Prevention of dehydration in hospital patients

Abstract

Dehydration is widely linked to increased risk of mortality in patients who are acutely unwell, and also increases the risk of further illness. Despite being recognised nationwide as a cause for concern, 45% of hospital patients will become dehydrated upon admission; suggesting more needs to be done to prevent dehydration. The use of bedside water devices allow patients to drink freely without assistance. Access to bedside water devices can reduce a patients length of stay in hospital and minimise the risk of a UTI developing, however further research is needed to fully assess the impact of such devices.

Key words: Dehydration, Avoidable harm, Acute Kidney Injury, Fluid balance, Bedside water device

Introduction

Hydration is vital for the sustenance of life; however the importance of it is often overlooked, despite the growing emphasis on tackling dehydration within hospitals (Johnstone, Alexander, and Hickey,2015). The 'Commissioning Excellent Nutrition and Hydration 2015–2018' guide highlights a major gap in information related to dehydration (NHS England, 2015). It also suggests more measures need to be implemented to reduce the prevalence of dehydration. Water is one of the basic six nutrients needed for life along side vitamins, carbohydrates, fats, proteins and minerals (NPSA , 2007). Dehydration is quantified by a 1% or greater loss of body mass due to fluid loss (Benelam and Wyness, 2010). For adults living in climates like the UK, Public Health England (2016) recommends a minimum daily water intake of 1.2 - 2.0 litres.

El-Sharkawy (2014) conducted a study into the prevalence of dehydration amongst hospital patients and found approximately 45% of patients suffered from dehydration within 48 hours of admission. In 2015, dehydration was recorded as the sole reason for 99 deaths within UK hospitals, however this does not account for the deaths in which dehydration was a contributing factor (ONS, 2017). Additionally, 33% of patients admitted from the community are dehydrated (NHS England, 2015).

Why is hydration important?

Water makes up 60% of the human body, and is the primary component of every cell (Arroyo and Schweickert, 2013). Fluid balance is carefully controlled through various homeostatic mechanisms; which become activated by any slight deficit or excess of fluid within the body (Jéquier & Constant 2010).

Dehydration has many negative effects on health and wellbeing, and also increases the risk of mortality for those suffering from an acute illness. Dehydration can significantly impact upon a patient's mental wellbeing; cognitive impairment, confusion, reduced concentration, and irritability are all common side effects of dehydration (Popkins et al, 2010). Additionally, physical health can also be affected. Dehydration can cause patients to feel fatigued, experience headaches, develop

constipation, or develop hypotension (McLafferty et al, 2014). The risk of a Urinary Tract Infection (UTI), or an Acute Kidney Injury (AKI) developing is also significantly increased (Popkins et al, 2010).

In periods of acute illness, patients are more susceptible to developing further illnesses or complications, or developing an electrolyte imbalance (McLafferty et al, 2014). Electrolytes are vital for effective cellular function, and reactions within the body (Scott, 2010). Dehydration can impair the metabolism of electrolytes within the blood stream, which in turn disturbs homeostasis within the body. Fluid homeostasis is a state of equilibrium achieved by balancing fluid intake with any fluid losses (Garrett, 2017).

Signs and Symptoms

Before a patient develops any of the effects of dehydration, many symptoms are often present, however they regularly go unnoticed.

Common signs and symptoms of dehydration are:

- Thirst
- Dry mouth
- Headache
- Dizziness

There are also several clinical signs of dehydration which indicate inadequate fluid balance levels. It is the responsibility of all health professionals to promptly identify and rectify signs of dehydration.

Clinical signs of dehydration:

- Tachycardia
- Hypotension
- Oliguria/Anuria
- Low Glasgow Coma Score (GCS)
- Dry mucosal membranes
- Reduced capillary refill time
- Electrolyte imbalance
- Abnormal blood test results
- Low central venous pressure
- Hypo-volaemia

(Source: Jéquier and Constant, 2010)

Risk factors

The Francis Report (2013) highlighted that elderly patients are more at risk from dehydration whilst in hospital; due to a range of factors such as reduced thirst

response, decline in renal function, physical weakness, or not being able to reach a drink.
It is important to remember that other groups of patients are also at a greater risk of dehydration:

- Babies and infants
- Patients with mal-absorption disorders i.e. chrons disease or ulcerative colitis
- Athletes
- Patients with long term health conditions i.e. diabetes

(Jones, 2014)

During periods of acute illness or long term chronic illness, there are a diverse range of causes for inadequate fluid intake resulting in dehydration:

- Nausea
- Vomiting
- Diarrhoea
- Haemorrhage
- Nil by mouth
- Dysphagia
- Physical weakness
- Fluids out of reach
- Diuretics
- Continence related anxiety

(Shepard, 2013)

'Older people and those who are unwell can lose their thirst response and their taste sensation. Never take it for granted that they will know when they need to drink.'
(RCN, 2007)

In 2007, the RCN surveyed 2500 working nurses in the UK and 46% of them said they felt too understaffed to ensure patients had adequate amounts of hydration and nutrition throughout their hospital stay; this issue remains a current factor in the provision of patient care (Johnstone, Alexander, and Hickey, 2015).

The Francis Report (2013) also recognised a link between staffing levels and patient hydration. It highlighted how the risk of patient dehydration increased in areas of inadequate staffing levels. Aside from providing assistance and encouragement, it is also the responsibility of the nursing staff to ensure all at risk patients have their fluid input and output accurately documented, and any risk factors are identified promptly (Campbell, 2014).

<u>Effects of dehydration</u>

In addition to the effects previously mentioned, dehydration also impacts upon patient prognosis, the risk of developing an AKI, the number of bed days patients spend in hospital, and also impacts financially upon the NHS.

El-Sharkawy et al (2015) conducted a study into the link between dehydration and mortality rates, and found that patients are 6 times more likely to die in hospital if they suffer from dehydration; these findings replicated data from an earlier study by Warren et al (1991). This reinforces the need for swift identification of at risk patients, and the need for appropriate measures to be implemented to prevent dehydration occurring (El –Sharkawy et al, 2015).

Dehydration is closely linked to the development of Acute Kidney Injury (AKI) and approximately 25% of all patients who develop hospital acquired dehydration, will also develop an AKI (El-Sharkawy, 2015). Acute kidney injury is a disruption to the normal kidney function which occurs quickly and is usually reversible. It results in patients becoming oliguric; a urine output of less than 1ml/kg/hour, and then anuric; passing no urine (Scott, 2010).

There are 3 causes of acute kidney injury, all of which are reversible if identified and treated promptly; pre-renal, intra-renal and post-renal (Scott, 2010). Pre-renal is a result of a lack of blood supply to the kidneys i.e. through hypovolaemia, trauma, sepsis or cardiovascular disorders (Dirkes, 2016). Intra-renal is due to damage to the kidneys themselves through causes such as nephrotoxins, trauma, non steroidal anti inflammatory drugs, or ischemia due to poor perfusion (Dirkes, 2016).Post renal is a result of obstruction to the flow of urine from the bladder i.e. benign prostatic hyperplasia, urethral obstruction or trauma (Scott, 2010). Through prompt treatment of dehydration and other avoidable causes of AKI, 12 000 deaths could be prevented annually (NCEPOD, 2009).

Dehydration also impacts upon patient's length of stay in hospital and causes excess costs to the NHS. The length of stay for patients with hospital acquired dehydration increases on average by three days, and also puts the patient at a greater risk of a failed discharge (Guest et al, 2011). Malnutrition is estimated to cost the NHS in excess of £19 billion annually (BAPEN, 2015); however NICE (2011) demonstrates that early detection and treatment of dehydration reduces patients' length of stay and substantial savings for the NHS is achievable. As part of The Five Year Forward View, NHS England is aiming to make savings of £22 billion by the year 2020 (NHS England, 2016).

Fluid balance monitoring

Fluid balance is the careful balance of fluids within the body via input and output, to maintain a state of homeostasis thus allowing effective metabolic processes to occur (Welch, 2010). The primary method of measuring fluid balance within hospitals is implementing a fluid balance chart (FBC). A FBC documents all fluid intake and output over a 24 hour period; including oral fluids, intravenous fluids, and also vomiting, wound loss and bowel movements. Doherty et al (1965) first identified the importance of using a FBC over 50 years ago; and the use of them are still supported in the present day (McGloin, 2015). Shepherd (2011) describes how

clinical areas to also use daily and weekly body weights as another tool to assess fluid balance.

When completed accurately, FBC's are indicative of adequate fluid balance, fluid overload or fluid deficit, and they also help in recognising deterioration promptly (McGloin, 2015). It is essential all amounts of fluid should be quantified in millilitres to allow for precise measurement and all staff need to be aware of the capacity of different containers I.e., cups, beakers, and glasses (Smith and Roberts, 2011).Tang and Lee (2010) recognise the importance of documenting fluid balance in acutely ill patients, however they also argue that many FBC's are completed inaccurately due to staff shortages, staff workload and lack of training. Inaccurate completion can lead to misdiagnosis, failure to recognise deterioration, and also consequences for nursing staff as the NMC (2015) state such factors are no excuse for inadequate record keeping.

Bedside water devices

Bedside water devices (BWD) are typically hands free water bottles produced in the aim of promoting patient independence and making it easier for patients to drink freely if they usually require assistance (Sutton and Stroud, 2013). They are designed to be clipped to a patient's bed, chair or wheelchair, and are similar to sports style water bottles. BWD's allow patients to drink via a long, flexible hose using a sucking motion; similar to drinking via a straw however the mouth piece is specifically designed to only allow fluids to flow up and out (Sutton and Stroud, 2013).

It is vital to remember that BWD's are not suitable for every patient, and prior to implementation patients should undergo a thorough assessment to identify if they are suitable to use the BWD.

The target audience of BWD's are patients who:

- Lack the physical ability to lift a jug of water and a glass or beaker
- Require assistance with ambulation and mobilisation
- Require intravenous fluids as a result of dehydration
- Immobile post surgery
- Have full capacity and able to recognise the thirst response
- Can swallow safely, have a good seal and suction, and have no signs of dysphagia

(Sutton and Stroud, 2013)

Despite being used in some healthcare environments, there is limited research available on the effectiveness of such devices (Sutton and Stroud, 2013). Data published by Braid and Smith (2012) suggests patient's length of stay can be reduced by up to 20% through the implementation of BWD's, and further research published by Sutton and Stroud (2013) indicate there is a general consensus across NHS Trusts that BWD's significantly improve patient hydration, and fluid balance monitoring has become easier for staff.

Using BWD's have financial implications for the NHS; however ordering drinking system's through the NHS Supply Chain offers a reduced price in comparison to ordering it as a member of the general public (Braid and Smith, 2012). In 2012, the published cost for a BWD and drinking tube was £5.92 and replacement drinking tubes were £1.32 (Braid and Smith, 2012). The drinking tubes are single patient use and require changing every day to minimise the risk of infection, however the bottle can be washed alongside other ward utensils in the ward dishwasher, and this has cost implications for the NHS (Evans, 2014). It is well publicised the increased pressure on the NHS to save money and reduce outgoing costs (BMA, 2016).

The use of BWD's is widely supported by the multi disciplinary team (MDT), including nurses, occupational therapists, catering staff, speech and language therapists, and also infection control (Evans, 2014). Research by Braid and Smith (2012) suggests that over 95% of staff members believe patients benefit from BWD's, and patient independence is promoted whilst also reassuring relatives that patients' hydration needs are being met. However, concerns have been voiced that drinking devices are only suitable for patients with full capacity who understand how to use the system (Wakeling, 2011). Further research carried out by Beaney and McKenna (2013) supports the findings of Braid and Smith (2012) in terms of how to use the system and its compliance.

Despite the level of support from staff members, the feedback received from patients included in the trials varies. In a study carried out by Braid and Smith (2012), over 80% of patients found the BWD's easy and beneficial to use, and 3 in 4 patients would consider using them once discharged. The patient group examined were those on a care of the elderly ward. In comparison to this, approximately 20% of patients found using BWD's unpleasant as the drinking tube has a plastic taste, and also several patients struggled to use the drinking straw if they had no bottom teeth (Beaney and McKenna, 2013)- this was on a wide variety of patient groups, including maternity, care of the elderly, orthopaedics and trauma. One patient reported feeling 'like a rabbit in a hutch' and felt embarrassed by not using a regular cup. However, despite the criticisms Evans (2014) believes patient dignity is promoted as patients are more independent, and in control of their hydration requirements.

Research by Braid and Smith (2012) suggested a reduction in the length of stay (LoS) time for patients, and also a reduction in the number of patients developing a UTI. Previously the average LoS for patients was 15.8 days, however this significantly decreased to 9.9 days for patients using BWD's, and there was also a 20% reduction in the number of patients diagnosed with a UTI (Braid and Smith, 2012). However, they also recognise there had been a recent focus on improving patient hydration through staff and patient education, so this may have attributed to the reduction in LoS and UTI's.

The results of Braid and Smiths (2012) study are replicated by research undertaken by Beaney and McKenna (2013) and they also mirror previous research by Wakeling (2011). Beaney and McKenna (2013) found patients LoS reduced by 9% and the

number of patients diagnosed with a UTI reduced by 10%. A reduction in the number of antibiotics used was also noted. 55% less Nitrofurantoin and 3% less Trimethoprim was prescribed and administered to patients; this had an annual cost saving for the trust of approximately £320 (Beaney and McKenna, 2013).

Braid and Smith (2012) suggest further research and analysis into BWD's is needed to gain an accurate representation of the impact BWD's have on patients.

Recommendations

Aside from using equipment such as BWD's to promote hydration, the traditional method of a water jug and glass is important, as is individual patient assessment.

It is common practice within hospital that all patients have a water jug and glass or beaker next to their bed; this is to allow and encourage patients to freely pour themselves a drink (Lecko, 2013). The water jugs used within hospitals often have a mixed review; whilst they help patients to feel independent and in control of their own hydration, many patients report that they are difficult to pour from without spilling and the lid frequently falls off (Johnstone, Alexander, and Hickey, 2015). It is important to remember that water at a patient's bedside does not equate to good hydration. There are several factors which could inhibit a patient's ability to effectively use the jug and glass (Johnstone, Alexander, and Hickey, 2015). Patients may not have the physical ability and strength to lift the jug, the jug may be out of reach, or the patients thirst response may have declined. It is vital that jugs are regularly refilled with fresh water, and put within reach of the patient, and also assistance is offered to patients who require it (Lecko, 2013).

Additionally, on admission to hospital all patients should undergo an assessment to address nutritional requirements, this can be used in conjunction in a holistic assessment to understand a patients fluid balance and nutritional status, as fluid balance and nutritional status often go hand in hand. A recognised tool to use is the Malnutrition Universal Screening Tool (MUST) (BAPEN, 2015), however MUST only examines nutritional status and not hydration status. MUST was launched in 2003 by the Malnutrition Advisory Group, and it is reported to be the most widely used malnutrition screening tool (BAPEN, 2015). It focuses upon patients weight, and any unplanned losses, eating and drinking habits, and also if there is likely to be no nutritional intake for more than 5 days MUST helps to identify current or potential problems that could impair a patient's ability to eat and drink; thus allowing appropriate measures to be put in place to assist patients (Bloomfield and Pegram, 2012). Patients should be regularly reassessed to promptly identify any changes in their condition, usually on a weekly basis or as their condition dictates (Bloomfield and Pegram, 2012).

Conclusion

Adequate hydration is essential to the maintenance of good health and recovery; however 45% of patients will develop dehydration during their admission into hospital. There are many indicators that a patient is becoming dehydrated and prompt identification and treatment is essential to recovery. Patients with long term health conditions, mal absorption disorders, infants and babies, and the elderly are more susceptible to developing this avoidable condition; and appropriate measures should be implemented to minimise the risk. Aside from the physical effects dehydration has on patients, it also has cost implications for the NHS. Bedside Water Device's help to promote independence and encourage patients to drink, and are widely supported by the MDT. Despite being well publicised, dehydration still remains an issue within healthcare.

Key Points

- Public Health England recommends a daily water intake of 1.2 – 2.0 litres
- In 2015, dehydration was responsible for 99 deaths within UK hospitals
- Many nurses feel hospital wards are too understaffed to meet patients' hydration needs
- Using Bedside Water Device's can have a positive impact on improving patient hydration

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