

## Research Article

# Hydration: Knowledge, Attitudes, and Practices of UK Dietitians

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*Aim.* The aim of this study was to investigate dietitians' knowledge, attitudes, and practices (KAP) regarding hydration and patient care. *Methods.* A cross-sectional online survey was administered to UK dietitians via the British Dietetic Association monthly newsletter and included 18 items on hydration knowledge ( $n = 8$ ), attitudes ( $n = 4$ ), and practices ( $n = 6$ ). KAP scores were calculated by adding the total number of correct knowledge responses and by ranking attitude and practice responses on a Likert scale. *Results.* 97 dietitians completed the online survey and displayed varying levels of KAP regarding hydration and patient care. The mean unweighted scores were knowledge 5.0 ( $\pm 1.3$ ) out of 8; attitude 13.9 ( $\pm 1.3$ ) out of 16; practice 14.9 ( $\pm 2.6$ ) out of 24. Dietitians appeared to be guided by clinical reasoning and priorities for nutrition care. *Conclusions.* There may be scope to further assess and potentially enhance the KAP of dietitians regarding hydration and patient care. Innovative approaches to hydration promotion are warranted and may include focusing on dietitians' personal hydration status, increasing communication with other healthcare professionals, and partnering with patients to take a proactive role in hydration monitoring.

## 1. Introduction

Hydration is a recognised determinant of health status for all population groups [1]. Mild dehydration can have negative health effects such as impaired physical function and cognitive decline [2]. There is limited understanding of the extent to which the hydration status of population groups increases health-related costs. There is, however, a growing evidence base of the use of health economics models for specific disease modalities [3, 4]. Dehydration is recognized as a component of malnutrition, for which the United Kingdom (UK) health-related costs are estimated to be at least £13bn annually [5]. As a result, national guidance widely encourages optimal hydration in UK hospital and community settings [6, 7].

Guidance exists for the promotion of hydration in UK hospitals [8]. The guidance provides practical advice for health care staff in England and Wales on how to minimise the risk and potential harm that dehydration can cause and offers solutions to improve the provision of fluids to patients in hospitals. Despite this guidance, it has been reported that patients continue to lack access to fresh drinking water and continued efforts to promote optimal hydration are needed [9]. Furthermore, over 90% of malnourished patients are cared for in community settings [10], suggesting that continued efforts for hydration promotion should occur in both hospital and community settings.

Healthcare professionals (HCPs) are expected to engage in best-practice care to address nutrition-related conditions in a multidisciplinary manner [11]. Registered dietitians are

HCPs who assess, diagnose, and treat nutritional problems for individuals in the UK [12]. It is recommended that dietitians take a coordinated and integrated approach to addressing the nutritional care of patients, including promotion of optimal hydration, and lead on relevant knowledge transfer to other HCPs [13]. Dietitians should be competent in assessing patients' hydration requirements, developing strategies to meet hydration needs, and providing user outcome focussed services in all care settings as part of a holistic integrated package of care [14]. However, the competence of UK dietitians regarding hydration and patient care has not been studied.

The knowledge, attitudes, and practices (KAP) of HCPs have been widely investigated as indicators of behaviours [15–17]. Investigating the KAP of UK dietitians regarding hydration will inform strategies to support optimal hydration of patients in hospital and community settings. These strategies are important due to the recognised influence of hydration status on health outcomes [1] and will contribute to a reduction in health-related costs [18]. The aim of this study, therefore, was to investigate dietitians' KAP regarding hydration and patient care.

## 2. Methods

**2.1. Overview.** This study utilised a cross-sectional online survey to describe dietitians' KAP regarding hydration and patient care. The survey was conducted before the British Dietetic Association fluid factsheet was released in 2014. The study was undertaken as part of a larger project on hydration education in health care, and was exempt from ethical approval due to the nonsensitive, anonymous, educational nature of the survey.

**2.2. Survey Instrument.** A cross-sectional online survey (SurveyMonkeyPro) was developed following a review of relevant scientific literature (developed into evidence tables), published texts, "grey" literature, and expert opinion from dietitians, doctors, and hydration experts. Topics requiring investigation were categorised into key areas: facts regarding hydration, dehydration and fluid intake, kidney function and associated conditions, cognitive function, vulnerable groups regarding hydration (e.g., dysphagia and older adults), hydration assessment and advice in practice, personal and clinical attitudes towards hydration, and perceived importance of hydration training.

The survey was piloted on a range of HCPs at various levels including medical students, junior doctors, and GPs and reviewed by GPs, GP trainers, dietitians, scientists, and hydration experts for feedback on the interpretation and understanding of survey items. Recommendations to survey content, wording, and layout were completed prior to data collection. The finalised survey included 18 items on knowledge ( $n = 8$ ), attitudes ( $n = 4$ ), and practices ( $n = 6$ ), and each practice question also included an open ended textbox for respondents to justify their response. The survey was intended to take approximately five minutes to complete following recommendations by the GP reviewers that a short

TABLE 1: Dietitians' knowledge of hydration and patient care ( $n = 97$ ).

Knowledge area	Proportion of participants answering correctly $n$ (%)
Definition of dehydration	74 (76)
Physical signs of dehydration	89 (92)
Impact on performance tasks	91 (94)
Fluid requirements for adults	39 (40)
Fluid requirements for older adults	59 (61)
Water content of foods and drinks	34 (35)
Water content of the human body	44 (45)
Recommended water intake	53 (55)

survey would promote participant completion. The survey was only available in English.

**2.3. Participant Sampling.** The potential participant pool was dietitians working in the UK who were registered with the British Dietetic Association in February 2014. Information about the survey was included in the monthly newsletter for February 2014, including a brief description of the study, assurance of confidentiality, link to complete the survey, and contact details of the research team.

**2.4. Data Analysis.** Data analysis was conducted using the SPSS statistical software package version 22. Frequency distributions were calculated for each survey item, as well as mean and range for participants' years of experience. Knowledge scores were calculated for each participant by adding up the total number of correct answers for the knowledge questions. Attitudes and practice scores were calculated for each participant by ranking each response on a scale from 1 to 4 where 1 indicated low attitude or infrequent practice and 4 indicated high attitude or frequent practice. Data are presented as mean ( $\pm$ standard deviation).

## 3. Results

A total of 126 dietitians accessed the survey during the data collection period, and 97 (77%) completed the survey. Participants were from a combination of hospital and community settings and had been working as a dietitian for a mean of 6 years (range of 0–40 years). More than one third ( $n = 39$ ; 40%) of participants reported being in their current post for  $\leq 2$  years, 28% ( $n = 27$ ) for 3–5 years, 11% ( $n = 11$ ) for 6–9 years, and 21% ( $n = 20$ ) for 10+ years.

**3.1. Knowledge.** Table 1 outlines the hydration knowledge of participating dietitians. The mean number of questions correctly answered was 5.0 ( $\pm 1.3$ ) out of 8. Most dietitians were able to recognise the physical signs of dehydration (92% correct) and knew the impact that dehydration has on performance tasks (94% correct). However, fewer dietitians knew the water content of the human body (45% correct),

TABLE 2: Dietitians' attitudes towards hydration in patient care ( $n = 97$ ).

Attitude area	Response	Proportion of participants' responses $n$ (%)
Person responsible for managing hydration intake of patients	Dietitian	0 (0)
	Doctor	0 (0)
	Patient	0 (0)
	All of the above	97 (100)
Risk of excess water consumption on health	No risk	0 (0)
	Minimal risk	25 (26)
	Moderate risk	59 (61)
	Significant risk	13 (13)
Importance of hydration for kidney stones	Very important	65 (67)
	Somewhat Important	24 (25)
	Unimportant	0 (0)
	Very unimportant	8 (8)
Importance of hydration education for dietitians	Very important	61 (63)
	Somewhat Important	32 (33)
	Unimportant	3 (3)
	Very unimportant	1 (1)

fluid requirements for adults (40% correct), and the water content of foods and drinks (35% correct).

**3.2. Attitudes.** Table 2 outlines the hydration attitudes of participating dietitians. The mean attitudes score was 14.0 ( $\pm 1.3$ ) out of a maximum score of 16. All dietitians (100%) reported that hydration management is the combined responsibility of HCPs and patients and recognised some degree of risk in consuming excess water. Nearly all participants (96%) reported that hydration education for dietitians is important.

**3.3. Self-Reported Practices.** Table 3 outlines the hydration practices of participating dietitians. The mean practice score was 14.9 ( $\pm 2.6$ ) out of a maximum score of 24. Most dietitians (91%) promoted hydration in standard care by encouraging intake of water and other beverages and reported wide variation in time spent promoting hydration to patients. Variations in practices were also apparent for promoting hydration to stroke patients and assessing urine colour. The majority of dietitians (58%) rated their personal hydration practices as bad or average but reported using water dispensing facilities at their place of work.

Dietitians reported that it is important to promote liberal intakes of all fluids to facilitate compliance and maximise the likelihood of patients reaching optimal hydration status. The amount of time dietitians spent on hydration promotion was dependent on the nutritional priorities of patients. Free text responses from dietitians who never promoted hydration to stroke patients reported that it was either not applicable to their current post ( $n = 20$ ) or that cognitive impairments of patients hindered communication ( $n = 1$ ;  $n = 2$  did not comment). Self-reported urine colour was deemed to be a practical and valid indicator of hydration status. The main

barrier to dietitians consuming adequate fluids at work was lack of time and not remembering to drink.

#### 4. Discussion

This study investigated the KAP of dietitians in the UK regarding hydration and patient care. This is important as dietitians are ideally placed to advise and educate on the benefits of appropriate hydration alongside nutrition [14, 19]. The dietitians in the current study displayed approaches to hydration and patient care that are realistic to practice settings. However, there were noted opportunities for improved hydration KAP.

The hydration knowledge of dietitians in this study appeared to be lacking. Whilst dietitians displayed very good understanding of physical signs of dehydration and its impact on cognitive performance, fewer dietitians provided correct answers to other knowledge questions, such as recommended water intakes and water content of food, drinks, and the human body. It is important to note that the evidence relating to specific hydration issues such as water content of foods and hydration requirements of patients is evolving [20, 21]. Based on the EFSA fluid intake from beverages recommendations, the most recent hydration guidelines promoted 8–10 glasses (200 mL glass) per day [22] which is higher than the previous guidelines of 6–8 glasses per day [23]. As a result, dietitians may have variable understanding of specific hydration issues and require further education to maintain clinical relevancy.

Participants appeared to recognise the need for improved hydration knowledge given that only 4% of participants regarded hydration education as unimportant. As a registered dietitian in the UK, it is a requirement to remain competent to practice [14, 24, 25], thus requiring a need for career-long learning to maintain evidence-based knowledge and skills

TABLE 3: Dietitians' self-reported practices regarding hydration in patient care ( $n = 97$ ).

Practice area	Response	Proportion of participants' responses $n$ (%)
Usual method of promoting hydration in standard care	Not part of care	7 (7)
	Encourage reduced caffeine intake	1 (1)
	Encourage water intake only	1 (1)
	Encourage water and other beverages	88 (91)
Average time spent providing hydration advice in a 4-hour clinical session	0 minutes	4 (4)
	Between 0 and 10 minutes	30 (31)
	Greater than 10 minutes	32 (33)
	Unable to quantify	31 (32)
Frequency of promoting hydration to stroke patients	Never	23 (24)
	Occasionally	17 (18)
	Regularly	22 (22)
	Always	35 (36)
Frequency of assessing patients' self-reported urine colour	Never	6 (6)
	Occasionally	36 (37)
	Regularly	38 (39)
	Always	17 (18)
Personal rating of hydration status at work	Bad	14 (14)
	Average	43 (44)
	Good	26 (27)
	Excellent	14 (14)
Workplace access and use of water dispensing facilities	Yes, and I use it	64 (66)
	Yes, but I do not use it	10 (10)
	No, but I would use if available	22 (23)
	No, I would not use it	1 (1)

[26, 27]. While the dietitians in this study recognized that nutrition and hydration are integral to optimise patient outcomes, the dietetics curriculum framework does not specifically mention hydration [14]. It has been said that water is the forgotten nutrient [8] and it could be suggested that it is important to be explicit in documentation to state nutrition and hydration together.

Dietitians in this study displayed positive attitudes towards hydration and its impact on prevention and patient care. They recognised the importance of a multidisciplinary approach to hydration promotion, particularly for at-risk patient groups and for dietitians to be well educated on hydration. However, it has been previously established that UK HCPs place less importance on hydration compared with counterparts in Mediterranean countries, which may be due to variations in climate [19]. Strategies to enhance a multidisciplinary approach to hydration care may lower the gap between UK HCPs and other countries by, for example, increased focus on the NHS nutrition and hydration awareness weeks [6].

Qualitative responses from free text boxes indicated that self-reported hydration practice was influenced by higher nutrition priorities for their patients. Therefore, despite the participants having a good attitude towards hydration care, this may not always translate into patient care. Less than

half of the dietitians in this study reported good personal hydration while at work, with 24% indicating that this was due to lack of access to water dispensing facilities in their workplace. This is particularly pertinent for health care professionals working in a community setting and carrying out domiciliary visits where there will be a lack of access to water dispensing and bathroom facilities. The impact of dietitians' personal habits on their counselling practices has not been investigated; however, doctors with healthy personal habits or a desire to improve their own health are more likely to counsel patients [28–30]. Similarly, interventions that focus on medical students' personal nutrition behaviours have been shown to improve the frequency of nutrition counselling [31]. These studies suggest that emphasis should be given to dietitians' workplace hydration practices to facilitate improvements in their own hydration status and the hydration-related care provided to patients.

As previously mentioned, in some hospitals and practice settings there were no water dispensing facilities available for staff. This has been related to guidance on preventing legionella and pseudomonas outbreaks in care settings, leading to infection control guidance, strict use and service maintenance records, or withdrawal of dispensers [32, 33]. HCPs should be cognisant of sourcing water throughout the day which could be supported if the substantive evidence of

how to maintain water dispensing facilities is appropriately applied [32–34].

Innovative approaches to promoting adequate fluid intake are required in UK hospitals and community settings [7]. One approach that has experienced positive outcomes is enhancing patients' participation in their health and medical care [35–37]. These studies report that patients are receptive to taking a proactive role in health care, which suggests that there are similar opportunities for hydration promotion initiatives utilising patient-participation. For example, initiatives could facilitate patients to self-monitor fluid balance, in order to reach targets set in collaboration with dietitians. A similar approach has been successfully trialled in Australia to enhance patients' protein and energy intake [38] and warrants further consideration.

Key limitations of the present study should be noted. Firstly, the strategy used to recruit participants may have resulted in some selection bias [39]. It is likely that those agreeing to participate may have had a particular interest in hydration and therefore may have resulted in an overestimation of dietitians' KAP. Secondly, a response rate could not be calculated as it is unknown how many dietitians read the newsletter/advertisements and chose not to participate. Similarly, questions relating to demographic characteristics were not included in the survey, which limited investigations into the representativeness of the participating dietitians in relation to the overall UK dietetic workforce. Finally, the self-reported nature of the survey may have resulted in participants providing more clinically desirable responses than a true reflection of their attitudes and practices.

There may be scope to further assess and potentially enhance the KAP of dietitians regarding hydration and patient care. The dietitians in the current study appear to be guided by clinical reasoning and priorities for nutrition care. There is also a potential opportunity to follow up this sample of dietitians to investigate whether release of the British Dietetic Association's fluid factsheet has influenced KAP regarding hydration. The current study suggests that promotion of optimal hydration for patients requires a broader focus involving patients and other HCPs. The NNEdPro Group is currently examining the KAP in relation to the hydration education of medical doctors and will continue this work with other HCPs to determine their need for further training. Innovative approaches to hydration promotion are warranted and may include focusing on dietitians' personal hydration status and their leadership role in educating other HCPs and partnering with patients to take a proactive role in hydration monitoring.

## Conflict of Interests

Joan Gandy works as a consultant for Danone Waters.

## Authors' Contribution

Pauline Douglas, Lynn McGuffin, Celia Laur, Minha Rajput-Ray, Joan Gandy, and Sumantra Ray contributed to the conception and design of the project. Pauline Douglas, Celia

Laur, Lynn McGuffin, and Sumantra Ray designed the survey instrument. Lauren Ball and Jennifer Crowley conducted the data analysis and drafted the paper. All authors participated in finalisation of the paper.

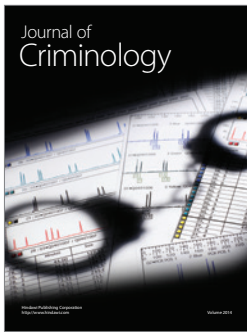
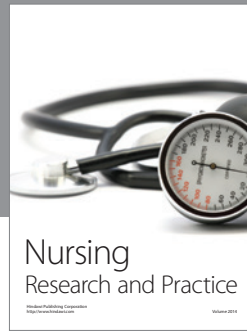
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