PBC increased the explained variance in intention and behaviour (Hagger et al., 2002; Hausenblas et al., 1997). The findings of the present study supported the results of previous literature that indicated that PBC was an important construct in understanding exercise (Hausenblas et al., 1997).

The inclusion of PBC as an additional determinant of intention and behaviour marks one of the most significant developments in TRA (Yzer, 2012). The TRA was changed to TPB with the incorporation of perceived control over behavioural

achievement as another determinant of intention and behaviour (Madden, Ellen & Azjen, 1992).

The literature showed that PBC is important in the domain of physical activity, but the results from this study showed that intervention targeting PBC alone would have no effect on increasing intention to participate in physical activity behaviour. For example, providing training on exercise skills to individuals who do not regularly exercise would not result in them taking up this behaviour as this would not contribute to increasing their intention. At the initiation stage of the programmes, attitude with higher predictive power of intention should be addressed. In fact, focussing too much on PBC, such as the skills or "doing it right", time or placing all resources into developing exercise facility, could be counterproductive as this would demotivate the participants. The "*Gimnasium Rakya*t" or People's Gymnasium project by the Ministry of Youth and Sports Malaysia was an example of an initiative to encourage physical activity among the community by building facilities, but the lack of proper maintenance and intervention led to its failure (Abdul Majid, 2009; Ismail, 2016). In the present study, this pattern was observed in the weak relationship between PBC-intention and PBC-behaviour at Time 1 and Time 2.

To increase the efficacy of the intervention to engage in physical activity, future programmes should target affective attitudes. However, as the programmes progress, the intervention should shift its target to other beliefs that affect behaviour, such as social motivation and PBC.

7.2.2 Objective 2: To test the predictive utility of self-efficacy in relation to physical activity behaviour in a Malaysian population setting

The literature showed that self-efficacy demonstrates a significant relationship between intention and physical activity among the general population and individuals with certain medical conditions (Dutton et al., 2009). A number of studies involving TPB and self-efficacy paired both concepts in various behavioural settings, such as blood donations, food choices, alcohol use and academic performances, with self-efficacy emerging as a significant predictor of intention (Giles, Mcclenahan, Cairns, & Mallet, 2004; Tolma, Reininger, Evans, & Ureda, 2006).

In the present study, analyses using ESE on intention to perform physical activity revealed this variable was only a significant predictor of intention at Time 2. At Time 2, self-efficacy (β = .374, p < .000) together with attitude direct measure (β = .485, p < .000) significantly predicted intention to perform physical activity explaining 51% of the variance. Entering self-efficacy at step 3 at this time point added an additional 8% of variance explained. Another study showed an increase in the variance explained when self-efficacy was added into the TPB equation. Using TPB to predict mammogram screening among Cypriot women it was found that by adding self-efficacy, the explained variance increased from 26.7% to 34.5% (Tolma et al., 2006). Another study investigating blood donation behaviour using TPB also revealed an increase of 64% in the variance explained when self-efficacy and PBC were entered into the analysis model (Giles et al., 2004).

Self-efficacy was only significantly related to intention at Time 2 and at this time point PBC was not associated with intention to perform physical activity. This result corroborated the finding of Hagger, Chatzisarantis, Biddle, Hagger, et al. (2001) that self-efficacy did not attenuate the influence of PBC. The results also supported the suggestion that self-efficacy does not predict physical activity at any time (Anderson et al., 2006; Mcauley & Blissmer, 2000) and has different relationships with intention and behaviour compared to PBC (Norman & Hoyle, 2004). Perceived control has a direct effect on behaviour and is related to intention (Norman & Hoyle, 2004; Terry & O'Leary, 1995). A direct relationship between self-efficacy and behaviour is not expected because the influence of self-efficacy on behaviour is fully mediated by motivation which was intention (Bandura, 1977; Norman & Hoyle, 2004). Studies distinguishing PBC and self-efficacy found that self-efficacy was highly predictive of intention compared to PBC (Manstead & Eekelen, 1998; Norman & Hoyle, 2004). However, the present study found that self-efficacy was only predictive of intention at one time point which was Time 2. A study on social cognitive determinants of physical activity showed that self-efficacy and social support were associated with a higher level of physical activity (Anderson et al., 2006). Corroborating the study, in the present study, behaviour was predicted both by intention and SN at Time 2. Intention at this time point was significantly associated with attitude and self-efficacy. A finding of the present study that adds to the understanding of self-efficacy was that physical activity behaviour would be influenced by self-efficacy and attitude mediated

by intention when SN was related to behaviour directly. However, more research is needed to confirm this suggestion. The results from the present study also corroborated other findings that self-efficacy takes a prominent role in the early stages of exercise programmes (Mcauley & Blissmer, 2000). Based on these findings, future interventions on physical activity should focus on improving self-efficacy at the early stage to maximise impact and resources spent on the intervention. Self-efficacy can be modified through reinforcement history, observational learning, persuasion and perceived exertion.

Examination of the Pearson's correlation of ESE and PBC direct as well as indirect measures showed that the strongest value of correlation was .682 (direct measures at Time 4) and .389 (indirect measures at Time 3). These results meant that the largest shared variance between PBC and ESE was 47% for direct measures and 15% for indirect measures. The correlation value and the shared variance between ESE and PBC did not indicate a major overlap of both measures in the present study. These results supported the findings of other studies that indicated that PBC and self-efficacy were distinct constructs (Giles et al., 2004; Rhodes & Courneya, 2003b; Tavousi, Hidarnia, Montazeri, Hajizadeh, & Taremian, 2009; Terry & O'Leary, 1995). Another implication of the findings for future studies using TPB, particularly in physical activity, is to include self-efficacy as both PBC and self-efficacy were distinct constructs.

7.2.3 Objective 3: To investigate the relationship between physical activity and quality of life in a Malaysian population setting

The present study investigated the relationship between physical activity behaviour and quality of life. To understand this relationship, the present study examined the association of physical activity that combined moderate and vigorous intensity with quality of life. A detailed analysis was achieved by examining the types of physical activity intensity with individual domains of quality of life.

Results from the present study showed that physical activity behaviour that combined moderate and vigorous intensity contributed 13% of the variance explained in quality of life. This result corroborated other research on the effects of physical activity on quality of life. A study evaluating the effect of physical activity

intervention and the perception of quality of life among 110 employees showed that mean quality of life increased by 13.7 score points compared to a control group (Bize et al., 2007; Brand et al., 2006). Another study on the relationship between physical activity and HRQOL among rural Hispanic youth found that participation in a greater number of sports teams was associated with better physical functioning, social functioning and overall HRQOL (Kantor, Grimes, & Limbers, 2015). A strong correlation between strenuous exercise and quality of life was found among breast cancer survivors engaging in physical activity (Valenti et al., 2008). The present study was also in congruence with the results of a study investigating the relationship between physical activity and HRQOL among colorectal cancer survivors. A positive and consistent relationship between HRQOL and physical activity over time was also found among colorectal cancer survivors (Husson, Mols, Ezendam, Schep, & van de Poll-Franse, 2015). After an extensive literature search, a study using the WHOQOL-BREF in Malaysia was found. Interestingly, the results of the present study were contrary to the findings of the study which examined the relationship between physical activity and quality of life among non-academic staff of a university in Malaysia (Mat Ludin, et al., 2015). The study found no correlation between physical activity and any of the quality of life domains despite 72% of its participants reporting high-intensity physical activity. The study noted the contradictory results with previous literature and suggested that this could be due to limitations of the study, such as sample size (n = 105) or reporting bias. This also made the results of the present study novel and unique in its contribution to the knowledge base as no other previous literature in Malaysia, which used the WHOQOL-BREF, studying physical activity among the general population could be located other than the study by Mat Ludin et al. (2015).

The result from SEM also showed that the psychological domain (domain 2) had the highest R^2 value on quality of life at .77, followed by environment (domain 4) at .65. The facets within the psychological domain included body image, negative/positive feeling, self-esteem, spirituality, thinking or memory and concentration (WHO, 1996). From the results, we could suggest that physical activity had an impact on the quality of life of the participants with facets within the psychological domain being the most affected. This result also aligned with the quantitative findings of the present study where attitude was the strongest predictor of intention. The affective attitude in TPB

refers to emotion engendered by the prospect of performing the behaviour, such as enjoyment or interest (French et al., 2005). This result of the psychological domain was further supported with themes generated from the qualitative interviews, such as enjoyment, social interaction and body image. As for the environment domain, themes such as cost, time, safety and environment were also generated from the interviews. Findings from other literature were also in support of the present findings on the relationship between physical activity and emotional consequences. Feeling happy or having a positive mood and emotional consequences was even proposed not just as an outcome but as a predictor and cause of future behaviour (Diener, 2013; Lawton, Ashley, Dawson, Waiblinger, & Conner, 2012; Stubbe et al., 2007; Taylor et al., 2004). The literature also supported the relationship between being physically active and other facets of the psychological domain, such as self-esteem (Dantas, Motzer, & Ciol, 2002; Scully et al., 1998; Taylor et al., 2004) and thinking, memory or concentration (Erickson et al., 2011; Sofi et al., 2011; Taras, 2005; Taylor et al., 2004). An implication from this result for health interventions is that future physical activity programmes should place more emphasis on the psychological facets, such as body image, positive feeling, self-esteem and concentration, as a result of physical activity rather than the physical activity itself. By placing emphasis on the quality of life consequence or reward, people would be more likely to take up and maintain the activity.

The relationship between physical activity and quality of life was examined in further detail by examining the association of three types of physical activity intensity with the individual domains of quality of life. The results showed that across the four time points, light-intensity physical activity showed no significant relationship with any of the WHOQOL-BREF domains. Moderate intensity was only significantly related to the physical health domain at Time 4. Vigorous intensity, however, showed a significant relationship with all WHOQOL-BREF domains at all time points. These results partially support the findings of Brand et al. (2006); in a 13-week exercise intervention programme and using WHOQOL-BREF as instrument, Brand et al. (2006) found that physical activity increased physical health and psychological domain.

However, Brand et al. (2006) did not find an increase in the quality of life indices of environment and social relationship as opposed to the present study that found a significant association with all domains. The positive association between physical activity and social relationship in the present study was possibly due to the fact that the participants of the NGOs were friends compared to office colleagues with hierarchy relationship in the study of Brand et al. (2006). The result of a significant relationship with the environment was comparable to the finding of Bize et al. (2007) in which physical activity was related to social relationship as well as environment. Participation in the activities organised by the NGOs could have influenced the environmental perception of the participants. A contribution of these findings to the knowledge of physical activity was that engaging in vigorous-intensity physical activity would contribute to improved quality of life. As such, future health programmes should promote vigorous-intensity physical activity compared to moderate intensity.

Analysis of the pattern of the R^2 value showed that the highest increase in the variance explained was for physical health domain at 7% at Time 1 and 44% at Time 4. This showed that the physical activity programme contributed to the perception of being healthy by the participants. This result was also supported by themes and interviews conducted among the participants. Themes such as healthy were generated and participants also mentioned that they felt healthy, fresh and lighter in body, indicating a healthier body from participating in the physical activity programme. The results also make an important and unique contribution to knowledge in relation to physical activity and quality of life. The psychological domain presented the highest R^2 value of quality of life from engaging in physical activity when measured cross-sectionally at the beginning of a programme. However, when measured over an extended period of time, the quality of life domain with most improvement would be physical health. The implication of the literature and in combination of the findings of the present study was that physical activity should be promoted as a sustained way of living to improve not only physical health but also quality of life.

7.3 Integration

The results from the qualitative interviews reflected unique and personal views of selected individuals from the NGOs involved in the study. It is important that the results of the study are interpreted in combination with the qualitative interviews. Integrating the quantitative and qualitative results adds meaning and understanding to the findings.

The findings from the qualitative study could be categorised into three different factors which were socio-economic, physical environment and personal factors. The socio-economic factor comprised themes such as cost and time while the environment factor included themes such as facility, skills and knowledge, instructor and supportive environment. Both factors were related to the PBC constructs of the present study. In the analyses of the ability of the TPB independent variables to predict intention, PBC did not emerge as a prominent predictor. However, in the analyses of relationship with future intention, PBC was significantly related to future intention. PBC direct measures significantly predicted future intention at model 1 and 2 while PBC indirect measures were significantly related to future intention at model 1. In analysing the relationship between the TPB variables and actual behaviour, PBC was significantly related to vigorous intensity at both Time 1 and Time 4. The results from quantitative analyses showed the important role of PBC and results from qualitative interviews provide further support for it.

The influence of PBC is not as pervasive as reported in other reviews (Blue, 1995; Hagger et al., 2002) but it is an important predictor of behaviours nevertheless. Perhaps one of the important issues in the present study regarding PBC was the control beliefs that were salient beliefs to the participants. Themes related to PBC that emerged from the qualitative analyses were types of activity, instructor, time, funding/cost, skills, easy or suitable for age. These findings from the present study also corroborated the results from the study by Henderson, Stalnaker, and Taylor (1988) where time, facilities and funds were among the obstacles to participation in physical activity. Thus, to increase the effectiveness of PBC in predicting intention and behaviour, the present study would suggest that the emerging themes, such as

types of activity, instructor/coach, time, funding/cost, skills, easy or suitable for age, be included as determinants of PBC in future studies.

The personal factor encompassed themes such as health, enjoyment and social interaction. These factors were related to the constructs of attitude and SN of the TPB. Studies on the predictive utility of attitude on health behaviours demonstrated that affective attitude was the strongest predictor of intention and behaviour (Conner et al., 2013; Lawton et al., 2009). Within the context of physical activity and studies on attitudes, the suggestion that positive affective response is associated with participation and maintenance was rarely explored (Kwan & Bryan, 2010). Measures of attitudes were more representatives of instrumental attitudes, beliefs about the degree to which physical activity has positive outcomes, such as physical attractiveness, reduced weight or improved health (Kwan & Bryan, 2010). The results of the quantitative analyses of the present study showed that attitude was the strongest predictor of intention where attitude direct measure consistently predicted intention at all four time points. In relation to this finding, examination of the qualitative interviews revealed themes that were related to affective responses. Themes such as enjoyment, feeling healthy, feeling fit and fresh, happy and maintaining good body image emerged from the qualitative interviews. The themes “feeling healthy” and “feeling fit” were included in the affective attitude rather than instrumental attitude in the present study as it was observed that the participants experienced a self-perception of health by comparing themselves to others of their age or stereotypes (Fontane, 1996). Participants mentioned they felt healthy and fit by comparing themselves with their friends who did not exercise and they felt happy about it. A contribution of the present study was that it provided support for the suggestion that affective attitude is a more salient belief in the context of physical activity (Conner et al., 2013). The results from the present study on affective responses were also comparable with the findings of Bruijn, Verkooijen, Vries, and Putte (2012) who found that performing physical activity also depends on the aspect of enjoyment of being active. In the present study, attitude was a strong predictor of intention but not behaviour. To enhance the predictive utility of attitude, particularly on predicting physical activity behaviour, it is suggested that the constructs of attitude be reviewed and to focus more on affective rather than instrumental components.

The contribution of SN towards intention to perform physical activity is small in the present quantitative study for both direct and indirect measures. Budden and Sagarin (2007) suggested that the small predictive power of SN was evidence that exercise relies more on personal motivation and is less subject to the influence or pressure of others. An interesting pattern of findings of the present study was that PBC only predicted behaviour at one time point which was Time 1, whilst intention predicted behaviour at two time points, which were Time 2 and Time 3. SN predicted behaviour at three time points: at Time 2, Time 3 and Time 4. This result was in contrast to the finding that SN was only useful to predict intention but not in predicting exercise behaviour (Hausenblas et al., 1997).

Interviewed participants mentioned that they were happy and had more confidence in themselves and themes such as friends, members and social interaction showed that social motivation was an important factor in their adherence to physical activities. The theoretical argument for the review of SN and social support is more superior to the SN that originated from the argument to extend the TRA (Ajzen & Fishbein, 1980) where PBC was included to extend the TPB to incomplete volitional behaviour. However, Ajzen (1991) failed to revisit the social influence of SN in TPB (Courneya et al., 2000). The discriminant validity of social support also had been demonstrated in another study (Courneya & McAuley, 1995). For behaviours that are incompletely volitional, such as physical activity, it seems that assistance from others for performing the behaviour would be helpful (Courneya et al., 2000). Social support has been extensively researched in the exercise domain and found to be consistently related to exercise behaviour (Courneya et al., 2000).

SN is operationalised as a global perception of social pressure but social pressure is rarely explicit, which led to the suggestion of an alternative conceptualisation (Armitage & Conner, 2001). Other studies showed that self-identity explained an additional proportion of variance of intention over and above the TPB variables (Armitage & Conner, 2001; Rise, Sheeran, & Hukkelberg, 2010). The concept of self-identity derived from Self-Identity Theory and it reflected the extent to which someone viewed him or herself as meeting the criteria for a social role (De Bruijn & Van den Putte, 2012). Identity predicts behaviour when the meaning of the behaviours is in line with the individual's identity (Burke & Reitzes, 1981; Reifsteck et

al., 2016). An individual who has a salient exercise identity, are more likely to engage and maintain physical activity (Reifsteck et al., 2016; Strachan, Brawley, Spink, & Jung, 2009). In the present study, the participants may have possibly identified themselves with a certain identity, such as exercisers or organiser, and these identities come with social roles or responsibility within their NGOs. The roles for the organisers were to plan and carry out the activities, which also included contacting the instructors or person in charge of exercise venue. The attendees would have other roles, such as helping in setting up the sound system or cleaning the place after an exercise session. Together, both organisers and attendees would share the role of performing the exercise together. Through these roles, the participants felt a certain degree of importance in the group to which they belonged. When individuals view themselves as holding roles and internalise role meanings, they are motivated to verify their identity by maintaining consistency through their behaviour (Strets & Burke, 2003). Exercise identity also has been associated with physical activity adherence (Strachan, Perras, Brawley, & Spink, 2016; Houser-Marko & Sheldon, 2006). The results from the present study provide support to the suggestion that SN be reconceptualised (Armitage, 2001) and self-identity be included as an additional variable or replace SN.

7.4 Reflexive Statement on Cultural and Language Differences Between English and Malaysian Populations and Their Impact

Malaysia is home to multiple races and people with different ethnic backgrounds and the country promotes a diversity of religion and faith. Islam is the most professed religion in Malaysia, with 61.3% of the total population identifying themselves as followers of Islam, while Buddhism is 19.8%, Christianity is 9.2% and Hinduism is 6.3% (Malaysia, 2011). Malay is the largest race representing 68% of the total population. This is followed by the Chinese representing 23%, whilst Indians represent 7% of the total population (Mahidin, 2017). Malaysia is known as an Islamic country and all born Malay are Muslim by constitution. The Islamic rules are negotiated into many aspects of Malay culture and influence the social practices of Malaysians including non-Muslims.

In Malaysia, language and ethnicity are strongly associated where the Malay speaks Malay language and Chinese is spoken by the Chinese population, and Tamil or Hindi are spoken by the Indian community. In eastern Malaysia or Borneo, indigenous languages such as Iban dan Kadazan are prominent. The Malay language is the official language of Malaysia; it is used in schools as well as in government institutions. Malaysia is a Commonwealth country and English is taught in schools and is widely spoken.

In the present study, both English and Malay languages were used but most of the participants preferred to speak and/or receive materials in Malay. Interviews were translated into English for transcription and analysis commenced. The Malaysian people may have cultural norms against expressing emotion on certain issues such as sex and body image. There is evidence of this from the analysis of missing values in Section 5.2.5 where Item 21 about sexual satisfaction suffered the highest number of missing values.

Some participants showed concern about their body image and cultural sensitivity when asked about the location they chose to perform physical activity with the NGO and why they did not go to a gymnasium. The location where some NGOs provided physical activity interventions was in the open air but a little hidden from traffic. When interviewed, some participants, particularly Chinese women, revealed that these locations provided them with some sense of privacy from the traffic and prevented them from being compared to other gymnasium members who were perceived to have better bodies. Some Muslim participants mentioned Chinese women and their gym attire which they considered to be revealing compared to their own, as Muslim women are discouraged from wearing tight fitting or revealing sports attire.

Among the questions asked during interviews with the participants were their views of the organisers, other members and the Board. Replies gathered from such questions were usually positive or safe answers. Other studies had indicated that Asians are collectivist individuals who usually gave moderate responses and were in agreement with others (Lee, Jones, Mineyama, & Zhang, 2002).

There were also situations in the interviews that were applicable to Malaysia or to a tropical country. The average temperature for Malaysia is 28°C and one could sweat

profusely by just standing out in the open, but sweating was mentioned as a reason the participants performed physical activity. The participants, however, mentioned that sweating from performing exercise made them feel lighter and this was the difference from sweating caused by the sun.

7.5 Reflexive Statement on the Intensity of Physical Activity and its Effect on the Study

As physical activity covers a wide range of activities, assessing such a complex set of behaviours is a challenging issue for researchers and epidemiologists. Accurate measurement of physical activity and energy expenditure is essential both in epidemiological studies and in the assessment of intervention programmes (Ndahimana, 2017). The selection of measurement methods depends on the purpose of the evaluation, the nature of the study population and the resources available (Haskell, 2000).

It is important to emphasise that physical activity and energy expenditure are two different concepts where physical activity is a behaviour that results in an elevation of energy expenditure above resting level while total energy expenditure refers to total amount of energy expended during a 24-hour period (Ndahimana, 2017). Various methods exist for assessing physical activity and energy expenditure and are categorised into two categories, which are direct and indirect measures. Direct measurement includes measurement such as doubly labelled water, calorimetry, accelerometer, pedometry, HR monitoring, global positioning system and direct observation (Kowalski, 2012). Indirect measures include self-report, diaries, logs, questionnaires, surveys and interviews (Kowalski, 2012). Direct measures of physical activity assess energy expenditure or actual movement and are generally considered to be more accurate (Kowalski, 2012). However, direct measures are more expensive, intrusive, time consuming and place a higher degree of burden on both participants and the researcher (Kowalski, 2012). Indirect measures rely on self-report and are practical, easy to administer, well accepted and place a low burden on the participants and the researcher (Kowalski, 2012) and they are reliable in assessing habitual physical activity in a target population (Haskell 2000).

There were several methods to quantify the relative intensity of physical activity which included specifying percentage of oxygen uptake reserve, HR reserve (HRR), oxygen consumption (VO_2), HR and MET (Prescatello et al., 2014). An important element of physical activity is the concept of expenditure of energy which is the amount of energy used to accomplish an activity or movement and it is measured in kilojoule (kJ) or kilocalorie (kcal) (Caspersen, Powell, & Christenson, 1985). The MET is a common, convenient and standardised way to describe variety of intensity of physical activity (Prescatello et al., 2014). Using this method, 1 MET is 1 cal/kg/hour and is equivalent to the energy used to sit quietly (Chan et al., 2014). Although using methods such as VO2 or HRR are more accurate in measuring intensity of physical activity, the researcher felt using MET would be more realistic considering the resources and time available. To gather the VO2 of the participants would require laboratory, equipment and training to handle the equipment which the researcher did not have. In the present study, activity was gathered through a self-reported survey and a MET value and intensity according to light, moderate and vigorous was assigned to each reported activity according to the Compendium by Answorth et al. (2011).

Physical activity intensity according to light, moderate and vigorous is also more common and accessible for the general public compared to other measures, such as VO_2, which require specialised training. Health promotion programmes carried out by the Ministry of Health Malaysia include light, moderate and vigorous as the measurements of intensity. In the “Global recommendations on physical activity for health” (World Health Organization, 2010), adults aged between 18 and 64 years were recommended to carry out 150 minutes of moderate intensity aerobic physical activity or at least 75 minutes of vigorous-intensity physical activity throughout the week. Accordingly, in Malaysia, physical activity is promoted to the general public under these three categories of intensity. The recommendation by the Ministry of Health Malaysia was the same as the WHO recommendation with the addition that adults should increase their moderate-intensity physical activity to 300 minutes per week or engage in 150 minutes of vigorous-intensity physical activity per week (Ministry of Health Malaysia, 2016). The Technical Committee on Strategies for the Prevention of Obesity Malaysia adopted the recommendation of 30 minutes of moderate intensity as important for limiting the health risk of chronic diseases, while

45 to 60 minutes of moderate intensity activity per day is required to prevent the transition to overweight (Ministry of Health Malaysia, 2010). The concept of categorising the intensity of physical activity into light, moderate and vigorous intensity is widely used in physical activity health promotion, research studies and reports by institutions such as the ACSM (ACSM, 2014) and the Ministry of Health Malaysia in the NHMS (IPH, 2008). To be in line with the health messages on physical activity to the general Malaysian public as well as the existing literature, the study used the categorisation of light, moderate and vigorous to describe the intensity of physical activity performed.

7.6 Implications

7.6.1 Policy/future interventions

The findings from this study provide recommendations for public health practitioners or for those considering developing a physical activity intervention with the aims of increasing maintenance of physical activity. According to the present findings, SN, particularly injunctive norms, have a weak impact on physical activity behaviour; as such, having interventions that just persuade or tell people to do physical activity and only emphasise the health benefits may be ineffective in delivering the desired results.

From the present study, PBC emerged as the strongest predictor of physical activity behaviour and the researcher would concur with the suggestion of Yzer (2012) that future interventions should focus on PBC with emphasis on both skill building and autonomous decision making.

Autonomous decision making or perceived autonomy is associated with the degree to which one has control over a behaviour (Yzer, 2012) and other aspects such as controllability, external control (Armitage & Conner, 1999) and volitional control (Trafimow et al., 2002). To develop the belief that a behaviour is completely up to a person to do, interventions should place emphasis on developing a proper, safe and accessible place to conduct physical activity. The government could provide an enabling environment such as having more properly maintained and safe public parks or community health centres with trained instructors and crèche facilities.

These initiatives should also be included in the policy of the Ministry of Health Malaysia, such as the NASPAL Malaysia.

Another aspect to tackle in interventions is skill building or perceived capacity (Yzer, 2012). The Ministry of Health Malaysia and the Health Promotion Board Malaysia should continue and intensify the training of the community on physical activity. The Ministry of Health has trained the community in various types of physical activity such as fitballrobic, jump-rope, aerobics, *poco-poco*, tabata and zumba through various programmes such as “Sweat Wednesday”, “KOSPEN”, “10 on 10”, physical activity at workplace setting, “Young Doctors”, “PROSIS” and others.

The results from the present study also indicated that strategies emphasising affective processes of engaging in exercise behaviour should be employed in the intervention (Pintrich, 1999), particularly at the beginning of the programme. Future intervention, especially by the Ministry of Health Malaysia, should target enjoyment in order to maximise intention-exercise adherence (De Bruijn et al., 2012). The Ministry of Health Malaysia has so far 15 Community Health Promotion Centres where district health clinics act as a centre for the local community to organise and participate in health-promoting activities, such as physical activity or healthy cooking sessions. This is an effort by the Ministry of Health Malaysia to shift the perception of health clinics as places treating sickness to places that promote health. The number of Community Health Promotion Centres should be increased and instead of technicalities, the activities in the centre should be organised in a fun and enjoyable way to socialise and to enhance feeling of self-confidence and self-worth.

7.6.2 Strengths

There were several strengths and novelties that the present study contributes to existing research on TPB as follows:

a) Based on the available literature, the present study was the first that investigated physical activity behaviour using TPB, self-efficacy and WHOQOL-BREF using a prospective design in Malaysia.

b) By incorporating the WHOQOL-BREF, the study was able to investigate the relationships among intention-behaviour-quality of life with regards to physical activity.
c) The population of the present study was NGOs receiving support from the Ministry of Health Malaysia. The results from the present study have a direct impact on future health promotion in Malaysia.
d) The sample of the main study also comprised NGO members which were the general population and this gives the advantage of generalisation to the study to the wider population as compared to using a sample of university students.
e) In the qualitative study, the researcher was able to interview two senior officers from the Health Education Division and the Health Promotion Board Malaysia. As such, the present study has the advantage of incorporating the views and beliefs of senior officers from two organisations responsible for health promotion in Malaysia.

7.6.3 Future research

Future research on TPB should focus on social support instead of SN. Social support, such as from friends and community, was found to be an important factor for engaging in physical activity. Findings from the present study showed that social support has a significant influence on physical activity behaviour, particularly on the Malaysian population, which has not been thoroughly addressed by previous literature.

Common types of social support include informational, instrumental, emotional and appraisal support (Cavallo et al., 2014). Instrumental support consists of the provision of tangible aids such as financial assistance and transportation; emotional support consists of the provision of caring, love and sympathy; informational support is the exchange of relevant advice or information; and appraisal support is the provision of feedback important to making decisions (Cavallo et al., 2014). Future studies that identify the beliefs which support physical activity behaviour would increase the predictive utility of the TPB as well as public health interventions and health promotion campaigns.

7.7 Limitation of Scope to Malaysia

Malaysia is situated in Southeast Asia with Thailand at the north, Indonesia and Singapore at the south and Philippines at the east. The population of Malaysia was estimated at 31.7 million in 2016 with an annual growth rate at 15% (Department of Statistics, 2016). The crude birth rate stood at 16.7/1,000 population while the death rate stood at 4.8/1,000 population in 2014 (Department of Statistics Malaysia, 2015). The life expectancy at birth was 72 years for males and 77 years for females (Department of Statistics Malaysia, 2015). The highest causes of hospitalisation were due to childbirth, pregnancy and puerperium at 20.8% and disease of the circulatory system was ranked the fifth highest cause at 7.53% (Health Informatics Centre, 2014). Even though disease of the circulatory system was the fifth highest cause of hospitalisation, the disease was the highest cause of death at 24.7% (Health Informatics Centre, 2014).

The sample of this study was gathered from NGOs that received support from the Health Promotion Board Malaysia. Participants, except for two Ministry of Health officials, were all members of NGOs; they were predominantly of Malay ethnicity with more females than males, in good health and physically active. The majority of the participants were ethnic Malay which was consistent with the demographic composition of Malaysia, with ethnic Malay forming almost 70% of the Malaysian population (Department of Statistics, 2016). Having a majority of female participants who perceived themselves to be in good health in a study was also consistent with other studies (Kaewthummanukul & Brown, 2006; Robroek, van Lenthe, van Empelen, & Burdorf, 2009).

The demographic characteristics of this study included personal involvement in a health promotion programme and knowledge from exposure to previous health promotion and education programmes carried out by the Ministry of Health Malaysia. The results of the present study could only be generalised to another population with similar characteristics and demographic composition.

7.8 Limitations

In research involving TPB, ad-hoc questionnaires were devised and used in the majority of studies following proposals by Francis, Eccles, and Johnston (2004) and recommendations by Ajzen (1991) to evaluate different variables included in the TPB (González et al., 2012). The questionnaire for this study was developed according to the manual *Constructing Questionnaires Based on the Theory of Planned Behaviour* (Francis, Eccles, & Johnston, 2004) to present adequate psychometric properties for study purposes (González et al., 2012). Nevertheless, some issues with the questionnaire were found and are discussed as follows along with mitigation measures taken by the researcher.

Estimations of internal consistency showed that the questionnaire measuring PBC and SN was unable to achieve an acceptable threshold of Cronbach's alpha of 0.6. The issue of low reliability of PBC (Baele & Manstead, 1991; Hagger et al., 2002; Hardeman et al., 2009; Hardeman, Prevost, Parker, & Sutton, 2013; Terry & O'Leary, 1995) and SN (Chatzisarantis & Hagger, 2007; Jalalian, Latiff, Tajuddin, & Hassan, 2010) has been reported in other literature and could potentially be considered a limitation of TPB itself. PBC also was found to be a multidimensional construct (Trafimow et al., 2002) and assessing PBC as one variable could also have contributed to this limitation. It could also mean that the items chosen to assess PBC and SN in the present study were not perceived in the same way by the participants in the full study as the participants in the validation process. In mitigation, the present study conducted two phases of qualitative interviews with the participants at Time 1 and a year later at Time 4.

The second limitation of the present study concerns the missing values of the ESE scale. The missing values of the ESE scale could possibly be due to the fatigue of the participants responding to the questionnaire booklet. The implication of this was to limit future self-administered questionnaires to about 20 minutes of answering time (Choi & Pak, 2005). Even respondents who were motivated to start on a lengthy questionnaire were less likely to stay until the end and would feel fatigue as the survey progressed, thus prompting uniform or inaccurate answers (Choi & Pak, 2005; Galesic & Bosnjak, 2009).

7.9 Dissemination and impact

The dissemination of PhD research is a crucial ethical, financial and status issue for universities as well as a means of growing a research career for the researcher (Odendaal & Frick, 2017). Dissemination of research and sharing of findings is also important so the research informs practice and thereby maximises the benefit to the public.

Research is most effectively disseminated using multiple vehicles and to ensure that the output reaches the key audiences, the research would be disseminated in the following ways:

a. Oral or poster presentation in conferences
b. Publication in journals and Ministry of Health Malaysia internal newsletter
c. Workshops

Through a targeted dissemination, the research would have the following impact:

i. Provide findings to enhance the current health promotion programmes on physical activity by enabling the policy-makers in the Ministry of Health Malaysia to make evidence-based decisions
ii. Potentially reduce costs for the Ministry of Health through identifying salient beliefs in developing health promotion programmes
iii. Contribute to the development of a manual or guidelines produced by the Ministry of Health Malaysia in promoting physical activity
iv. Contribute to national debate on the determinants of physical activity

7.10 Conclusion

In conclusion, this research provides support for the utility of the TPB as a predictor of behavioural intention and behaviour. The present findings also support the theoretical debate to expand the TPB model, particularly social support as an alternative to SN. Future studies on additional normative variables may increase the predictive power of the normative components of the TPB. The present study provides additional evidence on the direct relationship between performing physical

activity and quality of life as an emotional and cognitive enjoyment. The results from the present study also provide partial support for a distinction between PBC and self-efficacy and the utility of self-efficacy in predicting physical activity behaviour. More studies are required on the role of PBC and the integration of self-efficacy as an extended variable in the TPB model.

Finally, further research is required to test the sufficiency of additional variables of the TPB model by testing them against adequate and objective measures. Findings from this research would allow the identification of issues related to the current TPB model and improve the application of the model to health education intervention.

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APPENDIX

Appendix 1 – Study questionnaire (English)

Ministry of Health Malaysia

Health Promotion Board Malaysia

Before you fill in the survey
Thank you for taking time to respond to this questionnaire. Please read the information sheet as this explains why this research is being undertaken.

This study is undertaken by Ministry of Health Malaysia and Health Promotion Board Malaysia in collaboration with Liverpool John Moore University, UK. We are interested in finding out about your beliefs regarding physical activity. Understanding your beliefs in physical activity will help us to design a better health promotion intervention programme to assist you to achieve and maintain a healthy lifestyle.

The questions will ask about your demographic profiles, the physical activity you did in the last 7 days and your personal beliefs regarding physical activity. Please think about the activities you do at work, as part of your house work, to get from place to place (travel), and in your spare time for recreation, exercise and sport.

If you have any questions, please contact the research team on the details given in the information sheet. When you complete this questionnaire, please return it to the organizer or in the free post envelope.

How to fill in this survey

- Please read the instruction carefully
- Please try to answer all of the questions, but if you can't remember or would rather not say, please just cross out the question.
- Please circle the scores which most closely represent how you feel and for questions with tick-boxes ( ), please put a tick (√) or cross (×) in the box that is closest to your answer.
- For questions where you are asked to write something, please write clearly in the space given, but if you need more room, please use additional paper and give the question number that you answer(s) relate to.

For office use only
Participant no.:

1. About Your Physical Activity

First, I'm going to ask you about the time you spent being physically active in the last 7 days. Do not include activity undertaken today.

1.1 During the last 7 days, which activities have you completed?

Table 1

Activities	Please select all that apply. You can select more than one	How often did you do the activity in the last 7 days? (days)	How much time, in the last 7 days, did you typically spend on each of those activities? (minutes)
For example: Zumba	√	***2 days***	***50 minutes***
Carrying light load			
Housework (eg. Cleaning, vacuum, sweeping)			
Gardening (eg. digging, raking, planting)			
Martial arts (eg. Judo, Tae-kwondo)			
Walking up stairs			
Brisk walking			
Yoga			
Gym session (dumbell, treadmill, cycling machine) Please specify ……..			
Aerobic session (eg. zumba) Please specify ……			
Outdoor exercise (eg cycling, jogging) Please specify …….			
Dance (eg. line dance, latin, folk) Please specify …….			
Team sport (eg. Football, hockey) Please specify ……..			
Other (please specify) ……..			

2. About What You Think

Now I'm going to ask about what you think regarding physical activity. The definition below will help you through the following questionnaire. There are no right or wrong answers, so just select what you think honestly. Thank you.

"Being sufficiently active means:
At least 150 minutes (2 ½ hours) of moderate intensity physical activity or 60 minutes (1 hour) of vigorous intensity physical activity a week accumulated across work, home, transport or discretionary time"."

(Institute of Public Health(IPH) 2008. The Third Health and Morbidity Survey (NHMS III (2006). Vol. 2. Ministry of Health, Malaysia)

Think about the physical activity that you do (have a look back at Table 1, the activities you selected earlier) and answer the following questions. Please circle the scores which most closely represent how you feel.

2.1	Over the next 7 days, I will be sufficiently active	Definitely false	1	2	3	4	5	6	7	Definitely true
2.2	Over the next 7 days, I intend to be sufficiently active	Definitely false	1	2	3	4	5	6	7	Definitely true
2.3	Over the next 7 days, I plan to be sufficiently active	Definitely false	1	2	3	4	5	6	7	Definitely true
2.4	Over the next 7 days, I expect to be sufficiently active	Definitely false	1	2	3	4	5	6	7	Definitely true

Being sufficiently active means :
At least 150 minutes (2 ½ hours) of moderate intensity physical activity or 60 minutes (1 hour) of vigorous intensity physical activity a week accumulated across work, home, transport or discretionary time, which approximately corresponds to current recommendation in many countries.

(Institute of Public Health(IPH) 2008. The Third Health and Morbidity Survey (NHMS III (2006). Vol. 2. Ministry of Health, Malaysia)

Think about the physical activity that you do (have a look back at Table 1, the activities you selected earlier) and answer the following questions. Please circle the scores which most closely represent how you feel.

2.5 Being sufficiently active over the next 7 days will be …..

a) Difficult ⟷ Easy
1 2 3 4 5 6 7

b) Harmful ⟷ Beneficial
1 2 3 4 5 6 7

c) Good ⟷ Bad
1 2 3 4 5 6 7

d) Pleasant ⟷ Unpleasant
1 2 3 4 5 6 7

e) Worthless ⟷ Useful
1 2 3 4 5 6 7

f) Enjoyable ⟷ Un-enjoyable
1 2 3 4 5 6 7

Think about the physical activity that you do (have a look back at Table 1, the activities you selected earlier) and answer the following questions. Please circle the scores which most closely represent how you feel.

2.6	If I do physical activity, I will feel fresher	Unlikely ⟷ Likely 1 2 3 4 5 6 7
2.7	If I do physical activity, it will make me healthier	Unlikely ⟷ Likely 1 2 3 4 5 6 7
2.8	If I do physical activity, I will get fitter	Unlikely ⟷ Likely 1 2 3 4 5 6 7
2.9	If I do physical activity, I will get a better body figure	Unlikely ⟷ Likely 1 2 3 4 5 6 7
2.10	If I do physical activity, I will be prone to injury	Unlikely ⟷ Likely 1 2 3 4 5 6 7
2.11	If I do physical activity, I will be sweaty	Unlikely ⟷ Likely 1 2 3 4 5 6 7

Again think about the physical activity that you do (have a look back at Table 1, the activities you selected earlier) and answer the following questions. Please circle the scores which most closely represent how you feel.

2.12 If I do physical activity, I will be smelly

Unlikely ⟷ Likely

1 2 3 4 5 6 7

2.13 Feeling fresher after physical activity is …..

Extremely undesirable ⟷ Extremely desirable

-3 -2 -1 0 1 2 3

2.14 Getting healthy from doing physical activity is …..

Extremely undesirable ⟷ Extremely desirable

-3 -2 -1 0 1 2 3

2.15 Getting fitter from doing physical activity is …..

Extremely undesirable ⟷ Extremely desirable

-3 -2 -1 0 1 2 3

2.16 Getting a better body figure from doing physical activity is …..

Extremely undesirable ⟷ Extremely desirable

-3 -2 -1 0 1 2 3

2.17 Getting injury from doing physical activity is …..

Extremely unimportant ⟷ Extremely important

-3 -2 -1 0 1 2 3

Again think about the physical activity that you do (have a look back at Table 1, the activities you selected earlier) and answer the following questions. Please circle the scores which most closely represent how you feel.

2.18 Getting sweaty from doing physical activity is …..

Extremely unimportant ⟷ Extremely important

-3 -2 -1 0 1 2 3

2.19 Getting smelly from doing physical activity is …..

Extremely unimportant ⟷ Extremely important

-3 -2 -1 0 1 2 3

Now think about yourselves and how you feel. Answer the following questions

2.20 I am confident that I could do physical activity if I want to

Strongly disagree ⟷ Strongly agree

1 2 3 4 5 6 7

2.21 For me to do physical activity is Θ

Easy ⟷ Difficult

1 2 3 4 5 6 7

2.22 The decision to do physical activity is beyond my control

Strongly disagree ⟷ Strongly agree

1 2 3 4 5 6 7

Again think about yourselves and how you feel. Answer the following questions

2.23	Whether I do or do not do physical activity is entirely up to me	Strongly disagree ⟷ Strongly agree 1 2 3 4 5 6 7
2.24	The hot weather prevents me from doing physical activity	Unlikely ⟷ Likely 1 2 3 4 5 6 7
2.25	My works prevents me from doing physical activity	Unlikely ⟷ Likely 1 2 3 4 5 6 7
2.26	The criminal activity around my areas prevents me from doing physical activity	Unlikely ⟷ Likely 1 2 3 4 5 6 7
2.27	To do physical activity would incur additional cost to me	Unlikely ⟷ Likely 1 2 3 4 5 6 7
2.28	My family responsibilities prevents me from doing physical activity	Unlikely ⟷ Likely 1 2 3 4 5 6 7

Again think about yourselves and how you feel. Answer the following questions

2.29 I do not have time to do physical activity

Strongly disagree ⟷ Strongly agree

1 2 3 4 5 6 7

2.30 I prefer to participate in a structured programme of physical activity (programme with coach e.g aerobic class, yoga class, Taichi class etc).

Strongly disagree ⟷ Strongly agree

1 2 3 4 5 6 7

2.31 I would only do physical activity if rewards are provided (eg. t-shirt, drinks, certificate etc)

Unlikely ⟷ Likely

1 2 3 4 5 6 7

2.32 I prefer to participate in physical activity with friends

Unlikely ⟷ Likely

1 2 3 4 5 6 7

Again think about yourselves and how you feel. Complete the following sentences that most represent you

2.33 When the weather is hot, I would be...

….. to do exercises

Less likely ⟷ More likely

-3 -2 -1 0 1 2 3

2.34 My works make it ...

….. to exercise

Much more difficult ⟷ Much easier

-3 -2 -1 0 1 2 3

Again think about yourselves and how you feel. Complete the following sentences that most represent you

2.35 The criminal activity in my areas makes it ...

….. to exercise

Much more difficult ⟷ Much easier

-3 -2 -1 0 1 2 3

2.36 If I can access less costly ways of doing physical activity, I would be ...

….. to exercise

Less likely ⟷ More likely

-3 -2 -1 0 1 2 3

2.37 My family responsibilities makes it ...

….. to exercise

Much more difficult ⟷ Much easier

-3 -2 -1 0 1 2 3

2.38 My time schedule makes it ...

….. to exercise

Much more difficult ⟷ Much easier

-3 -2 -1 0 1 2 3

2.39 When there are structured programme of physical activity (programme with coach eg. aerobic, yoga, Taichi class etc), I am...

….. to exercise

Less likely ⟷ More likely

-3 -2 -1 0 1 2 3

2.40 If rewards are given (eg. t-shirt, drinks, certificate), I would be ...

….. to exercise

Less likely ⟷ More likely

-3 -2 -1 0 1 2 3

2.41 When there are friends, I would be ...

….. to exercise

Less likely ⟷ More likely

-3 -2 -1 0 1 2 3

Think about those who are important to you. They can be you best friend, partner, spouse, mother, father, brother, sister or anybody you feel very important in your life. With them in

2.42 Θ Most people who are important to me think that ... ….. do physical activity	I should ⟷ I should not 1 2 3 4 5 6 7
2.43 It is expected that I do physical activity	Strongly disagree ⟷ Strongly agree 1 2 3 4 5 6 7
2.44 I feel under social pressure to do physical activity	Strongly disagree ⟷ Strongly agree 1 2 3 4 5 6 7
2.45 People who are important to me want me to do physical activity	Strongly disagree ⟷ Strongly agree 1 2 3 4 5 6 7

Think about those who are important to you. They can be you best friend, partner, spouse, mother, father, brother, sister or anybody you feel very important in your life. With them in mind, complete the following sentences that most represent you

2.46 People who are important to me think that I … … do physical activity	should not ⟷ should -3 -2 -1 0 1 2 3
2.46 People who are important to me would … … me doing physical activity	Disapprove ⟷ Approve -3 -2 -1 0 1 2 3

Again think about those who are important to you. They can be you best friend, partner, spouse, mother, father, brother, sister or anybody you feel very important in your life. With them in mind, complete the following sentences that most represent you

2.48 I see people who are important to me ... ….. physical activity	Do not ⟷ Do -3 -2 -1 0 1 2 3
2.49 Approval from people who are important to me about my physically active lifestyle is crucial to me...	Not at all ⟷ Very much 1 2 3 4 5 6 7
2.50 In term of physical activity, what people who are important to me think I should do matters to me	Not at all ⟷ Very much 1 2 3 4 5 6 7
2.51 In term of physical activity, I think doing what people who are important to me are doing is crucial	Not at all ⟷ Very much 1 2 3 4 5 6 7

Now think about your friends or your social circle. Complete the following sentences that most represent you

2.52 My friends think that I ... ….. do physical activity	Should not ⟷ Should -3 -2 -1 0 1 2 3

Think about your friends or your social circle. Complete the following sentences that most represent you

2.53 My friends would ...

….. me doing physical activity

Disapprove of ⟷ Approve of

-3 -2 -1 0 1 2 3

2.54 I see my friends ...

….. physical activity

Do not do ⟷ Do

-3 -2 -1 0 1 2 3

Think about your friends or your social circle. Answer the following questions

2.55 My friends' approval of my physically active lifestyle is important to me

Not at all ⟷ Very much

1 2 3 4 5 6 7

2.56 What my friends think I should do matters to me

Not at all ⟷ Very much

1 2 3 4 5 6 7

2.57 In term of physical activity, doing what my friends doing is important to me

Not at all ⟷ Very much

1 2 3 4 5 6 7

Ministry of Health
Malaysia

Malaysian Health
Promotion Board

World Health Organization Quality of Life Assessment – BREF

Before you fill in the survey

Thank you for taking time to respond to this questionnaire. Please read the information sheet as this explains why this research is being undertaken.

This study is undertaken by Ministry of Health Malaysia and Health Promotion Board Malaysia in collaboration with Liverpool John Moore University, UK. We are interested in finding out about your beliefs regarding physical activity. Understanding your beliefs in physical activity will help us to design a better health promotion intervention programme to assist you to achieve and maintain a healthy lifestyle.

If you have any questions, please contact the research team on the details given in the information sheet. When you complete this questionnaire, please return it to the organizer or in the free post envelope.

How to fill in this survey

- Please read the instruction carefully
- Please try to answer all of the questions, but if you can't remember or would rather not say, please just cross out the question.
- Please circle the scores which most closely represent how you feel.

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Participant no.:

The following questions ask how you feel about your quality of life, health or other areas of your life. Please choose the answer that appears most appropriate to you.

No.	Question (s)	Very poor	Poor	Neither poor nor good	Good	Very good
1.	How would you rate your quality of life?	1	2	3	4	5

No.	Question (s)	Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
2.	How satisfied are you with your health?	1	2	3	4	5

The following questions ask about how much have you experienced certain things in the last 2 weeks.

No.	Question (s)	Not at all	A little	A moderate amount	Very much	An extreme amount
3.	To what extent do you feel that physical pain prevents you from doing what you need to do?	1	2	3	4	5
4.	How much do you need any medical treatment to function in your daily life?	1	2	3	4	5
5.	How much do you enjoy life?	1	2	3	4	5
6.	To what extent do you feel your life to be meaningful?	1	2	3	4	5

No.	Question (s)	Not at all	A little	A moderate amount	Very much	An extreme amount
7.	How well are you able to concentrate?	1	2	3	4	5
8.	How safe do you feel in your daily life?	1	2	3	4	5
9.	How healthy is your physical environment?	1	2	3	4	5

The following questions ask about how completely you experience or were able to do certain things in the last 2 weeks

No.	Question (s)	Not at all	A little	Moderately	Mostly	Completely
10.	Do you have enough energy for everyday life?	1	2	3	4	5
11.	Are you able to accept your bodily appearance?	1	2	3	4	5
12.	Have you enough money to meet your needs?	1	2	3	4	5
13.	How available to you is the information that you need in your day-to-day life?	1	2	3	4	5
14.	To what extent do you have the opportunity?	1	2	3	4	5

No.	Question (s)	Very poor	Poor	Neither poor nor good	Good	Very good
15.	How well are you able to get around?	1	2	3	4	5

No.	Question (s)	Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied
16.	How satisfied are you with your sleep?	1	2	3	4	5
17.	How satisfied are you with your ability to perform your daily living activities?	1	2	3	4	5
18.	How satisfied are you with yoru capacity for work?	1	2	3	4	5
19.	How satisfied are you with yourself?	1	2	3	4	5
20.	How satisfied are you with your personal relationship?	1	2	3	4	5
21.	How satisfied are you with your sex life?	1	2	3	4	5
22.	How satisfied are you with the support you get from your friends?	1	2	3	4	5
23.	How satisfied are you with the condition of your living?	1	2	3	4	5
24.	How satisfied are you with your access to health services?	1	2	3	4	5
25.	How satisfied are you with your transport?	1	2	3	4	5

The following question refer to how often you have felt or experienced certain things in the last 2 weeks.

No.	Question	Never	Seldom	Quite often	Very often	Always
26.	How often do you have negative feelings such as blue mood, despair, anxiety, depression?	1	2	3	4	5

Do you have any comments about the assessment?

.....

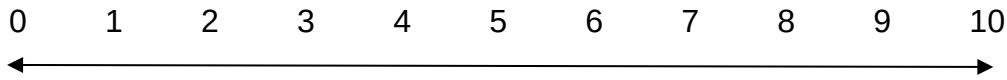
.....

Thank you

Self-Efficacy to Regulate Exercise

A number of situation are described below that can make it hard to stick to an exercise routine. Please rate in each of the blank in the column how certain you are that you can get yourself to perform exercise routine regularly (three or more times a week).

Rate your degree of confidence by recording a number from 0 to 10 using the scale given below:



Cannot do at all — Moderately can do — Highly certain can do

No.	Questions	Confidence (0-10)
1	When I am feeling tired	
2	When I am feeling under pressure from work	
3	During bad weather	
4	After recovering from an injury that caused me to stop exercising	
5	During or after experiencing personal problems	
6	When I am feeling depressed	
7	When I am feeling anxious	
8	After recovering from an illness that caused me to stop exercising	
9	When I feel psychical discomfort when I exercise	
10	After a vacation	
11	When I feel too much work to do at home	
12	When visitors are present	
13	When there are other interesting things to do	
14	If I don't reach my exercise goals	
15	Without support from my family or friends	
16	During a vacation	
17	When I have other time commitments	
18	After experiencing family problems	

Adapted from : Bandura, A.. (2006). Guide for constructing self-efficacy scales. In: Pajares, F. & Urdan, T.C *Self-efficacy beliefs of adolescents*. Greenwich: Information Age Publishing. 307-337.

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Participant no.:

3. About Your Background

Lastly, I'm going to ask you about your demographic data. I would like to re-assure you again that all information you provided are confidential.

I thank you in advance for providing me with your e-mail so I can send you subsequent questionnaire forms. You are not required to put your name and address in this form but if wish to join the lucky draw for this study, please fill the last 2 columns.

Age : ……

Occupation : ……

Ethnicity/Race : Malay ( ) Chinese ( ) Indian ( ) Other ( )

Gender : Male ( ) Female ( )

Education : University/college/professional degree ( )
Diploma/certificate/vocational ( )
STPM/HSC/A-Level & below ( )

Email : ……

Name (optional) : ……

Address (optional) : ……
……
……
……

This is the end of the questionnaire, **thank you** for your time.

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Participant no.:

Appendix 2 – Study questionnaire (Malay Language)

Kementerian Kesihatan Malaysia

Lembaga Promosi Kesihatan Malaysia

Sebelum anda mengisi soal selidik ini
Terima kasih di atas masa yang diluang untuk menjawab soal selidik ini. Sila baca lembaran maklumat, ia menerangkan tujuan kajian ini dilaksanakan.

Kajian ini dijalankan oleh Kementerian Kesihatan Malaysia dan Lembaga Promosi Kesihatan Malaysia dengan kerjasama Liverpool John University, UK. Pihak kami ingin mengetahui tentang nilai-nilai serta kepercayaan anda berkenaan aktiviti fizikal. Dengan memahami nilai dan kepercayaan anda, ia membantu pihak kami untuk merancang dan membentuk program promosi kesihatan yang lebih berkesan untuk membantu anda mencapai serta mengekalkan cara hidup yang sihat.

Soal selidik ini terbahagi kepada 3 bahagian. Bahagian pertama adalah tentang aktiviti fizikal yang anda lakukan sepanjang 7 hari yang lepas, bahagian kedua adalah tentang nilai dan kepercayaan anda terhadap aktiviti fizikal dan bahagian yang terakhir berkaitan profil demografi anda. Sila fikirkan aktiviti fizikal yang anda lakukan di tempat kerja, di rumah, sepanjang perjalanan dari satu tempat ke tempat lain, di masa lapang, rekreasi, senaman dan sukan semasa menjawab soal selidik ini.

Sekiranya anda mempunyai sebarang pertanyaan, sila hubungi urusetia penyelidik seperti lembaran maklumat yang disertakan. Sila kembalikan soal selidik yang telah lengkap diisi kepada pihak urusetia penyelidik atau gunakan sampul surat berbayar yang disertakan.

Bagaimana untuk mengisi soal selidik ini

- Sila baca arahan dengan teliti
- Cuba jawab semua soalan tetapi sekiranya anda tidak boleh mengingati atau tidak dapat menjawab mana-mana soalan, sila tandakan pangkah pada soalan tersebut
- Sila bulatkan skor jawapan yang anda fikir paling menepati perasaan anda. Bagi soalan yang memerlukan pilihan dengan menandakan kotak ( ), tolong tandakan (√) atau pangkah (×) di kotak yang paling menepati jawapan anda
- Bagi soalan yang memerlukan anda menulis sesuatu / menyatakan pendapat, sila tuliskan jawapan anda dengan jelas di ruangan yang diberikan. Jika ruangan itu tidak mencukupi, sila gunakan kertas tambahan dan nyatakan nombor soalan yang berkaitan.

Untuk kegunaan pejabat sahaja:
Nombor peserta:

4. Aktiviti Fizikal Anda

Saya akan bertanya tentang masa yang anda gunakan untuk melakukan aktiviti fizikal dalam 7 hari yang lepas. Jangan masukkan aktiviti yang anda lakukan pada hari ini.

1.1 Dalam 7 hari yang lepas, apakah aktiviti yang anda telah lakukan?

Jadual 1

Aktiviti	Sila tandakan √ pada aktiviti yang berkaitan. Anda boleh memilih lebih daripada 1 jawapan	Berapa kerapkah anda melakukan aktiviti tersebut dalam 7 hari yang lalu? (hari)	Bagi tempoh 7 hari yang lalu, berapa lamakah masa yang anda gunakan untuk setiap aktiviti berkenaan? (minit)
contoh: Zumba	√	***2 days***	***50 minutes***
Mengangkat barang ringan			
Kerja-kerja rumah (eg. mencuci, vakum, menyapu)			
Berkebun (eg. mencangkul, menyapu, bercucuk-tanam)			
Seni mempertahankan diri (eg. Judo, Tae-kwondo)			
Menaiki tangga			
Berjalan			
Yoga			
Sesi di gimnasium (dumbel, mesin larian, mesin basikal) Sila nyatakan ……..			
Sesi aerobik (contoh zumba) Sila nyatakan ……			
Senaman luar (contoh berbasikal, joging) Sila nyatakan …….			
Tarian (contoh line dance, latin, tarian kebudayaan) Sila nyatakan …….			
Sukan berpasukan (contoh bolasepak, hoki) Sila nyatakan ……..			
Lain-lain (sila nyatakan) ……..			

5. Pandangan Anda

Sekarang saya akan bertanya tentang pandangan anda terhadap aktiviti fizikal. Definisi di bawah akan membantu anda menjawab soalselidik ini. Pilih jawapan anda secara jujur kerana tiada jawapan benar atau salah bagi soalselidik ini. Terima kasih.

Aktif pada tahap yang mencukupi ialah :
Melakukan aktiviti fizikal intensiti sederhana selama sekurang-kurangnya 150 minit (2 ½ jam) atau 60 minit (1 jam) aktiviti intensiti tinggi yang dikumpul menerusi aktiviti di tempat kerja, rumah, pengangkutan atau sebarang aktiviti yang berkaitan

(Institute of Public Health(IPH) 2008. The Third Health and Morbidity Survey (NHMS III (2006). Vol. 2. Ministry of Health, Malaysia)

Dengan mengambilkira aktiviti fizikal yang anda lakukan (seperti yang anda tandakan pada Jadual 1 tadi) jawab soalan berikut. Bulatkan jawapan yang paling tepat mewakili pandangan anda.

2.1	Dalam tempoh 7 hari akan datang, saya akan menyertai aktiviti fizikal pada tahap yang mencukupi	Amat palsu	1	2	3	4	5	6	7	Amat benar
2.2	Dalam tempoh 7 hari akan datang, saya bercadang menyertai aktiviti fizikal pada tahap yang mencukupi	Amat palsu	1	2	3	4	5	6	7	Amat benar
2.3	Dalam tempoh 7 hari akan datang, saya merancang untuk menyertai aktiviti fizikal pada tahap yang mencukupi	Amat palsu	1	2	3	4	5	6	7	Amat benar
2.4	Dalam tempoh 7 hari akan datang, saya menjangka akan menyertai aktiviti fizikal pada tahap yang mencukupi	Amat palsu	1	2	3	4	5	6	7	Amat benar

Aktif pada tahap yang mencukupi ialah :
Melakukan aktiviti fizikal intensiti sederhana selama sekurang-kurangnya 150 minit (2 ½ jam) atau 60 minit (1 jam) aktiviti intensiti tinggi yang dikumpul menerusi aktiviti di tempat kerja, rumah, pengangkutan atau sebarang aktiviti yang berkaitan

(Institute of Public Health(IPH) 2008. The Third Health and Morbidity Survey (NHMS III (2006). Vol. 2. Ministry of Health, Malaysia)

Dengan mengambilkira aktiviti fizikal yang anda lakukan (seperti yang anda tandakan pada Jadual 1 tadi) jawab soalan berikut. Bulatkan skor jawapan yang paling tepat mewakili pandangan anda.

2.5 Melakukan aktiviti fizikal pada tahap yang mencukupi untuk 7 hari berikutnya adalah ……..

a) Sukar ⟷ Mudah
1 2 3 4 5 6 7

b) Memudarat ⟷ Bermanfaat
1 2 3 4 5 6 7

c) Baik ⟷ Buruk
Θ
1 2 3 4 5 6 7

d) Menyenangkan ⟷ Menyusahkan
Θ
1 2 3 4 5 6 7

e) Tidak berguna ⟷ Berguna
1 2 3 4 5 6 7

f) Menyeronokkan ⟷ Tidak menyeronokkan
Θ
1 2 3 4 5 6 7

Dengan mengambilkira aktiviti fizikal yang anda lakukan (seperti yang anda tandakan pada Jadual 1 tadi) jawab soalan berikut. Bulatkan skor jawapan yang paling tepat mewakili pandangan anda.

2.6	Jika saya melakukan aktiviti fizikal, saya akan rasa lebih segar	Tidak mungkin ⟷ Berkemungkinan 1 2 3 4 5 6 7
2.7	Jika saya melakukan aktiviti fizikal, ia akan akan menjadikan saya lebih sihat	Tidak mungkin ⟷ Berkemungkinan 1 2 3 4 5 6 7
2.8	Jika saya melakukan aktiviti fizikal, saya akan menjadi lebih cergas	Tidak mungkin ⟷ Berkemungkinan 1 2 3 4 5 6 7
2.9	Jika saya melakukan aktiviti fizikal, saya akan mendapat bentuk tubuh badan yang lebih baik	Tidak mungkin ⟷ Berkemungkinan 1 2 3 4 5 6 7
2.10	Jika saya melakukan aktiviti fizikal, saya akan terdedah kepada kecederaan	Tidak mungkin ⟷ Berkemungkinan 1 2 3 4 5 6 7
2.11	Jika saya melakukan aktiviti fizikal, saya akan berpeluh	Tidak mungkin ⟷ Berkemungkinan 1 2 3 4 5 6 7

Fikirkan semula tentang aktiviti fizikal yang telah anda lakukan (lihat semula pada Jadual 1) dan jawab soalan berikut. Bulatkan skor jawapan yang paling tepat mewakili pandangan anda.

2.12 Sekiranya saya melakukan aktiviti fizikal, badan saya akan berbau	Tidak mungkin ⟷ Berkemungkinan 1 2 3 4 5 6 7
2.13 Rasa segar selepas melakukan aktiviti fizikal adalah …..	Amat tidak dikehendaki ⟷ Amat dikehendaki -3 -2 -1 0 1 2 3
2.14 Menjadi sihat kerana aktiviti fizikal adalah…..	Amat tidak dikehendaki ⟷ Amat dikehendaki -3 -2 -1 0 1 2 3
2.15 Menjadi cergas kerana aktiviti fizikal adalah …..	Amat tidak dikehendaki ⟷ Amat dikehendaki -3 -2 -1 0 1 2 3
2.16 Mendapat tubuh badan yang baik kerana aktiviti fizikal adalah…..	Amat tidak dikehendaki ⟷ Amat dikehendaki -3 -2 -1 0 1 2 3
2.17 Mendapat kecederaan kerana aktiviti fizikal adalah …..	Sangat tidak penting ⟷ Sangat penting -3 -2 -1 0 1 2 3

Sekali lagi, fikirkan tentang aktiviti fizikal yang anda lakukan (lihat semula aktiviti yang anda tandakan pada Jadual 1) dan jawab soalan berikut. Sila bulatkan pada jawapan yang paling tepat mewakili pandangan anda.

2.1 Berpeluh kerana aktiviti fizikal adalah …..	Sangat tidak penting ⟷ Sangat penting -3 -2 -1 0 1 2 3
2.19 Badan berbau kerana aktiviti fizikal adalah …..	Sangat tidak penting ⟷ Sangat penting -3 -2 -1 0 1 2 3

Sekarang fikirkan tentang diri anda dan perasaan anda. Jawab soalan-soalan berikut.

2.20 Saya yakin saya boleh melakukan aktiviti fizikal jika saya mahu	Sangat tidak bersetuju ⟷ Sangat bersetuju 1 2 3 4 5 6 7
2.21 Θ Bagi saya, melakukan aktiviti fizikal adalah	Mudah ⟷ Susah 1 2 3 4 5 6 7
2.22 Keputusan untuk melakukan aktiviti fizikal adalah diluar kawalan saya	Sangat tidak bersetuju ⟷ Sangat bersetuju 1 2 3 4 5 6 7

Fikirkan lagi tentang diri anda dan perasaan anda. Jawab soalan berikut.

2.23	Sama ada saya melakukan aktiviti fizikal atau tidak terpulang kepada saya	Sangat tidak bersetuju ⟷ Sangat bersetuju 1 2 3 4 5 6 7
2.24	Cuaca panas menghalang saya daripada melakukan aktiviti fizikal	Tidak mungkin ⟷ Berkemungkinan 1 2 3 4 5 6 7
2.25	Kerja saya menghalang saya daripada melakukan aktiviti fizikal	Tidak mungkin ⟷ Berkemungkinan 1 2 3 4 5 6 7
2.26	Masalah jenayah di sekitar tempat tinggal saya menghalang saya daripada melakukan aktiviti fizikal	Sangat tidak setuju ⟷ Sangat setuju 1 2 3 4 5 6 7
2.27	Untuk melakukan aktiviti fizikal, ia melibatkan perbelanjaan tambahan untuk saya	Sangat tidak setuju ⟷ Sangat setuju 1 2 3 4 5 6 7
2.28	Tanggungjawab keluarga saya menyukarkan saya daripada melakukan aktiviti fizikal	Tidak mungkin ⟷ Berkemungkinan 1 2 3 4 5 6 7

Fikirkan tentang diri anda dan perasaan anda. Jawab soalan-soalan berikut

2.29 Saya tiada masa untuk melakukan aktiviti fizikal	Sangat tidak setuju ⟷ Sangat setuju 1 2 3 4 5 6 7
2.30 Saya lebih gemar untuk menyertai program aktiviti fizikal yang berstruktur (program yang mempunyai jurulatih seperti sesi aerobik, kelas tai-chi, kelas yoga dll)	Sangat tidak setuju ⟷ Sangat setuju 1 2 3 4 5 6 7
2.31 Saya hanya akan melakukan aktiviti fizikal sekiranya ditawarkan hadiah atau ganjaran (contoh baju-t, minuman, sijil dsb)	Sangat tidak setuju ⟷ Sangat setuju 1 2 3 4 5 6 7
2.32 Saya lebih gemar menyertai aktiviti fizikal bersama kawan-kawan	Sangat tidak setuju ⟷ Sangat setuju 1 2 3 4 5 6 7

Fikirkan tentang diri anda dan perasaan anda. Lengkapkan ayat berikut dengan jawapan yang paling hampir mewakili pandangan anda

2.33 Apabila cuaca panas, saya akan ... ….. untuk melakukan aktiviti fizikal	Kurang cenderung ⟷ Lebih cenderung -3 -2 -1 0 1 2 3
2.34 Kerja saya menyebabkan saya .... ….. untuk melakukan aktiviti fizikal	Sangat sukar ⟷ Sangat mudah -3 -2 -1 0 1 2 3

Fikirkan tentang diri anda dan perasaan anda. Lengkapkan ayat-ayat berikut dengan jawapan yang paling hampir mewakili pandangan anda

2.35 Masalah jenayah di tempat tinggal saya menyebabkan saya ... ….. untuk melakukan aktiviti fizikal	Sangat sukar ⟷ Sangat mudah -3 -2 -1 0 1 2 3
2.36 Jika saya memperoleh cara melakukan aktiviti fizikal yang murah, saya akan….. ….. untuk melakukan aktiviti fizikal	Kurang cenderung ⟷ Lebih cenderung -3 -2 -1 0 1 2 3
2.37 Tanggungjawab keluarga saya menyebabkan saya ... ….. untuk melakukan aktiviti fizikal	Sangat sukar ⟷ Sangat mudah -3 -2 -1 0 1 2 3
2.38 Jadual masa saya menyebabkan saya ... ….. untuk melakukan aktiviti fizikal	Sangat sukar ⟷ Sangat mudah -3 -2 -1 0 1 2 3
2.39 Apabila terdapat program aktiviti fizikal yang berstruktur...(program yang mempunyai jurulatih seperti aerobic, tai-chi, yoga dsb), saya akan.. ….. untuk melakukan aktiviti fizikal	Kurang cenderung ⟷ Lebih cenderung -3 -2 -1 0 1 2 3
2.40 Jika hadiah atau ganjaran diberikan, saya akan lebih ... ….. untuk bersenam	Kurang cenderung ⟷ Lebih cenderung -3 -2 -1 0 1 2 3

Fikirkan tentang orang yang penting terhadap anda. Mereka ini mungkin sahabat baik anda, pasangan, ibu, bapa, adik-beradik atau sesiapa yang anda rasakan amat penting di

2.41 Sekiranya ada kawan-kawan, saya akan lebih ....

….. untuk bersenam

Kurang cenderung ⟷ Lebih cenderung

-3 -2 -1 0 1 2 3

2.42 Θ Kebanyakan orang yang penting bagi saya, berfikir bahawa ...

….. melakukan aktiviti fizikal

Saya patut ⟷ Saya tidak patut

1 2 3 4 5 6 7

2.43 Saya sepatutnya melakukan aktiviti fizikal

Sangat tidak bersetuju ⟷ Sangat setuju

1 2 3 4 5 6 7

2.44 Saya rasa melakukan aktiviti fizikal adalah satu tekanan sosial

Sangat tidak setuju ⟷ Sangat setuju

1 2 3 4 5 6 7

2.45 Orang yang penting bagi saya mahu saya melakukan aktiviti fizikal

Sangat tidak setuju ⟷ Sangat setuju

1 2 3 4 5 6 7

Fikirkan tentang orang yang penting terhadap anda. Mereka ini mungkin sahabat baik anda, pasangan, ibu, bapa, adik-beradik atau sesiapa yang anda rasakan amat penting di dalam hidup anda. Fikirkan tentang mereka dan lengkapkan ayat-ayat berikut dengan

2.46 Orang yang penting bagi saya berpendapat saya …

… melakukan aktiviti fizikal

Tidak patut ⟷ Patut

-3 -2 -1 0 1 2 3

Fikirkan tentang orang yang penting bagi anda. Mereka ini mungkin sahabat baik anda, pasangan, ibu, bapa, adik-beradik atau sesiapa yang anda rasakan amat penting di dalam hidup anda. Fikirkan tentang mereka dan jawab soalan-soalan berikut.

2.47 Orang yang penting dalam hidup saya … … saya melakukan aktiviti fizikal	Tidak menyokong ⟷ Menyokong -3 -2 -1 0 1 2 3
2.48 Saya lihat orang yang penting bagi saya ... ….. aktiviti fizikal	Tidak melakukan ⟷ Melakukan -3 -2 -1 0 1 2 3
2.49 Pengiktirafan daripada orang yang penting dalam hidup saya, tentang cara hidup aktif saya amat penting bagi saya...	Tidak penting sama sekali ⟷ Sangat utama 1 2 3 4 5 6 7
2.50 Melakukan aktiviti fizikal yang dilakukan oleh mereka yang penting dalam hidup saya adalah penting bagi saya	Tidak penting sama sekali ⟷ Sangat utama 1 2 3 4 5 6 7
2.51 Melakukan aktiviti fizikal yang difikirkan oleh mereka yang penting dalam hidup saya adalah penting bagi saya	Tidak penting sama sekali ⟷ Sangat utama 1 2 3 4 5 6 7

Sekarang fikirkan tentang sahabat atau jaringan sosial anda. Lengkapkan ayat-ayat berikut dengan jawapan yang paling hampir mewakili pandangan anda.

2.52 Kawan-kawan saya berpendapat bahawa saya ... ….. melakukan aktiviti fizikal	Tidak Patut ⟷ Patut -3 -2 -1 0 1 2 3

Sekarang fikirkan tentang sahabat atau jaringan sosial anda. Lengkapkan ayat-ayat berikut dengan jawapan yang paling hampir mewakili pandangan anda.

2.53 Kawan-kawan saya akan ...

….. saya melakukan aktiviti fizikal

Tidak menyokong ⟷ Menyokong

-3 -2 -1 0 1 2 3

2.54 Saya lihat kawan-kawan saya ...

….. aktiviti fizikal

Tidak melakukan ⟷ Melakukan

-3 -2 -1 0 1 2 3

Sekarang fikirkan tentang sahabat atau jaringan sosial anda. Jawab soalan-soalan berikut.

2.55 Pengiktirafan kawan-kawan saya tentang cara hidup aktif saya penting bagi saya

Tidak penting ⟷ Sangat utama

1 2 3 4 5 6 7

2.56 Apa yang difikirkan oleh kawan-kawan saya tentang apa yang saya perlu lakukan penting bagi saya

Tidak penting sama sekali ⟷ Sangat utama

1 2 3 4 5 6 7

2.57 Dari segi aktiviti fizikal, adalah penting bagi saya melakukan aktiviti yang dilakukan oleh kawan-kawan saya

Tidak penting sama sekali ⟷ Sangat utama

1 2 3 4 5 6 7

Kementerian Kesihatan Malavsia

Lembaga Promosi Kesihatan Malavsia

World Health Organization Quality of Life Assesment

Brief version Bahasa Malaysia

Sebelum anda mengisi soal selidik ini
Terima kasih di atas masa yang diluang untuk menjawab soal selidik ini. Sila baca lembaran maklumat, ia menerangkan tujuan kajian ini dilaksanakan.

Kajian ini dijalankan oleh Kementerian Kesihatan Malaysia dan Lembaga Promosi Kesihatan Malaysia dengan kerjasama Liverpool John University, UK. Pihak kami ingin mengetahui tentang nilai-nilai serta kepercayaan anda berkenaan aktiviti fizikal. Dengan memahami nilai dan kepercayaan anda, ia membantu pihak kami untuk merancang dan membentuk program promosi kesihatan yang lebih berkesan untuk membantu anda mencapai serta mengekalkan cara hidup yang sihat.

Sekiranya anda mempunyai sebarang pertanyaan, sila hubungi urusetia penyelidik seperti lembaran maklumat yang disertakan. Sila kembalikan soal selidik yang telah lengkap diisi kepada pihak urusetia penyelidik atau gunakan sampul surat berbayar yang disertakan.

Bagaimana untuk mengisi soal selidik ini

- Sila baca arahan dengan teliti
- Cuba jawab semua soalan tetapi sekiranya anda tidak boleh mengingati atau tidak dapat menjawab mana-mana soalan, sila tandakan pangkah pada soalan tersebut
- Sila bulatkan skor jawapan yang anda.

Untuk kegunaan pejabat sahaja:
Nombor peserta.:

Soalan-soalan berikut akan bertanyakan tentang kualiti hidup anda, tahap kesihatan dan perkara-perkara yang berkaitan dengan kehidupan anda. Sila pilih jawapan yang paling menepati perasaan anda.

No.	Soalan	Sangat tidak baik	Tidak baik	Sederhana	Baik	Sangat baik
1.	Bagaimanakah anda menilai kualiti kehidupan anda?	1	2	3	4	5

No.	Soalan	Sangat tidak berpuas hati	Tidak berpuas hati	Sederhana	Berpuas hati	Sangat berpuas hati
2.	Setakat manakah anda berpuas hati dengan kesihatan anda?	1	2	3	4	5

Soalan-soalan berikut bertanyakan setakat manakah anda telah mengalami sesuatu perkara dalam 2 minggu yang lepas

No.	Soalan	Tiada langsung	Sedikit sahaja	Sederhana	Sangat banyak	Teramat
3.	Setakat manakah anda berasa kesakitan (fizikal) menghalang anda dari melakukan apa yang anda perlu lakukan?	1	2	3	4	5
4.	Berapa banyakkah rawatan perubatan yang anda perlu untuk berfungsi dalam kehidupan harian anda?	1	2	3	4	5
5.	Berapa banyakkah anda menikmati keseronokan dalam hidup anda?	1	2	3	4	5
6.	Setakat manakah anda rasa hidup anda bermakna?	1	2	3	4	5

No.	Soalan	Tiada langsung	Sedikit sahaja	Sederhana	Sangat banyak	Teramat
7.	Berapa baikkah anda dapat memberi tumpuan?	1	2	3	4	5
8.	Berapa selamatkah anda rasa dalam kehidupan seharian anda?	1	2	3	4	5
9.	Berapa sihatkah persekitaran fizikal anda?	1	2	3	4	5

Soalan-soalan berikutnya bertanyakan bagaimana sempurnya anda mengalami atau berupaya melakukan sesuatu perkara dalam 2 minggu yang lepas

No.	Soalan	Tiada langsung	Sedikit sahaja	Sederhana	Sangat banyak	Teramat
10.	Adakah anda mempunyai cukup tenaga untuk kehidupan harian anda?	1	2	3	4	5
11.	Adakah anda dapat menerima rupa dan bentuk tubuh anda?	1	2	3	4	5
12.	Adakah anda mempunyai wang yang cukup untuk memenuhi keperluan anda?	1	2	3	4	5
13.	Setakat manakah kemudahan bagi anda untuk mendapatkan maklumat yang diperlukan dalam kehidupan harian?	1	2	3	4	5
14.	Setakat manakah anda mendapat peluang untuk aktiviti riadah?	1	2	3	4	5

No.	Soalan	Sangat tidak baik	Tidak baik	Sederhana	Baik	Sangat baik
15.	Sebaik manakah keupayaan anda bergerak dari satu tempat ke satu tempat yang lain?	1	2	3	4	5

Soalan-soalan berikut bertanyakan perasaan anda terhadap beberapa aspek tertentu dalam kehidupan anda sepanjang 2 minggu yang lepas

No.	Soalan	Sangat tidak berpuas hati	Tidak berpuas hati	Sederhana	Berpuas hati	Sangat berpuas hati
16.	Adakah anda berpuas hati dengan tidur anda?	1	2	3	4	5
17.	Adakah anda berpuas hati dengan keupayaan anda melaksanakan aktiviti harian anda?	1	2	3	4	5
18.	Adakah anda berpuas hati dengan keupayaan anda bekerja?	1	2	3	4	5
19.	Adakah anda berpuas hati dengan diri anda?	1	2	3	4	5
20.	Adakah anda berpuas hati dengan perhubungan peribadi anda?	1	2	3	4	5

No.	Soalan	Sangat tidak berpuas hati	Tidak berpuas hati	Sederhana	Berpuas hati	Sangat berpuas hati
21.	Adakah anda berpuas hati dengan kehidupan seks anda?	1	2	3	4	5
22.	Adakah anda berpuas hati dengan sokongan yang anda dapati dari kawan-kawan anda?	1	2	3	4	5
23.	Adakah anda berpuas hati dengan tempat tinggal anda?	1	2	3	4	5
24.	Adakah anda berpuas hati dengan kemudahan mendapatkan perkhidmatan kesihatan?	1	2	3	4	5
25.	Adakah anda berpuas hati dengan pengangkutan anda?	1	2	3	4	5

Soalan berikut merujuk kepada kekerapan anda merasa atau mengalami sesuatu emosi sepanjang 2 minggu yang lepas

No.	Soalan	Tidak pernah	Jarang-jarang	Kerap	Sangat kerap	sentiasa
26.	Berapa kerapkah anda mengalami perasaan-perasaan negatif seperti susah hati, kecewa, kegelisahan atau kemurungan?	1	2	3	4	5

Adakah anda mempunyai sebarang maklumbalas tentang soalan ini?

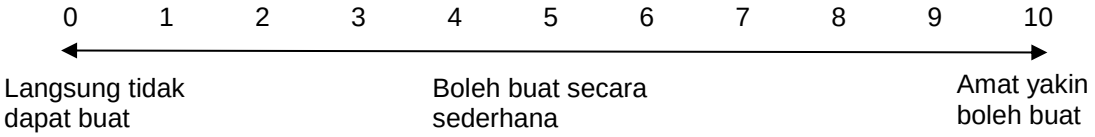
.....

.....

Terima kasih di atas kerjasama anda

Beberapa situasi di bawah ini mungkin boleh menyebabkan anda sukar untuk besenam secara rutin atau berpanjangan. **Sejauhmanakah anda yakin anda dapat bersenam secara rutin walaupun menghadapi situasi di bawah**. Berikan jawapan anda di kotak yang disediakan.

Berikan jawapan anda dalam nilai keyakinan diri dari 0 ke 10 berdasarkan skala dibawah.



Saya yakin saya dapat bersenam secara rutin walaupun menghadapi situasi dibawah:

No.	Situasi / Soalan	Tahap keyakinan (0-10)
1	Apabila saya berasa letih	
2	Apabila saya menghadapi tekanan kerja	
3	Cuaca buruk	
4	Selepas pulih daripada kecederaan yang menyebabkan saya berhenti bersenam	
5	Semasa atau selepas menghadapi masalah peribadi	
6	Semasa saya berasa murung / tekanan perasaan	
7	Semasa saya berasa cemas	
8	Selepas pulih daripada penyakit yang menyebabkan saya berhenti bersenam	
9	Apabila badan tidak selesa apabila saya bersenam	
10	Selepas bercuti	
11	Apabila saya berasa terlalu banyak kerja di rumah	
12	Apabila ada tetamu yang datang	
13	Apabila saya ada kerja-kerja lain yang lebih menarik untuk dibuat	
14	Apabila saya tidak mencapai tujuan saya bersenam	
15	Tiada sokongan daripada keluarga atau rakan-rakan	
16	Semasa bercuti	
17	Apabila saya ada komitmen yang lain / kerja yang lain	
18	Selepas menghadapi masalah keluarga	

Bandura, A.. (2006). Guide for constructing self-efficacy scales. In: Pajares, F. & Urdan, T.C *Self-efficacy beliefs of adolescents*. Greenwich: Information Age Publishing. 307-337.

Untuk kegunaan pejabat sahaja	*Nombor ruj peserta :*

6. Latar belakang anda

Akhirnya, saya akan bertanya tentang maklumat demografi anda. Saya ingin memberi jaminan bahawa semua maklumat yang diberikan adalah sulit.

Saya ingin mengucapkan terima kasih kerana memberikan saya alamat email anda supaya saya dapat menghantar soal selidik yang selanjutnya. Anda tidak diwajibkan untuk memberikan nama dan alamat di borang ini tetapi sekiranya anda ingin menyertai cabutan bertuah untuk kajian ini, sila penuhi 2 ruangan yang terakhir.

Umur : ……

Pekerjaan : ……

Bangsa : Melayu ( ) Cina ( ) India ( ) Lain-lain ( )

Jantina : Lelaki ( ) Perempuan ( )

Tahap Pendidikan :
Universiti /kolej/ ijazah profesional ( )
Diploma/sijil/vokasional ( )
STPM/HSC/A-Level dan ke bawah ( )

Email : ……

Nama (pilihan) : ……

Alamat (pilihan) : ……
……
……
……

Soal selidik ini tamat di sini. **Terima kasih** di atas kerjasama anda

Untuk kegunaan pejabat sahaja:

Nombor peserta:

Appendix 3 - List of activities and types of intensities

No.	Activity	Intensity
1.	Carrying light load	Light
2.	Housework (eg. Cleaning, vacuum, sweeping)	
3.	Gardening	Moderate
4.	Walking up stairs	
5.	Brisk walking	
6.	Yoga	
7.	Martial arts (e.g Judo, Tae-kwondo)	Vigorous
8.	Gym session (dumbell, treadmill, cycling machine)	
9.	Aerobic session (eg. zumba)	
10.	Outdoor exercise (eg cycling, jogging)	
11.	Dance (eg. line dance, latin, folk)	
12.	Team sport (eg. Football, hockey)	
13.	Other activity	

Appendix 4 – Point of discussion

Point of discussion for :

a. Director of Health Education Division
b. Chief Executive of Health Promotion Board

I am conducting a survey on the beliefs of the Malaysian population in participating in physical activities. I would appreciate your responses to this issue.

1. What are the objectives of the health promotion activities organized by your department?
2. What training / empowerment to the NGOs are provided by your department?
3. How many and how much worth of grants given by the board to NGOs for the past 3 years?
4. How do you approach or engage the NGOs for partnership?
5. Do you think there are any other organizations not included in your engagement?
6. Do you think there are advantages of NGOs working in partnership with your department? If so, what are they?
7. Do you think there are barriers for the NGO that prevents them from having partnership with your department? If so, what are they?
8. What are your plans to improve those areas?
9. What are the achievements of your department in promoting active healthy lifestyles among Malaysian?
10. What are the objectives that your department have yet to achieve? What is your plan to overcome it?
11. Do you perceive any quality issues with the NGOs? If so, what are they?
12. If there is anything you change about the quality of our NGOs, what would that be?
13. What do you perceive are the strength and limitation of the Malaysian NGOs?
14. Have you experience any problems working with the NGOs? If so, what are they?
15. What are the differences of the NGOs that you work with?
16. Do you know of any feedback by the NGOs about your department? If so, what are they?

Point of discussion for the organiser or main committee member

I am conducting a survey on the beliefs of the Malaysian population in participating in physical activities. I would appreciate your responses to this issue.

1. What are the objectives of the health promotion activities organized by your organization?
2. What is your plan to achieve it?
3. How do you approach your participants?
4. What do you think of your participants?
5. If there is anything you could change about your participants, what would that be?
6. Have you attended any training in organizing physical activity intervention programmes?
7. What do you think are the strength of the intervention programme run by your organization?
8. How is the programme carried out by your organization different from others?
9. What are the strength and limitation of your organization?
10. What is the achievement of your intervention programmes so far?
11. What are the problems you encountered when running your programme? What do you do to overcome them?
12. Do you think your programme would have achieve better result if your participants were: (a.) richer; (b.) more educated; (c.) younger age; (d.) professional; (e.) any other criteria you can think of
13. What do you think that make some participant “drop-out” from maintaining the active lifestyle they learn from your intervention?
14. How do you keep track of the progress of all participants that participated in your programmes after the intervention?
15. What do you think the participants needs for them to maintain a healthy and active lifestyle? Do you think your participants have those qualities?
16. What is your view about the partnership / grant provision programmes by the Ministry of Health Malaysia particularly the Health Promotion Board Malaysia? Is there anything you wish the government could change or improve?
17. Do you ever have problem working with the Ministry of Health?

Appendix 5 – email to health officials

( )KKM(HECC)-09/62/

Mac, 2013

Ketua Eksekutif
Lembaga Promosi Kesihatan Malaysia (MySihat)

Pengarah
Bahagian Pendidikan Kesihatan, KKM

Tuan,

PERMOHONAN UNTUK MENGADAKAN SESI TEMUBUAL BAGI KAJIAN PROMOSI KESIHATAN AKTIVITI FIZIKAL

Dengan segala hormatnya perkara di atas adalah dirujuk.

2. Dimaklumkan bahawa saya sedang menjalankan kajian bertajuk “Aktiviti fizikal dan kualiti hidup: Analisa menggunakan teori tingkahlaku terancang”. Kajian saya akan menjurus kepada faktor-faktor atau “beliefs” yang menyebabkan masyarakat Malaysia mengamalkan cara hidup aktif.

3. Sebagai memenuhi keperluan kajian, sukacita sekiranya saya dapat menjalankan sesi temubual bersama tuan. Saya akan bertanyakan tentang aktiviti promosi kesihatan berkaitan aktiviti fizikal yang dilaksanakan oleh pihak tuan, objektif serta pencapaian program berkenaan. Sekiranya tuan bersetuju untuk ditemuramah, sila kembalikan borang yang lengkap diisi melalui email K.B.Ng@2011.ljmu.ac.uk atau serahkan kepada setiausaha tuan. Saya akan menghubungi setiausaha tuan bagi mendapatkan maklumat berkenaan persetujuan tuan dan jadual diari yang bersesuaian.

4. Saya sertakan bersama-sama ini Lembaran Maklumat Peserta dan Borang Keizinan untuk rujukan dan tindakan pihak tuan. Sekiranya tuan bersetuju, sila lengkapkan borang keizinan tersebut. Di atas kerjasama tuan diucapkan terima kasih.

Sekian.

“ BERKHIDMAT UNTUK NEGARA ”

Yang benar,

(NG KHENG BAN)
Pegawai Pendidikan Kesihatan
Kementerian Kesihatan Malaysia

Appendix 6 – email to participants requesting for interviews

April, 2013

Dear Sirs,

INTERVIEW REQUEST FOR STUDY ON PHYSICAL ACTIVITY

The above matter refers.

2. I wish to inform you that I am currently undertaking a research entitled "Physical activity and quality of life: Analysis using the theory of planned behaviour". This study is conducted by the Ministry of Health Malaysia in collaboration with Liverpool John Moore University. This study aims to examine the beliefs that influence the active lifestyle behaviour of Malaysian people.

3. As part of the study, I would appreciate if I could interview you on matters related to your active lifestyle. I would be asking questions relating your physical activity lifestyle and your opinion on your participation of this intervention programmes. I append herewith the Participant information Sheet and Consent Form where you will find more information about this study including the researcher contact information. You may notify me of your decision to participate in this study by emailing me at K.B.NG@2011.ljmu.ac.uk or contact me with the number provided on the participant information sheet. Feel free to contact me if you have any inquiries about this study.

Thank you.

Yours truly,

(NG KHENG BAN)

Appendix 7 – Participant Information Sheet

Ministry of Health Malaysia

Health Promotion Board Malaysia

PARTICIPANT INFORMATION SHEET

Physical Activity and Quality of Life: Analysis Using Theory of Planned Behaviour

You are being invited to take part in a research study. Before you decide it is important that you understand why the research is being done and what it involves. Please take time to read the following information. Ask us if there is anything that is not clear or if you would like more information.

1. **What is the purpose of the study?**

The overall research proposes to evaluate how people beliefs and attitudes influence their behaviour and well-being in a Malaysian population. This study involves data collection in the form of questionnaires and interviews at multiple time points.

2. Why have I been asked to participate in this study?

You have been asked to participate in this study as you are a participating in an intervention programme held in partnership with the Health Promotion Board Malaysia. Your opinion is valuable to us to improve the future intervention programmes.

3. Do I have to take part?

No. It is up to you to decide whether or not to take part. If you do, you will be given this information sheet and asked to sign a consent form. You are still free to withdraw at any time and without giving a reason.

4. What will happen to me if I take part?

If you choose to take part, you will be asked to fill a set of questionnaires which will take around 15 minutes of your time. You will be asked to fill in the questionnaire once before the intervention, once at the end of the intervention, once at 6 and 9 months past the intervention programme. The print-out questionnaire would be given to you before the intervention and at the end of the intervention. Please return the completed questionnaire to the researcher. Depending on your preferences, we will either email or send by post the subsequent questionnaires to you. You can return the completed questionnaire via email or free post envelope.

If you choose to participate in the interview, you will be asked several questions which will take about 1 hour. If you agree to participate in subsequent interview, the researcher will contact you at 6 and 12 months after the intervention. Please inform the researcher of your decision to participate in subsequent interviews.

5. **Are there any risks involved?**
There are no risks associated with this study but should you find any of the questions to be sensitive or make you feel uncomfortable, you are free not answer them.

6. Will my taking part in the study be kept confidential?
Yes, data will be anonymised and the responses you give will only be seen by the researcher and will remain completely confidential. Your responses will stored securely.

Contact Details of Researcher

If you have any further questions relating to this study, please feel free to contact the researcher. Given below are the appropriate contact details:

email: ng_kheng@moh.gov.my **telephone : 03-88887700**

K.B.Ng@2011.ljmu.ac.uk

Appendix 8 – Consent Form

LIVERPOOL JOHN MOORES UNIVERSITY

CONSENT FORM

Physical Activity and Quality of Life: An Analysis Using Theory of Planned Behaviour

Kheng Ban, Ng
School of Natural Science and Psychology

I confirm that I have read and understand the information provided for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily	☐
1. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and that this will not affect my legal rights.	☐
2. I understand that any personal information collected during the study will be anonymised and remain confidential	☐
3. I agree to take part in the above interview/ focus group discussion study	☐
4. I understand that the interview/focus group will be audio recorded and I am happy to proceed	☐
5. I understand that parts of our conversation may be used verbatim in future publications or presentations but that such quotes will be anonymised.	☐
6. I will treat all information shared during this interview/focus group discussion by other participant as confidential.	☐

Name of Participant Date Signature

Name of Researcher Date Signature

Note: When completed 1 copy for participant and 1 copy for researcher

Appendix 9 – Qualitative Interview Topic List - Phone

Hi,

I'm Kheng Ban and I'm conducting a study on physical activity among Malaysian. If you still remember we have met last year where I went to your place conducting interviews on you. I'm currently doing a follow-up on all of my interviews respondent and I would truly appreciate if I can interview you again. I will be asking you questions about your physical activity behaviour for the past 1 year. Your identity will be withheld and you are free to withdraw from this interview at any time. Don't worry about right or wrong answer, just say what you think and it won't affect the relationship between your organisations with the Ministry of Health Malaysia in any way.

I'm going to ask you about your physical activity

1. Between our interview last year and now, did you stop exercising?
   Yes – Why?
   No -
2. Do you still exercise with this group?
   Yes – Why?
   No – Why?

3. Would you go somewhere else like join another group to continue exercising?

4. How do you feel after exercising?

5. How often do you exercise last year?
6. How often do you exercise now?
   If difference – Why?
7. Would you continue exercising with this group?
   Yes –
   No – Why?
8. Usually, what prevents you from exercising?
   Yes – Why?
   No – Why?
9. If this group stop doing aerobics exercise, would still be in this group?
   Yes – Why?
   No – Why?

Do you think this exercise is easy or difficult?

Why you want to do this?

I'm going to ask you about your health

10. What is the health benefit doing exercise with this group?
11. Did you feel any more health improvement to your health since last year?
    Yes – what it is?
    No – why you think so? Why you continue exercising if no more improvement?

I'm going to ask about your social experience with regards to your physical activity

12. What do you think is the benefits of joining this group?
13. Did you make any more friends with this group since last year?
14. What about the support from you family, any changes since last year?
15. What do you think you will lose if you stop joining this group

I'm going to ask about other activity you do with this group

16. Other than exercise, do you do any other activities with this group since last year? What are they?
17. If the group stop all other non-exercise activities, (e.g travels etc) would still be in this group?
    Yes – Why
    No – Why?

I'm going to ask about your feeling being in this group?

18. What is your feeling being with this group last year?
19. What is your feeling now?
    If difference – Why?
20. Do you ever receive any comment from your friends about your physical activity?
    Yes – What are they?

I'm going to ask you about the group

21. Do you think the cost that you pay for exercise reasonable?
    Yes – Can you tell me how much? Do you think that is reasonable?
    No – Do you think the group should start imposing fee?
22. Would you still join if they now ask to pay more?
23. Do you know whether this group still receive sponsor from the government?
24. If the government stop giving help to this group, do you think it will affect you from exercising?
25. Do you have any idea how this group should improve or change?
26. Do you know your instructor?
27. Do you have any model / icon or anybody that you feel like "I want to be like him/her"?
    Yes – Why?
    No – Do you anybody else in mind? (non-celebrity)
28. Do you know whether the exercise instructor is trained?
29. Have you attended any training before?

Lastly, I'm going to ask about government support and other issues

30. Do you think the facilities for exercising you have is good enough?
    No – Why?
31. Do you think safety in your area affect your exercise behaviour?
    Yes – Why?
    No – Why?

32. Do you **think** weather affect your exercise behaviour?
    Yes – Why?
33. Do you think there is any other ways the Ministry of Health can help your group?

Appendix 10 – Postal Survey Form (English)

Ministry of Health Malaysia

Malaysian Health Promotion Board

Hi,

I'm Ng Kheng Ban and I'm conducting a study on physical activity among Malaysian. I hope you recall that we met last year when I interviewed you in the first part of the study and you agreed to be interviewed again (please see Participant Information Sheet attached). I'm currently doing a follow-up on all of my interviews respondents and would truly appreciate if as you are not available to interview on phone / via skype you would consider completing the attached interview survey. It asks questions about your physical activity behaviour for the past 1 year. Just as the first part of the study, your identity will be withheld and you are free to withdraw from this study at any time. Completion of the survey will imply your consent. Don't worry about right or wrong answer, just say what you think. Your answer will help to improve health promotion activities and it won't affect the relationship between your organisations with the Ministry of Health Malaysia in any way.

Once you complete this form, please post it back to the research organizer using the free post envelop enclosed. Thank you.

How to fill in this survey

- Please read the questions carefully
- Please try to answer all of the questions, but if you can't remember or would rather not say, please just cross out the question.
- Please circle the answer which most closely represent how you feel.
- For questions where you are asked to write something, please write clearly in the space given, but if you need more room, please use additional paper and give the question number that you answer(s) relate to.

☐ *I have read the information sheet provided and I am happy to participate. I understand that by completing and returning this questionnaire I am consenting to be part of the research study and for my data to be used as described.*

Participant no.

Firstly I'm going to ask you about your physical activity

34. Between our interview last year and now, did you stop exercising?

Yes

No

If yes, why?

……..

(If you have stop exercising altogether, please go to question 20)

35. How often do you exercise last year?

Each time I exercise is …….. hour(s) and

I exercise …….. time per week

36. Do you still exercise that much now?

Yes

No

(If no, why?)

……...

Now I'm going to ask you about your health

37. Did you feel any more health improvement since last year?

Yes

No

What are they?

Why you think that happen?

……...

……...

Despite no improvement, you still exercise. Why?

……...

I'm going to ask about your social experience with regards to your physical activity

38. Other than health benefits, what do you think of other benefits you get from this group?

……

……

39. Did you make any more friends with this group since last year?

Yes No

40. What about the support from you family, any changes since last year?

Yes No
If yes, why?

……..

41. What do you think you will lose if you stop joining this group

……

……

I'm going to ask about other activity you do with this group

42. Other than exercise, do you do any other activities with this group since last year?

Yes No

If yes, what are they?

……..

43. If the group stop all other non-exercise activities such as travels etc, would still be in this group?

Yes No

Why? Why?

……... ……...

I'm going to ask about your feeling about being in this group?

44. What is your feeling being with this group now?

……
……

45. Do you ever receive any comment from your friends about your physical activity?

    Yes No

    If yes, what are they?

    ……..

I'm going to ask you about the group

46. Do you have to pay to attend exercise session, if so do think the cost are reasonable?

    Yes No

    Why? Why?

    …….. ……..

47. If the government stop giving help to this group, do you think it will affect you from exercising?

    Yes No

    Why? Why?

    …….. ……..

48. Do you think the group should improve or change? If so, how?

    ……

    ……

49. Do you think you want to be like your instructor in term of exercise and fitness?

    Yes No

    Why? Why?

    …….. ……..

Lastly, I'm going to ask about government support and other issues

50. Do you think the facilities for exercising with your group is good enough?

    Yes No

    Why?

    . ……..

51. What do you think are the barriers for you to get active?

……

……

52. Do you think there is any other ways the Ministry of Health can help your group?

……

……

53. Why you choose to stop exercising altogether?

……

……

Thank you for your time!

Appendix 11 – Postal Survey Form (Malay Language)

Kementerian
Kesihatan Malaysia

Lembaga Promosi
Kesihatan Malaysia

LIVERPOOL JOHN MOORES UNIVERSITY

Salam Sejahtera,

Nama saya ialah Ng Kheng Ban dan saya sedang menjalankan kajian tentang aktiviti fizikal di kalangan masyarakat Malaysia. Saya berharap tuan/puan masih ingat yang mana saya menemuramah tuan/puan pada tahun lepas dan saya juga memaklumkan bahawa saya akan menghubungi tuan/puan semula. Saya sedang membuat kajian susulan daripada temuramah berkenaan dan berharap tuan/puan dapat melengkapkan soalselidik ini. Soalselidik ini berkaitan aktiviti fizikal atau senaman yang tuan/puan lakukan sepanjang setahun yang lepas. Identiti tuan/puan akan dirahsiakan dan tuan/puan juga bebas untuk menarik diri daripada soal selidik ini. Sekiranya tuan/puan bersetuju untuk menyertai kajian kami, sila lengkapkan soal selidik ini. Tiada jawapan yang salah atau betul, sila jawab apa yang tuan/puan fikirkan sebagai jawapan paling tepat. Jawapan yang tuan/puan berikan akan membantu kami meningkatkan lagi aktiviti promosi kesihatan dan tidak akan menjejaskan hubungan persatuan tuan/puan dengan pihak Kementerian Kesihatan Malaysia.

Sekiranya tuan/puan tidak lagi melakukan senaman dengan persatuan seperti di atas, sila nyatakan pada soalan 21 dengan memberikan nama persatuan baru dan tarikh tuan/puan menyertai persatuan tersebut. Sila jawab soalan berdasarkan pengalaman bersama persatuan baru. Sila kembalikan borang yang lengkap diisi kepada urusetia kajian dengan menggunakan sampul surat bersetem yang disertakan, terima kasih.

Bagaimana untuk mengisi soal selidik ini

- Sila baca dengan teliti
- Tolong isikan semua soalan yang ada, jika ada soalan yang tidak dapat dijawab sama ada kerana tuan/puan lupa atau tidak mahu menjawab, sila pangkah pada nombor soalan tersebut.
- Tolong bulatkan pada jawapan yang bersesuaian.
- Bagi soalan yang memerlukan tuan/puan untuk menulis huraian, sila tulis dengan ringkas dan jelas pada ruangan yang disediakan. Jika ruangan tersebut tidak mencukupi, sila gunakan kertas berasingan dan tulis nombor soalan tersebut.

☐ *Saya telah membaca lembaran peserta dan bersetuju untuk menyertai kajian ini. Saya faham bahawa dengan melengkap dan mengembalikan soal selidik ini, saya bersetuju untuk menjadi sebahagian daripada kajian ini dan data digunakan untuk tujuan seperti yang dinyatakan.*

Pertamanya, saya ingin bertanya tentang senaman yang anda lakukan

54. Semenjak temuramah kita pada tahun lepas sehingga sekarang, pernahkah anda berhenti daripada melakukan senaman?

    Ya Tidak

    Jika Ya, kenapa?

    ……..

    (Jika anda berhenti terus dari bersenam, sila ke soalan 20)

55. Berapa kerapkah anda bersenam?

    Setiap kali saya bersenam ialah selama …….. jam dan

    Saya bersenam sebanyak …….. kali seminggu

56. Adakah anda masih mengekalkan kekerapan seperti di atas?

    Ya Tidak

    Jika Tidak, kenapa?

    ……...

Sekarang saya ingin bertanya tentang tahap kesihatan anda

57. Adakah anda rasa semakin sihat semenjak tahun lepas?

    Ya Tidak

    Apa peningkatan tersebut? Jika Tidak, kenapa?

    ……... ……...

    Walaupun kesihatan tidak meningkat, anda masih bersenam, kenapa?

    ……...

Saya ingin bertanya tentang pengalaman sosial yang berkaitan dengan aktiviti senaman anda

58. Pada pandangan anda, selain daripada faedah kesihatan apakah faedah lain yang anda perolehi daripada persatuan ini?

……

……

59. Adakah anda mendapat sahabat baru melalui persatuan ini semenjak tahun lepas?

Ya Tidak

60. Adakah sokongan daripada keluarga anda terhadap rutin senaman anda berubah semenjak tahun lepas?

Ya Tidak

Jika Ya, kenapa?

……..

61. Pada pandangan anda, apakah kerugian anda sekiranya anda keluar dari persatuan ini?

……

……

Saya ingin bertanya tentang aktiviti lain yang anda lakukan

62. Selain daripada bersenam, adakah anda menyertai aktiviti lain anjuran persatuan ini?

Ya Tidak

Jika Ya, apakah aktiviti tersebut?

……..

63. Sekiranya persatuan ini menghentikan semua aktiviti yang bukan berbentuk senaman seperti lawatan, adakah anda akan kekal bersama persatuan ini?

Ya Tidak

Kenapa? Kenapa?

……... ……...

Saya ingin bertanya tentang perasaan anda terhadap persatuan ini?

64. Apakah perasaan atau pandangan anda terhadap persatuan ini sekarang?

……

……

65. Pernahkah anda menerima komen dari kawan-kawan berkaitan aktiviti senaman anda, sama ada komen positif atau negatif?

    Ya Tidak

    Jika Ya, apa komen tersebut?

    ……..

Saya ingin bertanya tentang persatuan yang anda sertai ini

66. Fikirkan tentang kos yang anda perlu belanjakan untuk bersenam (termasuk yuran, pakaian, alatan, kos pengangkutan dsb), adakah anda rasa ia berpatutan?

    Ya Tidak

    Kenapa? Kenapa?

    …….. ……..

67. Sekiranya pihak kerajaan seperti Kementerian Kesihatan Malaysia berhenti daripada memberi bantuan kewangan atau peralatan kepada persatuan ini, adakah ia memberi kesan kepada aktiviti senaman anda?

    Ya Tidak

    Kenapa? Kenapa?

    …….. ……..

68. Adakah anda berpandangan persatuan ini perlu berubah dan diperbaiki lagi? Jika Ya apa perubahan tersebut?

    ……

    ……

69. Adakah anda ingin menjadi seperti instruktor anda dari segi senaman dan kecergasan?

    Ya Tidak

    Kenapa? Kenapa?

    …….. ……..

Akhirnya saya ingin bertanya tentang isu lain berkaitan aktiviti senaman anda

70. Pada pandangan anda, adakah kemudahan senaman yang ada mencukupi untuk persatuan anda?

    Ya Tidak

Kenapa?

. ……..

71. Pada pandangan anda, apakah halangan-halangan yang anda tempuhi untuk bersenam?

……

……

72. Pada pandangan anda, bagaimana Kementerian Kesihatan Malaysia boleh membantu lagi persatuan ini?

……

……

73. Kenapa anda berhenti terus daripada bersenam?

……

……

21 ……
(diisi sekiranya berkaitan)

Terima kasih di atas kerjasama anda!

Appendix 12 – Topic list for elicitation study

Questions during the elicitation study

We are conducting a study of participation in physical activity among Malaysian. We are interested in the reasons why Malaysian do or do not participate in physical activity. We would appreciate your responses to the questions about these issues. There are no right or wrong answer. Please tell us what you really think.

- What do you believe are the advantages of physical activity?
- What do you believe are the disadvantages of physical activity?
- Is there anything else you associate with your own views about physical activity?

- Are there any individual or groups who would approve of your participation in physical activity?
- Are the any individual or groups who would disapprove of your participation in physical activity?
- Is there anything else you associate with other people's view about physical activity?

- What factors or circumstances would enable you to participate in physical activity?
- What factors or circumstances would make it difficult or impossible for you to participate in physical activity?
- Are there any other issues that come to mind when you think about physical activity?

Appendix 13 – Email to participants

To:

Cc:

Subject: Invitation to Participate in a Study

Dear All,

I'm writing to invite you to participate in a focus group discussion / interview. The study is to find out people belief about physical activity and quality of life. Please find Participant Information Sheet and Consent Form attached herewith. If you would like to participate in this study, please reply to this email. You will be advised on the date, time and place of the focus group discussion/interview.

Should you have any queries pertaining to this study, please contact me and I would be happy to attend to them.

Thank you.

Kheng Ban, Ng
LJMU

Appendix 14 – Participant Information Sheet (elicitation study)

LIVERPOOL JOHN MOORES UNIVERSITY
PARTICIPANT INFORMATION SHEET

Elicitation Study - FGD

Physical Activity and Quality of Life: An Analysis Using Theory of Planned Behaviour

Kheng Ban, Ng
School of Natural Science and Psychology

You are being invited to take part in a research study. Before you decide it is important that you understand why the research is being done and what it involves. Please take time to read the following information. Ask us if there is anything that is not clear or if you would like more information.

What is the purpose of the study?

The overall research proposes to evaluate how people belief and attitude influence their behaviour and well-being following an intervention to increase physical activity in a Malaysian population. This is designed to develop the items for a questionnaire to measure these beliefs. It is aim to understand what makes you participate in physical activity and does not.

Do I have to take part?

No. It is up to you to decide whether or not to take part. If you do you will be given this information sheet and asked to sign a consent form. You are still free to withdraw at any time and without giving a reason.

What will happen to me if I take part?

If you choose to take part you will be asked to fill a consent form and take part in a focus group discussion with approximately 8 - 10 other participants.

The focus group discussion will last about 1 ½ hour and you will be ask about your feeling and belief pertaining to physical activity. There are no right or wrong answer to any questions. Your input will be recorded, analysed and stored securely. The result will help the researcher in developing a questionnaire and be written as part of MPhil/PhD dissertation and may or may not become available in the public domain.

Are there any risks / benefits involved?

There are no risk associated with this study but should you find the question to be sensitive or make you feel uncomfortable, you are free not answer them.

Will my taking part in the study be kept confidential?

Yes, data will be anonymised and the responses you give will only be seen by the researcher and will remain completely confidential. Your responses will stored securely and will be destroyed after 1 year.

Contact Details of Researcher

If you have any further questions relating to this study, please feel free to contact the researcher. Given below are the appropriate contact details:

email: K.B.Ng@2011.ljmu.ac.uk **telephone : 075535 35568**

Supervisor Detail

Dr. Helen Poole **email: H.M.Poole@ljmu.ac.uk**
School of Natural Science & Psychology

Note: A copy of the participant information sheet should be retained by the participant with a copy of the signed consent form.

Appendix 15 – Consent Form (elicitation study)

LIVERPOOL JOHN MOORES UNIVERSITY

Physical Activity and Quality of Life: An Analysis Using Theory of Planned Behaviour

Kheng Ban, Ng
School of Natural Science and Psychology

7. I confirm that I have read and understand the information provided for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily ☐

8. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and that this will not affect my legal rights. ☐

9. I understand that any personal information collected during the study will be anonymised and remain confidential ☐

10. I agree to take part in the above study *(if appropriate please specify the type of study or particular intervention you are seeking consent for – eg focus group, interview, training programme)* ☐

For studies involving the use of audio / video recording of interviews, focus groups etc or where there is a possibility that verbatim quotes from participants may be used in future publications or presentations please include the following:

11. I understand that the interview/focus group will be audio / video recorded and I am happy to proceed ☐

12. I understand that parts of our conversation may be used verbatim in future publications or presentations but that such quotes will be anonymised. ☐

Name of Participant	Date	Signature
Name of Researcher	Date	Signature
Name of Person taking consent	Date	Signature

(if different from researcher)
Note: When completed 1 copy for participant and 1 copy for researcher

Appendix 16 - Scoring Key for TPB questionnaire

Questions number	Response format	Items requiring reverse score	Items requiring internal consistency analysis	Items requiring multiplication	Construct measured
2.1 to 2.4	1 to 7	-	2.1, 2.2, 2.3, 2.4	-	Generalised Intention
2.5 (a) to 2.5 (f)	1 to 7	2.5 (c), (d), (f)	2.5 (a), (b), (c)*, (d)*, (e), (f)*	-	Attitude, direct measure
2.6 to 2.12	1 to 7	-	-	(2.6 x 2.13) (2.7 x 2.14) (2.8 x 2.15) (2.9 x 2.16) (2.10 X 2.17) (2.11 x 2.18) (2.12 x 2.19)	Behavioural beliefs
2.13 to 2.19	-3 to +3	-	-		Outcome evaluation
2.20 to 2.23	1 to 7	2.21	2.20, 2.21*, 2.22, 2.23	-	PBC, direct measure
2.24 to 2.32	1 to 7	-	-	(2.24 x 2.33) (2.25 x 2.34) (2.26 x 2.35) (2.27 x 2.36) (2.28 x 2.37) (2.29 x 2.38) (2.30 x 2.39) (2.31 x 2.40) (2.32 x 2.41)	Control beliefs
2.33 to 2.41	-3 to +3	-	-		Control beliefs power
2.42 to 2.45	1 to 7	2.42	2.42*, 2.43, 2.44, 2.45	-	Subjective norms, direct measure
2.46 to 2.48	-3 to +3	-	-	(2.46 x 2.49) (2.47 x 2.50) (2.48 x 2.51)	Normative beliefs
2.49 to 2.51	1 to 7	-	-		Motivation to comply
2.52 to 2.54	-3 to +3	-	-	(2.52 x 2.55) (2.53 x 2.56) (2.54 x 2.57)	Normative beliefs (friend)
2.55 to 2.57	1 to 7	-	-		Motivation to comply (friend)

* after re-coding negative endpoints

Appendix 17 – Consent Form (questionnaire validation)

Ministry of Health Malaysia

Health Promotion Board Malaysia

LIVERPOOL JOHN MOORES UNIVERSITY

CONSENT FORM

(Interview)

1. I confirm that I have read and understand the information provided for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving a reason and that this will not affect my legal rights. ☐

3. I understand that any personal information collected during the study will be anonymised and remain confidential ☐

4. I agree to take part in this study ☐

5. I understand that the interview will be audio recorded and I am happy to proceed ☐

6. I understand that parts of our conversation may be used verbatim in future publications or presentations but that such quotes will be anonymised. ☐

Name of Participant Date Signature

Name of Researcher Date Signature

Appendix 18 – Participant Information Sheet (questionnaire validation)

LIVERPOOL JOHN MOORES UNIVERSITY

PARTICIPANT INFORMATION SHEET

Questionnaire Validation

Physical Activity and Quality of Life: An Analysis Using Theory of Planned Behaviour

Kheng Ban, Ng
School of Natural Science and Psychology

You are being invited to take part in a research study. Before you decide it is important that you understand why the research is being done and what it involves. Please take time to read the following information. Ask us if there is anything that is not clear or if you would like more information.

What is the purpose of the study?

The overall research proposes to evaluate how people belief and attitude influence their behaviour and well-being following an intervention to increase physical activity in a Malaysian population. This is designed to develop the items for a questionnaire to measure these beliefs. It is aim to understand what makes you participate in physical activity and does not.

Do I have to take part?

No. It is up to you to decide whether or not to take part. If you do you will be given this information sheet and asked to sign a consent form. You are still free to withdraw at any time and without giving a reason.

What will happen to me if I take part?

If you choose to take part you will be asked to fill a consent form and a set of questionnaire comprising of 45 questions.

The process will last about 45 minutes and you will be ask about your feeling and belief pertaining to physical activity. Your input will be analysed and stored securely. The result will help the researcher in developing a questionnaire and be written as part of MPhil/PhD dissertation and may or may not become available in the public domain.

Are there any risks / benefits involved?

There are no risk associated with this study but should you find the question to be sensitive or make you feel uncomfortable, you are free not answer them.

Will my taking part in the study be kept confidential?

Yes, data will be anonymised and the responses you give will only be seen by the researcher and will remain completely confidential. Your responses will stored securely and will be destroyed after 1 year.

Contact Details of Researcher

If you have any further questions relating to this study, please feel free to contact the researcher. Given below are the appropriate contact details:

Email: K.B.Ng@2011.ljmu.ac.uk **Telephone : 075535 35568**

Supervisor Detail

Dr. Helen Poole **email: H.M.Poole@ljmu.ac.uk**
School of Natural Science & Psychology

Note: A copy of the participant information sheet should be retained by the participant with a copy of the signed consent form.

Appendix 19 - Rotated Factor Matrix with Principal Axis Factoring of four factors solution of TPB questionnaire

Item / variables	Rotated Factor Loading				Communalities
	1	2	3	4	
2.3 – I plan to be sufficiently active (GI)	**.768**	.112	.121	-.091	.625
2.2 – I intend to be sufficiently active (GI)	**.748**	.229	.042	-.050	.617
2.4 – I expect to be sufficiently active (GI)	**.743**	.217	-.031	-.080	.607
2.1 – I will be sufficiently active (GI)	**.743**	.219	.063	-.006	.604
2.5a – Being active difficult – easy (AttDM)	**.715**	.202	.064	-.004	.556
2.5d – Being active pleasant – unpleasant (AttDM)	**.660**	.049	.086	.044	.447
2.5f – Being active enjoy – un-enjoyable (AttDM)	**.526**	.198	-.067	.092	.329
2.5b – Being active harmful – beneficial (AttDM)	**.492**	.018	.399	-.069	.406
2.5c – Being active good – bad (AttDM)	**.440**	-.075	.411	.046	.370
2.21 – To do is easy-difficult (PBCDM)	**.423**	.240	-.016	**.333**	.348
2.29 x 2.38 – I don't have time (PBCIM)	**.398**	.291	-.155	-.201	.307
2.47 x 2.50 – Important people approve me (SNIM)	.105	**.791**	-.075	.067	.647
2.46 x 2.49 – Important people think (SNIM)	.160	**.762**	.117	-.026	.621
2.52 x 2.55 – My friends think (SNIM)	.097	**.575**	-.222	-.008	.389
2.9 x 2.16 – I get better body (AttIM)	.183	**.563**	.399	-.026	.510
2.53 x 2.56 – My friends would approve (SNIM)	.062	**.552**	-.273	-.077	.389

2.48 x 2.51 – I see people do (SNIM)	.166	**.526**	-.157	-.102	.339
2.43 – I'm expected to do (SNDM)	.203	**.511**	.071	.126	.323
2.32 x 2.41 – I prefer to do with friends (PBCIM)	.090	**.476**	.069	.049	.242
2.20 – I could do if I want to (PBCDM)	.215	**.461**	.366	.100	.402
2.6 x 2.13 – I feel fresh (AttIM)	.203	**.458**	**.353**	.027	.376
2.30 x 2.39 – I prefer structured programme (PBCIM)	.015	**.433**	.184	-.046	.224
2.54 x 2.57 – I see my friends (SNIM)	.323	**.398**	-.070	-.014	.267
2.11 x 2.18 – I will be sweaty (AttIM)	.106	**.356**	-.021	.125	.154
2.45 – People important to me want me to do (SNDM)	.122	**.325**	-.026	-.138	.140
2.42 – Most important people think (SNDM)	.076	**.308**	.261	.116	.182
2.8 x 2.15 – I will get fitter (AttIM)	.056	.507	**.614**	.050	.640
2.22 – To do is beyond me (PBCDM)	-.080	-.089	**.556**	**.347**	.444
2.23 – To do or not is up to me (PBCDM)	.017	-.199	**.537**	-.288	.411
2.5e – Being active worthless – useful (AttDM)	**.497**	.117	**.520**	-.036	.553
2.7 x 2.14 – Make me healthier (AttIM)	.039	.281	**.484**	.038	.316
2.12 x 2.19 – I will be smelly (AttIM)	.130	.130	**-.479**	.011	.264
2.10 x 2.17 – I will be prone to injury (AttIM)	-.182	-.015	**-.411**	.079	.208
2.25 x 2.34 – My works prevent me (PBC)	.085	.229	-.076	**.655**	.494
2.44 – I feel under pressure (SN)	-.026	.062	.179	**.648**	.457
2.24 x 2.33 – Hot weather (PBC)	.151	.143	-.326	**.583**	.490
2.26 x 2.35 – Criminal activity (PBC)	.059	.101	-.171	**.552**	.348
2.31 x 2.40 – I do for gifts/material reward (PBC)	.088	.172	-.234	**-.497**	.339

2.27 x 2.36 – Costly to me (PBC)	.067	.123	-.013	**-.413**	.190
2.28 x 2.37 – My family responsibility	.261	.167	-.034	**-.377**	.240

Appendix 20 - Outliers and action taken

ID number	Variables name	5% trimmed mean value	Mean value	Action taken on outliers
6, 14, 22, 34, 44, 104, 64, 159, 554, 161	Time 1 Generalised Intention	21.42	21.22	Retain value
8	Time 2 Attitude direct measure	32.82	32.66	Retain value
54, 72, 47, 63	Time 3 Generalised Intention	17.89	18.04	Retain value
158, 54, 58, 63, 73	Time 4 Generalised Intention	19.72	19.87	Retain value
128, 163, 13, 137	Time 4 Attitude direct measure	33.68	33.65	Retain value
164, 63, 58, 34	Time 1 Physical health	13.95	14.02	Retain value
164, 4, 58	Time 1 Psychological	14.28	14.33	Retain value
4, 3, 63	Time 1 Environment	13.83	13.88	Retain value
63	Time 2 Physical Health	14.32	14.37	Retain value
112, 2, 4, 63, 164	Time 2 Psychological	14.08	14.16	Retain value
63, 4, 28	Time 2 Environment	13.78	13.88	Retain value
63	Time 3 Physical health	13.90	14.00	Retain value
4, 164, 63, 143, 14	Time 3 Psychological	13.72	13.86	Retain value
164, 63, 27, 58	Time 3 Social relationship	13.96	14.12	Retain value

4, 63, 54, 14, 46	Time 3 Environment	13.35	13.52	Retain value
163, 63, 13, 58, 52, 2	Time 4 Physical health	13.97	14.14	Retain value
54, 2, 58, 52	Time 4 Psychological	13.69	13.90	Retain value
54, 13, 7, 52, 63	Time 4 Environment	13.03	13.22	Retain value
69, 70, 159, 409, 556, 416, 313, 45, 501, 46	Time 1 Situational	30.78	30.59	Retain value
63, 418, 45, 556, 403	Time 1 Competing demand	27.92	27.76	Retain value
63	Time 1 Internal feeling	35.25	35.28	Retain value
159, 63, 58	Time 3 Situational	24.04	24.55	Retain value
159	Time 3 Internal feeling	29.34	29.75	Retain value
159, 58, 63	Time 4 Situational	25.32	25.97	Retain value
159, 63, 2	Time 4 Internal feeling	30.77	31.39	Retain value

The outlier were checked through the boxplot and the 5% trimmed mean value and mean value of the variables were then checked against each other. It was discovered that the differences were small and as such the outliers detected would not have huge impact on the overall result of any following analysis. As such it was decided that it was not necessary to replace the value of the outliers and the original values given by the participants were retained.

Appendix 21 - Maximum and minimum values of z-score for variables

	Variables	Time 1		Time 2		Time 3		Time 4	
		Max	**Min**	**Max**	**Min**	**Max**	**Min**	**Max**	**Min**
TPB	Generalised Intention	1.69	-3.29	1.96	-2.55	2.25	-1.82	2.44	-2.97
	Attitude direct measure	1.71	-2.64	3.01	-1.51	1.95	-2.23	2.05	-2.37
	PBC direct measure	1.94	-2.52	2.06	-2.05	2.43	-1.58	2.36	-1.32
	SN direct measure	1.477	2.01	1.64	-1.97	2.07	-2.21	2.19	-2.12
QOL	Physical health	3.07	-2.22	2.92	-2.41	3.10	-1.92	2.95	-1.07
	Psychological	3.14	-2.40	2.94	-2.36	3.16	-1.46	2.84	-0.88
	Social relationship	2.28	-1.83	2.50	-2.75	2.61	-1.53	2.47	-0.92
	Environment	3.13	-2.24	3.24	-2.23	3.17	-1.48	2.70	-1.17
	ESE	2.93	-2.69	2.40	-2.65	2.14	-1.80	2.36	-1.56

Appendix 22 - Outliers removed

IV	DV	Maximum Mahalanobis distance value	Maximum Cook's distance value	Critical chi-square value	Correction measure taken
Attitude, PBC & SN direct measures (T2)	Generalised Intention (T2)	26.28	0.460	16.27	ID no. 8 removed
Attitude, PBC & SN direct measures (T3)	Generalised Intention (T3)	17.46	0.382	16.27	ID no. 54 removed
Attitude, PBC , SN direct measures, Situational, Competing demands & Internal feeling (T2)	Generalised Intention (T2)	29.87	2.91	22.46	ID no. 8 removed
Attitude, PBC , SN direct measures, Situational, Competing demands & Internal feeling (T3)	Generalised Intention (T3)	19.11	1.22	22.46	ID no. 54 removed
Attitude, PBC , SN direct measures, Situational, Competing demands & Internal feeling (T4)	Generalised Intention (T4)	26.19	11.30, 1.92, 1.29, 1.13, 3.65	22.46	ID no. 163,158, 3, 72, 48, 2 removed

Appendix 23 – WHO Quality of Life inputted measures

WHO QOL inputted measures *(Replaced value for WHO QOL-Bref Item from Time 1 - Time 4)*

Time point	ID No.	Item No.	Value replaced
Time 1 (n=244)	538	QOL 21	3
Time 2 (n=134)	45	QOL 6	3
	60	QOL 21	2
	84	QOL21	2
	85	QOL 21	2
	154	QOL 21	2
	8	QOL 25	3
	84	QOL 21	2
	85	QOL 21	2
Time 3 (n=119)	23	QOL 6	3
	43	QOL 21	2
	26	QOL 26	3
	59	QOL 4	4
	12	QOL 6	3
	51	QOL 16	3
	47	QOL 21	3
	60	QOL 21	2
	63	QOL 21	3
	154	QOL 21	3
Time 4 (n=105)	98	QOL 6	3
	96	QOL 7	3
	157	QOL 12	4
	131	QOL 14	3
	112	QOL15	3
	158	QOL 18	3
	47	QOL 21	3
	304	QOL 21	3
	129	QOL 25	3

Appendix 24 - Skewness and Kurtosis table

Variables	Time 1 (n=244)				Time 2 (n=134)				Time 3 (n=119)				Time 4 (n=105)			
	skewness	Zs	kurtosis	Zk	skewness	Zs	kurtosis	Zk	skewness	Zs	kurtosis	Zk	skewness	Zs	kurtosis	Zk
Generalised intention	-.763	4.83	.879	2.81	.038	0.18	-.503	1.19	.720	3.21	.106	0.236	.846	3.54	1.141	2.38
Attitude	-.468	-2.96	-.029	0.09	-.528	2.49	-.569	1.35	.129	0.58	-.631	1.41	.187	0.78	.419	0.87
PBC	-.042	-0.27	.802	2.56	.014	0.07	-.507	1.20	.732	3.23	-.025	0.06	.828	3.46	.080	0.17
Subjective Norms	.154	0.97	-.826	2.64	.047	0.22	-1.14	2.70	.432	1.93	-.474	1.06	.375	1.57	.015	0.03
Physical Health	.552	3.49	.080	0.26	.493	2.33	.311	0.74	.729	3.25	-.158	0.35	1.285	5.38	.980	2.05
Psychological	.379	2.40	-.209	0.67	.752	3.55	.412	0.97	1.273	5.68	.776	1.73	1.422	5.95	.998	2.08
Social Relationship	.169	1.07	-.696	2.22	.342	1.61	.477	1.13	.946	4.22	.335	0.75	1.097	4.59	.306	0.64
Environment	.363	2.30	.103	0.33	.970	4.58	1.048	2.48	1.326	5.92	1.091	2.43	1.253	5.42	.476	0.99
ESE	-.136	-.59	.883	2.82	.159	.468	.427	0.64	-.187	.55	-.156	-.23	.998	2.64	.741	.58

$Zs = \frac{\text{Skew value}}{SE_{\text{skewness}}}$ $Zk = \frac{\text{Excess Kurtosis}}{SE_{\text{excess kurtosis}}}$

Appendix 25 - Pearson's r correlation tables

Pearson's r correlation between all measures at Time 1 (n=244)

	Variables	TPB							ESE	QOL				
		Generalised intention	Attitude direct measure	PBC direct measure	SN direct measure	Attitude indirect measure	PBC indirect measure	SN indirect measure	Exercise Self-efficacy	Physical health	Psychological	Social relationship	Environment	Overall health
TPB	Generalised Intention	1	.65**	.15*	.21**	.26**	.28**	.35**	.27**	.16**	.15*	.06	.33**	.21**
	Attitude direct measure		1	.29**	.28**	.16*	.20**	.26**	.16	.26**	.20**	.13*	.30**	.16*
	PBC direct measure			1	.23**	.03	.06	-.06	.14	.36**	.40**	.20**	.18**	.16*
	SN direct measure				1	.20**	.29**	.41**	.02	.29**	.40**	.33**	.35**	.37**
	Attitude Indirect measure					1	.32**	.35**	-.01	.15*	.16	.16	.38**	.19**
	PBC Indirect measure						1	.41**	.15	.00	.03	.03	.27**	.15*
	SN Indirect measure							1	.10	.10**	.15*	.14*	.32**	.28**
	Exercise Self-efficacy								1	.29*	.31**	.35	.41**	.32**
QOL	Physical Health									1	.76**	.66**	.64**	.53**
	Psychological										1	.66**	.67**	.69**
	Social relationship											1	.61**	.61**
	Environment												1	.61**
	Overall health													1

** Correlation is significant at 0.01 level (2-tailed) * correlation is significant at 0.05 level (2-tailed)

Pearson's r correlation between all measures at Time 2 (n=134)

	Variables	TPB							ESE	QOL				
		Generalised intention	Attitude direct measure	PBC direct measure	SN direct measure	Attitude indirect measure	PBC indirect measure	SN indirect measure	Exercise Self-efficacy	Physical health	Psychological	Social relationship	Environment	Overall health
TPB	Generalised Intention	1	.61**	.52**	.52**	.46**	.27**	.45**	.73**	.467**	.465**	.347**	.561**	.448**
	Attitude direct measure		1	.64**	.66**	.57**	.28**	.44**	.474**	.471**	.504**	.237**	.467**	.423**
	PBC direct measure			1	.56**	.60**	.21*	.32**	.572**	.477**	.478**	.119	.377**	.194*
	SN direct measure				1	.53**	.35**	.69**	.585**	.537**	.540**	.381**	.531**	.338**
	Attitude Indirect measure					1	.38**	.54**	.463**	.440**	.437**	.188*	.400**	.369**
	PBC Indirect measure						1	.39**	.172*	.252**	.329**	.212*	.244**	.293**
	SN Indirect measure							1	.516**	.446**	.542**	.461**	.532**	.488**
	Exercise Self-efficacy								1	.602**	.639**	.370**	.644**	.488**
QOL	Physical Health									1	.808**	.646**	.728**	.603**
	Psychological										1	.649**	.749**	.581**
	Social relationship											1	.682**	.448**
	Environment												1	.561**
	Overall health													1

** Correlation is significant at 0.01 level (2-tailed) * correlation is significant at 0.05 level (2-tailed)

Pearson's r correlation between all measures at Time 3 (n=119)

	Variables	TPB							ESE	QOL				
		Generalised intention	Attitude direct measure	PBC direct measure	SN direct measure	Attitude indirect measure	PBC indirect measure	SN indirect measure	Exercise Self-efficacy	Physical health	Psychological	Social relationship	Environment	Overall health
TPB	Generalised Intention	1	.708**	.731**	.419**	.659**	.474**	.404**	.480**	.616**	.588**	.479**	.660**	.621**
	Attitude direct measure		1	.657**	.327**	.573**	.388**	.261**	.464**	.532**	.536**	.460**	.553**	.409**
	PBC direct measure			1	.437**	.601**	.496**	.333**	.572**	.567**	.553**	.387**	.571**	.464**
	SN direct measure				1	.568**	.442**	.626**	.433**	.444**	.530**	.504**	.519**	.443**
	Attitude Indirect measure					1	.531**	.571**	.496**	.431**	.614**	.503**	.596**	.425**
	PBC Indirect measure						1	.408**	.389**	.412**	.464**	.420**	.454**	.303**
	SN Indirect measure							1	.464**	.462**	.543**	.489**	.559**	.385**
	Exercise Self-efficacy								1	.477**	.520**	.374**	.541**	.373**
QOL	Physical Health									1	.724**	.647**	.731**	.690**
	Psychological										1	.755**	.835**	.685**
	Social relationship											1	.762**	.549**
	Environment												1	.657**
	Overall health													1

** Correlation is significant at 0.01 level (2-tailed) * correlation is significant at 0.05 level (2-tailed)

Pearson's r correlation between all measures at Time 4 (n=105)

	Variables	TPB							ESE	QOL				
		Generalised intention	Attitude direct measure	PBC direct measure	SN direct measure	Attitude indirect measure	PBC indirect measure	SN indirect measure	Exercise Self-efficacy	Physical health	Psychological	Social relationship	Environment	Overall health
TPB	Generalised Intention	1	.592**	.536**	.492**	.510**	.555**	.223*	.508**	.652**	.561**	.503**	.556**	.593**
	Attitude direct measure		1	.509**	.518**	.495**	.480**	.403**	.338**	.421**	.528**	.372**	.492**	.568**
	PBC direct measure			1	.635**	.349**	.089	.261**	.682**	.593**	.654**	.518**	.682**	.547**
	SN direct measure				1	.645**	.184	.501**	.511**	.590**	.504**	.352**	.528**	.491**
	Attitude Indirect measure					1	.509**	.690**	.344**	.519**	.484**	.349**	.500**	.459**
	PBC Indirect measure						1	.397**	.287**	.465**	.465**	.452**	.444**	.502**
	SN Indirect measure							1	.276**	.452**	.423**	.440**	.470**	.441**
	Exercise Self-efficacy								1	.719**	.708**	.595**	.670**	.563**
QOL	Physical Health									1	.844**	.772**	.848**	.799**
	Psychological										1	.817**	.897**	.836**
	Social relationship											1	.838**	.774**
	Environment												1	.805**
	Overall health													1

** Correlation is significant at 0.01 level (2-tailed) types of intensities * correlation is significant at 0.05 level (2-tailed)