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Interns' knowledge of, and attitudes and practices towards malnutrition and hydration in an Australian acute tertiary-care hospital

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RESEARCH

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ABSTRACT

Background
Malnutrition and inappropriate hydration can result in adverse clinical consequences for patients in acute tertiary-care hospitals. Interns have an important role in ensuring optimal patient nutrition and hydration care.

Aims
To determine the knowledge of, and attitudes and practices towards, the assessment and management of malnutrition and hydration of interns working in an Australian acute tertiary-care hospital.

Methods
Eighty-four interns completed a purpose-designed questionnaire.

Results
The mean percentage of correct responses for knowledge questions was 53.4 per cent for malnutrition and 56.0 per cent for hydration. Most participants did not undertake assessment of nutritional status as part of their medical examination (n=55 [65 per cent]) whereas the majority did assess hydration status (n=78 [92 per cent]). A minority believed they had adequate knowledge to identify patients at risk of malnutrition (n=14 [16 per cent]) or manage a patient with malnutrition (n=13 [15 per cent]) whereas a majority believed they had adequate knowledge to manage patient hydration (n=61 [72 per cent]). The majority of participants indicated that further training on malnutrition (n=76 [90 per cent]) and hydration (n=74 [88 per cent]) would be beneficial.

Conclusion
Participants demonstrated poor knowledge of the core principles of malnutrition and hydration and acknowledged the need for further education. Given the detrimental impact of malnutrition and inappropriate fluid management on patient outcomes and healthcare costs, medical schools and hospitals need to collaborate and explore effective education strategies for interns.

Key Words
Malnutrition, hydration, medical education

What this study adds:

1. What is known about this subject?
Interns have an important role in the assessment and management of patient malnutrition and hydration however, poor knowledge has been demonstrated in non-Australian samples.

2. What new information is offered in this study?
Interns in this Australian acute tertiary-care hospital demonstrated poor knowledge of the core principles of patient malnutrition and hydration.

3. What are the implications for research, policy, or practice?
Educational strategies need to be developed to ensure Australia interns demonstrate appropriate nutrition and hydration knowledge, attitudes and practices.

Background

Malnutrition has been described as both a cause and consequence of disease.[1] Disease, or the symptoms of disease, may affect the ability to eat, digest or absorb nutrients resulting in malnutrition.[2-4] Malnutrition affects 20–50 per cent of patients in acute care hospitals[3-5] and is associated with adverse clinical consequences including delayed wound healing, increased infection rates, greater functional decline, increased hospital length of stay (LOS) and increased mortality.[3,6] Patients may be malnourished or at risk of malnutrition on admission to hospital and for many nutritional status may deteriorate further during their admission.[1,5,7] Inappropriate hydration is also a cause and consequence of illness[8] with dehydration being associated with renal, urological, circulatory and respiratory problems, and may result in an increased LOS and mortality in hospital.[9-11] Dehydrated patients may deteriorate further during the course of their admission to hospital[10,11] while fluid overload can result in complications such as pulmonary oedema, pneumonia and delayed post-operative gastrointestinal function.[8-13]

In England, health and social care expenditure in 2011–12 on malnutrition was estimated to be £19.6 billion (A$34.7 billion [per exchange rate November 2017]).[14] While there are very little data on the cost of inappropriate hydration it is likely that improved care with respect to nutrition and hydration would result in financial benefits as a consequence of reduced complications and LOS.[8,11] Improving nutrition and hydration care does make both clinical and economic sense.

Despite the known importance of malnutrition and hydration, both from a physiological and economic perspective, they are often overlooked by medical staff in acute care hospitals.[1,6,15-17] Whilst we were unable to identify any studies conducted in Australia, overseas studies have shown that medical students do not receive sufficient nutrition training[18,19] and that interns can have poor knowledge of malnutrition and the administration of commonly used intravenous fluids.[20-23] The General Medical Council in the United Kingdom identified nutrition and hydration as a core responsibility of medical staff [24] with the National Institute for Health and Clinical Excellence calling on doctors to assess and monitor patient malnutrition, hydration status and re-feeding syndrome risks,[25] and be competent to deliver nutritional interventions.[26] Given the importance of malnutrition and hydration, and lack of studies conducted in Australia, the aim of this study was to investigate the knowledge of, and attitudes and practices to, the assessment and management of malnutrition and hydration among interns working in an acute tertiary-care hospital in Australia.

Method

Sample frame

A survey of interns was undertaken at the Royal Adelaide Hospital, Adelaide, South Australia, an acute tertiary-care hospital with 650 beds, over a six week period in 2014. Participation was voluntary, no personal identifying information was recorded and verbal consent was obtained. Any intern working at the Royal Adelaide Hospital during the study period was eligible for participation. Ethics approval was obtained from the Royal Adelaide Hospital Research Ethics Committee.

Recruitment method

Participants were recruited by an investigator who attended interns' scheduled professional development or ward meetings during their second of five rotations that year. At these meetings, an investigator distributed a hard copy of the questionnaire. Participants had no prior knowledge that they would be asked to complete the questionnaire. All participants completed the questionnaire at the time of issue without consulting any external reference sources.

Outcome measure

A questionnaire was developed by the investigators based on previously published questionnaires from other countries that demonstrated similar clinical scenarios to those encountered within our hospital.[20-23] The questionnaire was assessed for bias by an independent educational psychologist who had psychometric experience and a senior medical consultant to give feedback about the content validity. Adjustments were made to the questionnaire based on their feedback. The questionnaire was then piloted with a total of 15 junior and senior medical staffs to ensure questions were clear and unambiguous: only minor changes were required as a result of this process. Formal psychometric testing of the questionnaire was not undertaken.

The survey comprised 21 questions. The first 11 questions addressed knowledge of malnutrition and hydration with five multiple choice responses provided for each question. The next 10 questions examined interns' reported attitudes and practices towards the assessment and management of malnutrition and hydration, and their views regarding their educational needs around malnutrition and hydration. Five-point Likert scales were used for these 10 questions with responses ranging from strongly agree to strongly disagree. The survey took approximately 10 minutes to complete.

Data analysis

Data were transcribed from hard copies into an Excel spreadsheet. Descriptive statistics were used to calculate frequencies and percentages. For the 11 knowledge questions, each participant had their number of correct responses identified and a mean percentage correct score for the malnutrition questions (n=6), hydration questions (n=5) and total score calculated.

Results

Participants

Of the 101 interns employed at the Royal Adelaide Hospital at the time of the survey, 84 (83 per cent) completed the questionnaire. The 17 interns who did not participate were unavailable due to being on night shift or leave. All 84 participants qualified in the previous year (2013). Fifty-six (67 per cent) participants completed their medical degree at the University of Adelaide with the remainder at other Australian universities.

Malnutrition and hydration knowledge scores

Table 1 provides data summarising the mean percentage of correct responses for the questions addressing knowledge of malnutrition and hydration. Overall, for these 11 questions, the mean percentage of correct responses was 54.7 per cent and the mean number of questions answered correctly was 6 (range 2–9). The mean percentage of correct responses was higher for the hydration than the malnutrition questions.

Table 2 summarises the responses of the 84 participants to each of the 11 knowledge questions. The prevalence of malnutrition in acute care hospitals was underestimated by 60 (71 per cent) participants. Only 8 (10 per cent) participants were aware that albumin was not a measure of nutritional status whereas 60 (71 per cent) were aware that the Malnutrition Universal Screening Tool ('MUST') was a nutritional screening tool. In terms of the complications of malnutrition, most participants were aware that malnourished patients were more likely to be admitted to hospital (n=75 [89 per cent]) and correctly identified that hypotension was not a complication of malnutrition (n=69 [82 per cent]). In relation to the management of re-feeding syndrome only 35 (42 per cent) participants correctly identified that sodium, potassium, magnesium and phosphate should be monitored, although 34 (41 per cent) identified the key electrolytes of potassium, magnesium and phosphate. With respect to the hydration questions, only a minority of participants (n=23 [27 per cent]) were aware of the correct energy content of 5 per cent dextrose solution whereas the most frequent responses to the other questions were the correct ones (range 41–83 per cent).

Table 3 shows the responses regarding the participants' attitudes and practices towards the assessment and management of malnutrition and hydration. The majority of participants reported they did not undertake assessment of nutritional status as part of their medical history and examination (n=55 [65 per cent]) and believed that identification of malnutrition is of a lower priority (n=58 [69 per cent]). Only a minority believed they had adequate knowledge to identify patients at risk of malnutrition (n=14 [16 per cent]) or manage a patient with malnutrition (n=13 [15 per cent]). In contrast, the majority of participants reported that assessment of hydration status was part of the medical history and examination (n=78 [92 per cent]), that prescription of intravenous fluids was their responsibility (n=79 [94 per cent]) and they had adequate knowledge to manage patient hydration (n=61 [72 per cent]). The majority of participants indicated that further training on malnutrition (n=76 [90 per cent]) and hydration/fluid management (n=74 [88 per cent]) would be beneficial to their clinical practice.

Discussion

This study investigated the knowledge of, and attitudes and practices towards, the assessment and management of malnutrition and hydration among interns working in an acute tertiary-care hospital. Overall, the level of knowledge demonstrated by participants regarding the core principles of the assessment and management of both malnutrition and hydration was poor. Participants did not appear to have the same attitudes and practices regarding the assessment and management of malnutrition and hydration, with more believing assessment and management of hydration was part of their clinical role. Overwhelmingly, participants indicated that more training regarding malnutrition and hydration would benefit their clinical practice.

Our findings are comparable with previous research with respect to the lack of knowledge, competing priorities, lack of interest and unclear sense of responsibility in relation to patient nutrition.[27-29] Similarly, our findings of inadequate knowledge regarding the core principles of hydration are comparable to previous studies.[30,31] We found that, compared to malnutrition, our participants placed higher priority on hydration assessment and management and believed they had better knowledge of hydration principles (even though this was not demonstrated). This difference may be related to the frequency with which interns perform hydration tasks compared with nutritional tasks as previous

research has shown that interns report high confidence in tasks that they frequently undertake (e.g., fluid management) and low confidence for infrequent tasks such as inserting nasogastric feeding tubes.[32]

The clinical implications arising from our results, given the sub-optimal levels of knowledge and the recognised desire of interns for more education regarding both malnutrition and hydration, is that further education is required. In the United Kingdom, this need for further education has been recognised[33-36] Nutrition education has been shown to raise awareness and assist staff in identifying their role in improving patient nutritional care.[37] This education could be undertaken at the under-graduate level, during the intern program and/or at the post-graduate level. Whilst dietitians are well placed to provide nutrition education,[38] the wider medical profession needs to commit to the process irrespective of when and who provides this education. Furthermore, there is potential for improved inter-professional collaboration between medical and dietetic staff, both in universities and hospitals (i.e., at an undergraduate and postgraduate level), to enable the optimal management of patient nutrition and hydration.

Optimal patient nutrition and hydration care has the potential to not only improve patients' clinical outcomes, but also economic outcomes. Treatment costs for malnourished patients have been shown to be greater than that of patients who are not malnourished due to greater treatment costs, LOS and hospital readmission rates.[14,39] With increasing demand for acute care hospital beds and finite resources it is prudent to investigate all potential ways of reducing healthcare costs.

Strength of this study was that it was, to our knowledge, the first to investigate intern's knowledge of, and attitudes and practice to, nutrition and hydration in an Australian setting. Limitations of the study included that although we achieved a high response rate it was at a single site and only included interns from one year and predominately one university, thus limiting the generalisability of the results. This study did not explore interns' previous nutrition and hydration educational experiences obtained during undergraduate training. Further study could be undertaken to examine the nutrition and hydration teaching content of current university curriculum and hospital training programs. Clearly, further research is required to confirm and extend these findings.

Conclusion

Interns participating in this Australian study showed a lack of knowledge regarding the core principles of malnutrition and hydration and expressed a desire for further education. Improved education of interns regarding malnutrition and hydration assessment and management is required.

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PEER REVIEW

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CONFLICTS OF INTEREST

The authors declare that they have no competing interests.

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ETHICS COMMITTEE APPROVAL

Royal Adelaide Hospital Ethics Committee reference number 140209.

Table 1: Mean percentage of correct responses for the knowledge questions for the 84 participants

Questions	Mean percentage correct	Standard Deviation	95 per cent Confidence Interval
Malnutrition	53.4	17.9	49.5-57.3
Hydration	56.0	24.2	50.7-61.2
Combined	54.7	21.3	51.4-57.9

Table 2: Responses to the 11 knowledge questions by the 84 participants.*

Questions	Frequency (per cent)
Malnutrition questions	
1. What do you estimate the prevalence of malnutrition to be in acute care hospitals?	
<10 per cent	2 (2)
10-20 per cent	20 (24)
20-30 per cent	38 (45)
20-50 per cent	***22 (26)***
Unsure	2 (2)
2. Which of the following is not a measure of nutritional status?	
10 per cent weight loss in 3 months	12 (14)
Body mass index	37 (44)
Serum albumin	***8 (10)***
Patient-generated subjective global assessment	18 (21)
Unsure	9 (11)
3. Which of the following statements is true?	
Provision of oral nourishing fluids to malnourished patients does not improve outcomes	4 (5)
Malnutrition has no significant impact on patient mortality	
Obese patients are not at risk of malnutrition	1 (1)
Malnourished patients are more likely to be readmitted to hospital	3 (4)
Unsure	***75 (89)***
	1 (1)
4. Which of the following is not a complication of malnutrition?	
Poor wound healing	5 (6)
Increased risk of hypotension	***69 (82)***
Increased hospital stay	3 (4)
Increased risk of infection	3 (4)
Unsure	4 (5)
5. Which biochemical parameters should be monitored in a patient at risk of re-feeding syndrome?	
Sodium, potassium, phosphate and albumin	4 (5)
Sodium, potassium, phosphate and magnesium	***35 (42)***
Potassium, phosphate and magnesium	34 (41)
Phosphate, magnesium and albumin	5 (6)
Unsure	6 (7)
6. What is 'MUST'?	
A malnutrition screening tool	***60 (72)***
A malnutrition documentation tool	1 (1)
A malnutrition assessment tool	12 (14)
A hospital menu tool	0 (0)
Unsure	11 (13)

Hydration questions	
7. The following are required daily in healthy adults:	
Water 35-55ml/kg, sodium 3-4mmol/kg, potassium 1-2mmol/kg	20 (24)
Water 10ml/kg, sodium 1-1.2mmol/kg, potassium 3mmol/kg	2 (2)
Water 25-35ml/kg, sodium 1-1.2mmol/kg, potassium 1mmol/kg	***34 (41)***
Water 30ml/kg, sodium 3mmol/kg, potassium 1mmol/kg	16 (19)
Unsure	12 (14)
8. How much energy is there in 1 litre of 5 per cent dextrose solution?	
2000kcal	1 (1)
600kcal	12 (14)
200kcal	***23 (27)***
100kcal	13 (16)
Unsure	35 (42)
9. How much sodium and chloride is there in 1 litre of 0.9 per cent 'normal' saline solution versus 1 litre of Hartmann's solution?	
154mmol sodium and 300mmol chloride *vs.* 131mmol sodium and 200mmol chloride	6 (7)
100mmol sodium and 154mmol chloride *vs.* 300mmol sodium and 154mmol chloride	2 (2)
100mmol sodium and 100mmol chloride *vs.* 100mmol sodium and 111mmol chloride	3 (4)
154mmol sodium and 154mmol chloride vs. 131mmol sodium and 111mmol chloride	***65 (77)***
Unsure	8 (10)
10. What is the minimal desired postoperative urine output for a 70kg man?	
10ml/hour	2 (2)
20ml/hour	4 (5)
35ml/hour	***70 (83)***
70ml/hour	5 (6)
Unsure	2 (2)
Not answered	1 (1)
11. Patients are often fasted for theatre. What are the recommended times for a patient to be fasted for light diet and clear fluid prior to theatre?	
6 hours for food and 2 hours for clear fluids	***43 (51)***
8 hours for food and 4 hours for clear fluids	30 (36)
2 hours for both food and clear fluids	0 (0)
Fast from midnight of previous day for both food and clear fluids	10 (12)
Unsure	1 (1)

*correct responses are shown in italics and bold

Table 3: Attitudes and practices towards the assessment and management of malnutrition and hydration for the 84 participants

Strongly agree	**Agree**	**Neutral**	**Disagree**	**Strongly disagree**
Malnutrition questions				
12. Assessment of nutritional status is part of my medical history and examination.				
1 (1)	28 (33)	25 (30)	27 (32)	3 (4)
13. Identification of malnutrition is a lower priority.				
4 (5)	40 (48)	14 (17)	25 (30)	1 (1)
14. I have adequate knowledge to identify patients at risk of malnutrition.				
1 (1)	13 (15)	32 (38)	33 (39)	5 (6)
15. I have adequate knowledge in the management of patient malnutrition.				
0 (0)	13 (15)	30 (36)	37 (44)	4 (5)
16. Further training on malnutrition would be beneficial to my clinical practice.				
12 (14)	64 (76)	7 (8)	1 (1)	0 (0)

Hydration questions				
17. Assessment of hydration status is part of my medical history and examination.				
44 (52)	34 (41)	4 (5)	2 (3)	0 (0)
18. I am responsible for the prescription of IV fluids.				
42 (50)	37 (44)	4 (5)	1 (1)	0 (0)
19. The 24 hour FBC is an important tool in management of patient hydration.				
37 (44)	43 (51)	3 (4)	1 (1)	0 (0)
20. I have adequate knowledge in the management of patient hydration.				
11 (13)	50 (60)	20 (24)	3 (4)	0 (0)
21. Further training on hydration and fluid management would be beneficial to my clinical practice.				
21 (25)	53 (63)	7 (8)	3 (4)	0 (0)

FBC - fluid balance chart; IV - intravenous