

# Nutrition & Dietetics

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A photograph showing a male healthcare professional in a white polo shirt and glasses leaning over a table to assist an elderly female patient in a hospital bed. The patient is wearing a purple hospital gown and has an oxygen mask on her face. The professional is holding a spoon and a bowl of food on the table. The background shows a hospital room with a bed, a chair, and medical equipment.

**Evidence as  
foundation  
of practice**

# Nutrition & Dietetics

## Journal of Dietitians Australia

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# Nutrition & Dietetics

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## ORIGINAL RESEARCH

# Nutritional intake and foodservice satisfaction of adults receiving specialist inpatient mental health services

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## Abstract

**Aim:** Meeting the nutritional needs and foodservice expectations of hospital inpatients is challenging. This study aimed to determine whether adults receiving specialist inpatient mental health services meet their energy and protein requirements and are satisfied with the foodservice.

**Methods:** An observational study of adults admitted to three specialist inpatient mental health services within a large health service. Energy and protein intake were determined over 24 h via observation, and nutritional requirements were estimated using standard procedures. Validated questionnaires were used to assess satisfaction with the lunch meal, elements of the foodservice system, and overall foodservice satisfaction.

**Results:** Among 74 participants, the median (IQR) energy intake (6954 [5111–10 250]kJ/day) was less than estimated requirements (8607 [7319–9951]kJ/day), whilst protein intake (85 [62–120]g/day) exceeded requirements (59 [46–70]g/day). Food from external sources was consumed by 50% of participants. Satisfaction surveys found vegetables were rated more poorly than the meat or carbohydrate portion of the meal, food quality was rated lowest compared with meal service, staffing and physical environment. The majority of participants (89%) rated their last meal as average, with the remainder (11%) rating it as poor.

**Conclusion:** There are opportunities to improve the meal and foodservice experience for this patient group to meet their nutritional requirements and expectations. Investment in quality food and menus that are appropriate for the demographics, exploration of the most appropriate foodservice system, and adequate dietetic resourcing are needed to improve nutrition care within specialist inpatient mental health services.

## KEYWORDS

foodservice, hospital, mental health, nutrition, satisfaction

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## 1 | INTRODUCTION

In Australia one in five (20%, or 4.8 million) Australians reported that they had a mental or behavioural condition during the 12-month period from July 2017.<sup>1</sup> Individuals with mental health conditions are likely to suffer comorbidities, particularly physical health problems,<sup>2,3</sup> with 11.7% (1.9 million) Australians reporting both a mental disorder and a physical condition.<sup>3</sup> National Health Survey data indicates a range of lifestyle factors are present, which contribute to and compound mental and physical health problems.<sup>1</sup> One third of individuals with mental health conditions consumed sugar sweetened drinks daily, one fifth did not meet the recommendations for consumption of fruit and vegetables, and one fifth consumed alcohol in excess of guidelines.<sup>1</sup> The Australian Government has a range of policies and plans in place to support the mental health of Australians, and access to appropriate healthcare including specialist inpatient services.<sup>4</sup>

People who require hospitalisation for a mental health condition are a unique population, different to those admitted for care for physical health conditions. The national average length of stay in a public acute hospital psychiatric unit is 15.7 days compared with that of the general population where the average length of stay in a public hospital is 5.7 days.<sup>5</sup> People aged 35–44 and 18–24 years have the highest rate of admissions for specialist mental health care, which is younger than many patients admitted with chronic conditions.<sup>6</sup> Balancing risk of chronic disease<sup>7</sup> and malnutrition<sup>8</sup> in this patient cohort is at odds with the challenges of addressing the inpatient malnutrition prevalence in many other hospitalised patients. The Agency of Clinical Innovation have produced dedicated Nutrition Standards for consumers of inpatient mental health services, reflecting the uniqueness and priority of their food and nutrition needs.<sup>7</sup> They identify that disability and other physical and mental health conditions, along with medication side effects, dictates the need for the broader foodservice system to be flexible to meet these patients' complex needs.<sup>7</sup> However, dedicated Nutrition Standards do not exist in all states of Australia.

The challenge for health service delivery is to provide a menu and foodservice system that meets the needs of a range of different patient groups simultaneously. This is particularly difficult in hospitals where specialist inpatient mental health services are collocated with patients admitted for physical health conditions. Constraints to the systems and contracts in place for meal ordering, production, plating and the skills and schedule of the foodservice workforce can limit flexibility. In turn, this may impact patients' nutritional intake, further

compounding their physical and mental health conditions, and influence their experience of meals and mealtimes. The foodservice provided to specialist inpatient mental health services is further complicated by dietetic staffing pressures within the acute hospital system.<sup>9</sup> Although the collocation of specialist inpatient mental health services can support patients to engage with physical health care,<sup>10</sup> access to dietetic services may be challenging within collocated service models.

The present study aimed to determine whether adults receiving specialist inpatient mental health services meet their energy and protein requirements and are satisfied with the foodservice.

## 2 | METHODS

This observational study was reported using the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.<sup>11</sup> Approval to undertake this research was received from the Eastern Health Human Research Ethics Committee (reference QA57-2016).

The setting was a large multi-site health service with a catchment of more than 750 000 people in Victoria, Australia. The study was undertaken in the adult (aged 18–65 years) mental health units collocated at the two largest hospitals (one ward at one hospital [site A] and two wards at another hospital [site B]), each ward accommodated 25–30 admissions. Collection of participant-level social and medical history was outside the scope of the ethics approvals for this study, however due to the broad admission criteria it is likely that participants were heterogeneous in terms of their mental health diagnoses and other characteristics. There were no differences in admission procedures to the units, nor any differences in the menus provided.

The healthcare network operates a cook-chill foodservice system, where the majority of meals (soups, main meals, desserts) are prepared off-site at a large central production kitchen, prior to being delivered chilled to the hospitals. At site A meals were plated cold and rethermalised and at site B food was heated in bulk and plated hot in the hospital kitchen prior to distribution to patients at mealtimes. Meals were delivered by a patient service assistant and patients on the mental health wards ate in a communal dining room. The menu throughout the healthcare network was a 4-week cycle menu for main meals and static menu for mid meals, with an additional barbeque meal for adults admitted to specialist inpatient mental health services every 1–2 weeks. At site A the foodservice system was contracted to an external provider and at site B the foodservice system was managed by an in-house workforce. Meal ordering using

paper menus occurred up to 48 h prior to meal service with meal service at 8 a.m., 12 midday and 5 p.m.

Senior nursing staff identified a convenience sample of patients to be observed each day. In selecting patients to be invited to participate, staff considered patients' mental health status and length of stay. Patients with less severe mental health symptoms who had longer lengths of stay were invited preferentially so that they had sufficient time to experience the foodservice system. Observational data were collected during a 3-week period in late-2016, with dietary intake of participants observed for 1 day. A maximum of nine patients were observed each day, with a predicted sample size of 70–90 participants accounting for patient discharge and new admissions.

The primary outcomes were intake of energy (kJ/day) and protein (g/day) and satisfaction with the foodservice. During the day of observation, the intake of all main meals was estimated by trained observers using the validated one-quarter method,<sup>12</sup> while intake of mid-meals and snacks was self-reported by patients at the next meal period (the following day for supper intake). Intake records were analysed using the detailed hospital dietetics ready reckoner to estimate energy (kJ/day) and protein (g/day) consumption for the 24 h period. NUTTAB 2010 within Foodworks 7.0<sup>13</sup> was used to determine the energy and protein content of foods consumed that were from sources external to the hospital menu.

Age, gender and weight (measured by nursing staff on admission) were collected from medical records. Height was derived from ulna length measured with a tape measure according to a recommended process.<sup>14</sup> Energy requirements were estimated using the Schofield equation<sup>15</sup> (applying 1.3 activity factor, no stress factor), with protein requirements estimated according to the Nutrient Reference Value.<sup>16</sup> To calculate requirements, if participant BMI < 30 kg/m<sup>2</sup> actual weight was used, whilst if BMI ≥ 30 kg/m<sup>2</sup> adjusted ideal body weight ( $[(\text{weight} - \text{IBW}) * 0.25] + \text{IBW}$ , where IBW is weight at BMI = 25 kg/m<sup>2</sup>) was used.<sup>17</sup> The percent of estimated requirements met by intake was determined.

Satisfaction with the foodservice system was evaluated using the Acute Care Hospital Foodservice Satisfaction Questionnaire,<sup>18</sup> a tool developed for use within the acute hospital setting. This survey includes 18 statements measuring aspects of foodservice satisfaction using a 5-point Likert scale (“always”, “often”, “sometimes”, “rarely” or “never”). Responses are converted to a numerical value and a score is derived for satisfaction with four domains; food quality score, meal service quality score, staffing/service issues score, and physical environment score. Domain scores were calculated where there were

TABLE 1 Demographic details of the adults receiving specialist inpatient mental health services ( $n = 77$ )

Variable	All participants
Age, years (median [IQR])	36 (29–47)
Gender ( $n, \%$ )	
Male	40, 52
Female	37, 48
Length of stay at data collection, <sup>a</sup> days (median [IQR])	5 (2–15)
Body mass index, <sup>b</sup> kg/m <sup>2</sup> (median [IQR])	23.9 (21.1–27.4)
Body mass index <sup>b</sup> ( $n, \%$ )	
Underweight (BMI < 20 kg/m <sup>2</sup> )	9, 13
Healthy weight (BMI 20–25 kg/m <sup>2</sup> )	32, 46
Overweight/obese (BMI > 25 kg/m <sup>2</sup> )	29, 41
Estimated energy requirements, <sup>c</sup> kJ/day (median [IQR])	8607 (7319–9951)
Estimated protein requirements, <sup>c</sup> g/day (median [IQR])	59 (46–70)

<sup>a</sup>Data missing for one participant.

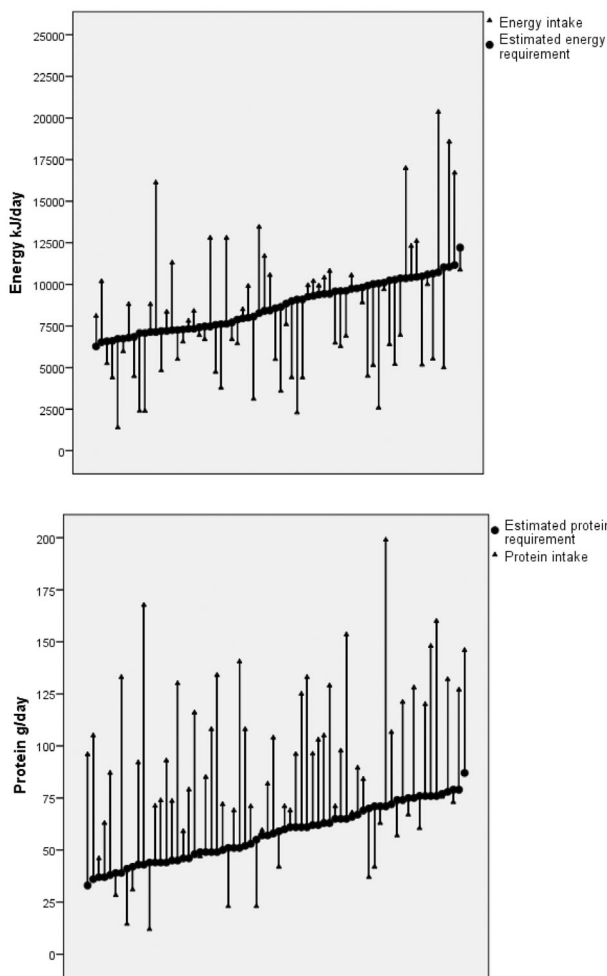
<sup>b</sup>Data missing for seven participants.

<sup>c</sup>Data incomplete for nine participants.

complete responses for all required statements. One statement of overall satisfaction is measured using a 5-point Likert scale (“very good” to “very poor”).

The Meal Assessment Tool<sup>19</sup> was utilised to assess satisfaction with a particular meal. This tool uses a seven-point Likert scale (“excellent” to “very poor”) to rate the flavour and taste, appearance and quality of the meat or meat alternative, potato or other carbohydrate source, and the vegetables, of the last meal received. Responses are converted to a numerical value. One additional question assesses whether the meal met expectations using a 5-point Likert scale (“very good” to “very poor”). These surveys were administered verbally with each participant after the midday meal on the day of obtaining their 24 h food intake. Researchers determined whether the participant received the meal they ordered, or whether a default meal was provided.

Data collection was performed by trained nutrition and dietetics students from Monash University. All students received 1 day of training by the principal investigator in the accurate estimation of intake to reduce inter-rater variation in measurement and to complement their pre-existing skills in dietary assessment. A pair of data collectors (breakfast/lunch and lunch/dinner) observed and estimated intake of three or four patients per meal. Students also received site orientation prior to commencing data collection with a focus on safety procedures within the inpatient mental health setting.



**FIGURE 1** Comparison of estimated requirements and intake of energy and protein of people receiving specialist inpatient mental health services ( $n = 68$ ).

Descriptive analyses of demographic characteristics, nutritional intake and satisfaction with the foodservices were performed using IBM SPSS Statistics for Windows (Version 22.0. Armonk, NY: IBM Corp.). To ascertain parametricity, Shapiro–Wilk normality tests along with skewness and kurtosis were assessed for all variables. Median and interquartile range (IQR) were reported for non-normally distributed continuous variables, mean and standard deviation (SD) were reported for normally distributed variables and number ( $n$ ) and percentage (%) were reported for categorical variables. Analyses were completed with available data.

### 3 | RESULTS

In total, 77 patients were recruited over the 3-week data collection period, described in Table 1. Over 40% were overweight or obese, and nine (13%) were underweight.

There was a large range in energy and protein requirements due to body composition and gender differences (Figure 1).

Two participants had leave of absence from the ward at dinner, an additional patient was discharged during the day of their observation. Data from these patients were removed from the original  $n = 77$ , leaving  $n = 74$  records for nutritional analysis. Among the group with complete 24 h intake records, the median total intake of energy was 6954 kJ/day (IQR 5111–10 250, range 1400–20 359) and the median intake of protein was 85 g/day (IQR 62–120, range 12–199). There were 43% (29/68) of participants who consumed  $\geq 100\%$  of their energy requirements and 77% (52/68) who consumed  $\geq 100\%$  of their protein requirements; the remaining participants (57% for energy, 23% for protein) did not meet their estimated requirements. At the group level, the variability in the requirements and intake of participants was large. Figure 1 plots the requirements (circle) and the intake (triangle) of each participant to illustrate the difference between these at the individual level, and across the group. Half of participants (37/74, 50%) consumed food from external sources. Where participants chose food in addition to the hospital menu, the energy provided by external sources was often large (median 1648, IQR 800–2903 kJ/day). Two participants consumed all of their daily intake from external sources on the day of observation.

Only 8–50% of participants completed their menu each day, resulting in the majority of participants receiving a default meal. This was due to several factors including patients reporting they were not aware that they could choose meals, and patients forgetting to complete the menu order.

The Acute Care Hospital Foodservice Satisfaction Questionnaire and Meal Assessment Tool satisfaction surveys were completed in full by 63 of 77 (82%) participants. Four participants did not complete the Acute Care Hospital Foodservice Satisfaction Questionnaire survey at all, and responses to single items were missing for up to 10 participants. Two participants did not eat any component of their meal, and a further three did not eat the meat component and therefore were unable to provide responses for these sections of the Meal Assessment Tool.

Satisfaction with the foodservice overall received an average rating of 2.9 out of 5 (correlating to “good”), where 5 indicates higher satisfaction. This was derived from ratings of very good ( $n = 25$ , 34%), good ( $n = 26$ , 36%), average ( $n = 15$ , 21%), poor ( $n = 4$ , 5%) and very poor ( $n = 3$ , 4%). Acute Care Hospital Foodservice Satisfaction Questionnaire data demonstrated participants were least satisfied with the food quality, and most satisfied with staff/service and the physical environment (Table 2).

**TABLE 2** Satisfaction of people receiving specialist inpatient mental health services with items and domains of foodservice assessed using the Acute Care Hospital Foodservice Patient Satisfaction Questionnaire.<sup>22</sup>

Aspect of foodservice <sup>a</sup>		Rating (mean ± SD)
Food quality domain ( <i>n</i> = 64)		2.6 ± 1.0
Q.1 ( <i>n</i> = 73)	The hospital food has been as good as I expected	2.8 ± 1.2
Q.5 ( <i>n</i> = 71)	I am able to choose a healthy meal in hospital	2.9 ± 1.3
Q.8 ( <i>n</i> = 72)	I like the way the vegetables are cooked	2.5 ± 1.3
Q.9 ( <i>n</i> = 73)	The meals taste nice	2.7 ± 1.1
Q.13 ( <i>n</i> = 73)	The menu has enough variety for me to choose meals that I want to eat	2.6 ± 1.4
Q.16 ( <i>n</i> = 73)	The meals have excellent and distinct flavours	2.4 ± 1.2
Q.18 ( <i>n</i> = 68)	The meat is not tough and dry <sup>b</sup>	2.5 ± 1.3
Meal service quality domain ( <i>n</i> = 64)		3.3 ± 0.7
Q.7 ( <i>n</i> = 69)	The cold drinks are just the right temperature	3.4 ± 1.0
Q.10 ( <i>n</i> = 68)	The hot drinks are just the right temperature	2.9 ± 1.3
Q.14 ( <i>n</i> = 69)	The cold foods are the right temperature	3.6 ± 0.8
Staff/service issues domain ( <i>n</i> = 68)		3.7 ± 0.5
Q.3 ( <i>n</i> = 73)	The staff who deliver my meals are neat and clean	3.8 ± 0.7
Q.11 ( <i>n</i> = 71)	The staff who take away my finished meal tray are friendly and polite	3.7 ± 0.7
Q.15 ( <i>n</i> = 70)	The staff who deliver my meals are helpful	3.6 ± 0.8
Physical environment domain ( <i>n</i> = 71)		3.4 ± 0.8
Q.2 ( <i>n</i> = 72)	The crockery and cutlery are not chipped and/or stained <sup>b</sup>	3.5 ± 1.0
Q.4 ( <i>n</i> = 73)	The hospital smells do not stop me from enjoying my meals <sup>b</sup>	3.3 ± 1.2
Q.6 ( <i>n</i> = 72)	I am not disturbed by the noise of finished meal trays being removed <sup>b</sup>	3.4 ± 1.1
Statements not belonging to a domain		
Q.12 ( <i>n</i> = 63)	I like to be able to choose different sized meals	2.8 ± 1.4
Q.17 ( <i>n</i> = 73)	The hot foods are just the right temperature	3.2 ± 1.1
Overall satisfaction ( <i>n</i> = 73)		2.9 ± 1.1

<sup>a</sup>Responses coded from 5 to 1 (always/often/sometimes/rarely/never); higher satisfaction denoted by ratings closer to 5.

<sup>b</sup>Questions and responses were reverse-coded according to tool guidelines.

**TABLE 3** Satisfaction with components of the lunch meal assessed using the meal assessment tool.<sup>23</sup>

Meal component <sup>a</sup>	Poor (1, 2), <i>n</i> (%)	Average (3–5), <i>n</i> (%)	Good (6, 7), <i>n</i> (%)	Rating (mean ± SD)
Meat/meat alternatives ( <i>n</i> = 68)				
Flavour and taste	5 (7%)	28 (41%)	35 (52%)	5.2 ± 1.6
Appearance	6 (9%)	31 (46%)	31 (45%)	5.0 ± 1.7
Quality	4 (6%)	32 (47%)	32 (47%)	5.1 ± 1.6
Starch (potato, rice, pasta, cous cous) ( <i>n</i> = 70)				
Flavour and taste	5 (7%)	32 (46%)	33 (47%)	5.1 ± 1.6
Appearance	7 (10%)	26 (37%)	37 (53%)	5.1 ± 1.7
Quality	8 (11%)	27 (39%)	35 (50%)	5.1 ± 1.7
Other vegetables ( <i>n</i> = 71)				
Flavour and taste	12 (17%)	29 (41%)	29 (41%)	4.7 ± 1.9
Appearance	13 (18%)	27 (38%)	31 (44%)	4.7 ± 1.9
Quality	12 (17%)	26 (37%)	32 (46%)	4.7 ± 1.9

<sup>a</sup>Higher satisfaction denoted by ratings closer to 7.



Satisfaction with the components of the lunch meal, assessed using the Meal Assessment Tool, are presented in Table 3. Vegetables were the meal component that rated the poorest. When asked to compare the overall lunch meal to their expectations, 11% ( $n = 8$ ) rated it as poor, 89% ( $n = 62$ ) rated it as average, whilst no participants rated it as good.

## 4 | DISCUSSION

In this study of 74 adults receiving inpatient services for mental health conditions, almost half of the participants met their estimated energy recommendations and three-quarters met their estimated protein recommendations. Results identified variability and inconsistencies among participants in their satisfaction with meals and the foodservice system. This disconnect between intake, estimated nutritional requirements and expectations is likely to occur because patients in specialist mental health inpatient facilities are recipients of meals and foodservice not designed for them. When health services are collocated at the same hospital, and in the absence of Nutrition Standards for patients in mental health facilities in Victoria, the menu and foodservice is oriented to an older patient demographic where issues of taste preferences, malnutrition, and dysphagia are prevalent.

This study serves as a baseline for exploring the consumer perspective on the meals, eating experience, and nutrition intake of hospitalised adults receiving specialist mental health services. With increasing prevalence and funding<sup>6</sup> to support people with mental health conditions, it is important that the food and nutrition needs of this cohort are understood, that this information is acted on to put appropriate nutrition care strategies in place and that the dietetic profession is shaping this future. There is evidence that individualised dietetic intervention can provide cost-effective nutrition care for people with mental health conditions,<sup>20</sup> but the foodservice system is a platform offering greater reach and delivery of nutrition care to all inpatients.

Literature indicates the foodservice system is a significant determinant of patient satisfaction, and the choice, timing and delivery of food are the most important factors in determining younger patients' satisfaction.<sup>21</sup> A review of strategies to reduce plate waste in hospital recommended foodservice systems that give patients choice, allow selections to be made as close to the mealtime as possible, and promote social interaction at mealtimes.<sup>22</sup> Therefore, making changes to the systems for ordering, plating and distribution of food for patients with mental health conditions, and the settings where meals are consumed, have the potential to increase satisfaction and

intake. Such strategies include spoken menu systems,<sup>23</sup> the use of dining rooms,<sup>24</sup> room service,<sup>25</sup> a la carte style menus and electronic bedside meal ordering.<sup>26</sup> Although not previously reported as being implemented for patients receiving inpatient specialist mental health services, aspects of these models may better align with the younger adult population.

Regrettably, little research has been reported internationally of the nutritional intake and satisfaction of inpatients admitted to units providing specialist mental health services. A study of nutritional intake and foodservice satisfaction undertaken within collocated acute physical and mental health services simultaneously is recommended to enable comparisons and a broader understanding of the food-related issues facing each of these patient groups. Consideration of nutrients beyond energy and protein was beyond the scope of this study, however this is likely to be of clinical interest in this patient cohort and should be undertaken in the future.

This study provides useful lessons for designing future studies in collecting food related information from adults admitted to inpatient mental health facilities. There was a level of inconsistency between the results received (where many patients were satisfied) compared with the observation of half the participants sourcing at least some food from external sources in the observation day. This brings into question the relevance and understanding of foodservice satisfaction surveys more generally. The value of quantitative surveys in the literature whereby the concept that patients think and evaluate in a continuum of satisfaction has been challenged.<sup>27</sup> Some authors have indicated that patients display a more critical nature when they are given an opportunity through open ended questions or other qualitative approaches, and hence uncover greater dissatisfaction.<sup>27</sup> Therefore, further exploration of the foodservice satisfaction of this patient group through qualitative approaches may be valuable. Observation of the meal, through approaches such as ethnography,<sup>28</sup> may also provide valuable insights.

Challenges in collecting intake data in hospitalised patients are also acknowledged. This study used the validated one quarter method, with data collected on hard copy forms and manually collated. Recent innovations such as electronic measurement of plate waste (e.g., Mobile Intake system) have been validated<sup>29</sup> and may provide some efficiencies to this process. Despite not providing the accuracy of weighed food data, time is saved through the use of such systems because recording of food intake occurs once at the bedside which is automatically synchronised to the menu and food composition data.

There are several limitations associated with the methods utilised for determining nutrient requirements, intake and food composition. It is acknowledged that

1 day of observation may not represent usual intake, but it provides a useful snapshot and has been utilised in other point prevalence studies.<sup>30</sup> The use of hospital ready reckoners to estimate some nutrient analyses and the convenience sampling method within this study are also acknowledged as limitations. The absence of more detailed anthropometric data and any biochemical change data limits the strength of conclusions able to be drawn from the study findings. Also, we were unable to report physical and mental health diagnoses due to ethics restrictions placed on the research.

This is one of the first studies to explore food service for hospitalised adults with mental health conditions. We advocate for greater consideration of how the dietetics profession can meet the food and nutrition needs and promote a positive foodservice experience for this patient group. This requires a well-planned menu, careful selection of systems for production, ordering, plating, and distribution of food, and adequate investment in foodservice systems and workforce. We also encourage nursing staff and other members of the mental health team to advocate for improved foodservice provision in healthcare. Their presence and influence within their units is vital to improve food and nutrition for this vulnerable group.

#### AUTHOR CONTRIBUTIONS

JP and JC conceived and co-ordinated the study, ran the statistical analysis and wrote the manuscript. Both authors have approved submission of this version of the manuscript.

#### CONFLICT OF INTEREST

Judi Porter is the Editor-in-Chief of Nutrition & Dietetics and was excluded from the peer review process and all decision-making regarding this article. This manuscript has been managed throughout the review process by the Journal's Editor. The Journal operates a blinded peer review process and the peer reviewers for this manuscript were unaware of the authors of the manuscript. This process prevents authors who also hold an editorial role to influence the editorial decisions made. Jorja Collins has no conflict to disclose.

#### DATA AVAILABILITY STATEMENT

The data reported in this paper are not publicly available due to privacy or ethical restrictions.

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## Evidence as foundation of practice

'I don't know, I'll do a literature search and find out', I promised the head of our ICU, fully expecting that I would find some useful references to show him the next day. Instead I had to admit, embarrassed, that I had not found anything at all to answer our clinical question: 'I'm sorry, I couldn't find any evidence'. His reply surprised me: 'Well, get some!' I had to ask him what he meant. I had never been involved in research and it had never occurred to me that it is perhaps presumptuous to expect that there will always be evidence to answer every clinical question I have; that some researchers somewhere will undertake to study patients just like mine, use rigorous methods to look at exactly the issues facing me in my clinical caseload and publish a nice summary for me to use in my 'evidence-based practice'. If I need evidence for my practice, then perhaps I need to 'get some' for myself.

Evidence-based practice is a concept that sometimes seems to have been overused to the point of meaninglessness. It seems obvious that we should do what evidence indicates is the best practice, if such evidence is available! But this ideal of evidence-based practice is often used negatively, to criticise outdated ideas by contrasting them with 'best practice', not acknowledging some key limitations: that there is no guidance for situations where there is no evidence, or where the evidence is not sound; and the evidence itself is always evolving. Rather than being a kind of benchmark to judge ideas and practices, I think it is really more of a call to be part of a process. Evidence-based practice means knowing what work has been done in a particular area, but also critically appraising that work to see whether, and how, it could be applicable in a particular context. In clinical practice, the particular context may be an individual patient, and quite often our experience and knowledge will tell us that the evidence does not apply to this specific case. Instead of just throwing up our hands in despair, saying 'they never study patients like mine!' or 'I couldn't find any evidence!' we are called to do something about it. And increasingly, dietitians are responding by undertaking research to answer those clinical questions themselves.

I am very proud to introduce this issue of *Nutrition & Dietetics* which features a number of studies undertaken by dietitians in clinical settings. Within the healthcare

system, traditionally there has been little support or resourcing of research in allied health, and in Australia significant change in this situation has occurred only recently. The increase in dietitian-led clinical research has been driven by pioneers in our profession who overcame numerous barriers to build a critical mass of researcher clinicians that could sustain the growth we now see. It has become much more common for research to be included in the job description for a clinical dietitian, and for routine hospital quality improvement projects to be conducted by dietitians to a rigorous standard that allows for valid analysis and publication. Two such examples can be seen in this issue, where Utter et al.<sup>1</sup> analysed a hospital staff health survey to identify ways to improve the food retail service, and Neaves et al.<sup>2</sup> conducted a detailed evaluation of a change in their hospital's food service system, assessing multiple quality dimensions and quantifying the benefits of a more patient-centred approach to meal ordering. Being able to share their findings by the publication of this study means that the authors' work will have an impact beyond the quality reporting in their own hospital.

This integration of research into dietitians' clinical roles has been supported by the increase in research experience and the possibilities for sharing expertise, mentoring and collaboration, which have not been seen before. There is now a good number of clinical dietitians with PhDs conducting research within a clinical caseload, and a greater recognition of our profession's unique contribution to multidisciplinary research projects. All of these factors have helped to build a self-sustaining, and growing, system that continues to produce high-quality work. In addition to these enabling factors, research in clinical dietetics contends with a number of constraints, particularly when working within the healthcare system. But some of these constraints have led to unexpected benefits for our clinical research, promoting flexibility, creativity and the development of some unique strengths.

First, budgetary constraints in the healthcare system have regularly challenged us to review our service delivery to show that it is effective and evidence-based, and to evaluate thoroughly any changes we make to our services and our models of patient care. This has forced everyone in healthcare to think more like researchers, with an



increased emphasis on valid outcome measures and performance indicators. It has helped to justify investigative projects to fill evidence gaps and more rigorous approaches to practice. It has also led to greater support for building networks outside the healthcare system which can otherwise be quite complicated to negotiate, but which potentially provides a source of extra resources, experience and expertise to build research capacity amongst clinicians. The importance of resource limitations in healthcare has also led to the development of expertise in health economics and a greater sensitivity to cost implications in clinical research. The study by Sheedy et al.<sup>3</sup> in this issue is an example of this, where the authors have quantified the cost to the patient of following dietary advice for the debilitating condition eosinophilic oesophagitis. This meticulous analysis identifies cost as a significant barrier to adherence, as common practice recommendations may be completely unaffordable for some patients.

Second, limitations in resources mean that much of the research in healthcare is conducted by clinicians as part of their usual workloads, with a consequent emphasis on investigating clinical questions that have arisen from practice. In research, it can often be challenging to justify a project and demonstrate its impact, and there can be large gaps between knowledge creation and translation, but this is less often the case with clinical projects. It is much easier to show how a study benefits clinical care when the research question comes directly out of the clinical work and feeds back into it in a much more immediate way. The clinical context is therefore a rich environment for translational studies, action research, and implementation science. The study by Blake et al.<sup>4</sup> in this issue exemplifies this, evaluating a novel model of dietetic care with a prophylactic gastrostomy tube in patients being treated for head and neck cancers. By looking at practical considerations such as adherence, in addition to clinical outcomes, the authors can show the value of familiarising patients with tube management earlier in their journey, as part of a prehabilitation process, and justify this new approach to patient care.

Third, the constraints of the clinical setting and the clinical workload may mean that it is not feasible to run a large double-blinded randomised controlled trial and it may be necessary to be more creative, or more pragmatic. This could involve cluster randomisation, or an observational design. Alternatively a qualitative approach can be richly informative, like the New Zealand study of gestational diabetes management by North et al.<sup>5</sup> also in this issue, which identifies gaps in primary care and how dietetics resources may be best employed in this area.

Another approach is a retrospective study which can harness an existing database, like this issue's study by Izekawa et al.<sup>6</sup> who use a large dataset of over 40 000 stroke patients to show that feeding early in the hospital admission is associated with increased likelihood of being discharged home. The constraints of the clinical setting need not constrain the quality of the evidence we obtain.

Fourth, when research is conducted in the clinical setting, it is often necessarily limited to the patients available in that setting, and conducted by the dietitian in that setting. This forces the study to be patient-focused, which is an approach increasingly valued in the health system as part of holistic care. In this issue, the study by Croisier et al.<sup>7</sup> exemplifies this, following women through their treatment for gynaecological cancer from the first day of radiotherapy to 6 months later and making links between symptom management, nutritional status and quality of life. The dietitian's role influences all of these aspects of the patient's journey.

The current emphasis on patient-centred care, in Australia and internationally, gives dietitians an advantage as this is already central to our practice. Dietitians' unique expertise is in translating between science and everyday life, between nutrients and the foods and behaviours that provide them to our bodies. Nutrition affects all of the processes in the body, and food interacts with so many aspects of life such as health, relationships, culture, and activities of daily living. So there is no approach to a patient that is more holistic than dealing with food and nutrition, which affects their whole body and their whole life. In this issue, the study by Marsh et al.<sup>8</sup> exemplifies this, analysing the eating behaviour of outpatients with inflammatory bowel disease, and identifying an interesting disconnect between the foods that help this condition and the foods that the patients typically eat. Dietitians are routinely presented with the complex task of incorporating patients' food beliefs, and food behaviours, into the dietary recommendations that are based on the available evidence.

This brings us back to the notion of evidence-based practice and its role in clinical care. The study by Edwards et al.<sup>9</sup> looks at the use of a current guidelines document amongst dietitians working in head and neck cancer. The authors point out that there are multiple barriers to implementing guideline recommendations, which can lead to a large evidence-to-practice gap. The study's analysis of these barriers will enable future work to close this gap.

All of the authors in this month's issue of the journal are to be congratulated for their contribution to the evidence that is the foundation of our practice in nutrition and dietetics. Dietitians Australia supports this journal to

build our evidence base and promote and develop our clinical knowledge, and the Editorial Board are commended for their hard work in establishing the journal as a high-quality publication with increasing recognition worldwide. The journal's impact factor has increased from 1.7 to 2.3 since 2019 and there has been steady improvement in other metrics. A further recent development is the new agreement between Wiley and the Council of Australian University Librarians to allow more of our accepted papers to be published as open access at no charge to the authors. This is a great initiative that will allow greater scope for disseminating our work. Our thanks go to the members of the journal's Editorial Board, to the reviewers, and of course to the authors, for their contributions to this issue of *Nutrition & Dietetics*.

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## ORIGINAL RESEARCH

# Work site food purchases among healthcare staff: Relationship with healthy eating and opportunities for intervention

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## Abstract

**Aim:** The current study describes food-purchasing behaviours of healthcare staff, determines whether purchasing food at work is associated with overall indicators of healthy eating, and explores opportunities for improving the hospital food environment.

**Methods:** A secondary analysis of a health and wellbeing survey of healthcare workers ( $n = 501$ ) in Queensland, Australia. Multiple regression models describe the associations between food purchases and indicators of healthy eating, while controlling for age, gender and work role.

**Results:** More than 60% of staff purchased food/drinks at work in the past week, and this was inversely associated with indicators of healthy eating. For example, among those purchasing food/drinks at work on most days, only 18% reported their overall diet as excellent or very good, compared to 50% of those who do not purchase food/drink at work (odds ratio [OR] = 0.24; 95% confidence interval [CI] = [0.12,0.48] in adjusted models). Staff feedback prioritised strategies to make healthy meals more accessible and affordable.

**Conclusion:** Improvements to the retail food environment in hospitals could have a positive impact on the overall nutritional wellbeing of staff.

## KEYWORDS

diet, food and nutrition, food habits, healthcare, hospital, work-site

## 1 | INTRODUCTION

Globally, healthcare workers experience high rates of poor nutrition<sup>1–3</sup> and obesity.<sup>4</sup> A systematic review reported that half of the nurses in the United States eat poor-quality diets

and approximately 60% are overweight or obese.<sup>2</sup> Similarly, in the United Kingdom, more than half of healthcare professionals eat too few fruits and vegetables<sup>3</sup> and are overweight or obese.<sup>4</sup> A large survey of Australian nurses found that only 40% were in a healthy weight range and fewer than 10% met the Australian recommendations for fruit and vegetable consumption.<sup>1</sup> This is only slightly

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better than the general population of adults in Australia, where one third are in a healthy weight range and 5% meet recommendations for fruit and vegetable consumption.<sup>5</sup>

Unhealthy eating behaviours can impact the physical health and emotional wellbeing of healthcare workers<sup>6</sup> and, ultimately, the quality of care they provide. Healthcare providers who engage in healthy lifestyle behaviours themselves are more likely to advise and discuss appropriate behaviour changes with their patients and be viewed as more trustworthy by them.<sup>7-9</sup> Additionally, nutrition-related health concerns, such as obesity, result in financial costs to organisations through absenteeism, presenteeism and losses in productivity,<sup>10</sup> and work site nutrition interventions have been demonstrated to improve productivity and performance among employees.<sup>11</sup>

Work site nutrition initiatives in healthcare settings hold promise in their ability to improve health outcomes among staff.<sup>12</sup> However, the majority of these interventions have emphasised individually-focused behavioural and educational strategies rather than environmental changes.<sup>12,13</sup> Individually-focused programs can be successful in achieving reduction in obesity if they are intensive, delivered face-to-face and sustained over a period of time, but these programs have limited reach and high attrition.<sup>12</sup> Environmental interventions that address the food environment of work sites, including hospitals, have a greater reach and may be effective in changing the healthy eating and activity behaviours that contribute to preventing poor health outcomes.<sup>14,15</sup> Interventions that make improvements to the affordability, availability and accessibility of healthy foods in retail environments in hospitals also show promise in having a positive impact on staff food purchases.<sup>16-18</sup>

Yet, healthcare workers spend only a limited amount of time at their work site, and it remains largely unknown how significant the work food environment is to the overall nutritional wellbeing of staff. A study of American healthcare workers<sup>19</sup> found that healthy food choices in the work site cafeteria were associated with overall diet quality and health risk. Specifically, those who bought the healthiest foods at work ate healthier outside of work and had better cardiometabolic health indicators. But, a survey of employed adults in the United States found that fewer than half reported having access to affordable healthy food at work.<sup>20</sup> In Australia, most states have guidelines or policies to ensure healthcare staff have adequate access to healthy food and drinks on site, yet the implementation of these policies is varied.<sup>21</sup>

The aim of the current research is to extend this body of work to understand more about the significance of the hospital food environment to nutritional wellbeing of staff and explore opportunities for improvement. Specifically, the objectives of the current research are to describe the food-purchasing behaviours of healthcare staff, determine whether purchasing food at work is associated with overall

indicators of healthy eating, and explore opportunities for supporting healthcare staff to eat more healthfully at work.

## 2 | METHOD

All staff ( $n = 6100$ ) employed at Mater South Brisbane, a large healthcare organisation in south-east Queensland, Australia, were invited to participate in a health and wellbeing survey amidst the COVID-19 pandemic. The primary aim of the survey was to understand how the COVID-19 pandemic affected the work, health and wellbeing of hospital-based staff. In total, 501 staff (88% female) completed the survey.

Staff were invited to participate in the anonymous survey between 17 and 31 August 2020. The survey was administered online, via REDCAP. Staff were notified about the survey through individual emails, staff COVID email updates and staff online newsletters. Information was provided about the research through these forums, and participants gave implicit consent by starting the survey. Participation in the survey was voluntary and anonymous. Participants could quit the survey at any time. The Human Research Ethics Committee at Mater Research granted ethical approval for the survey (HREC/MML/64490).

On 17 August 2020 (the first day of the survey), Queensland had 1091 confirmed cases of COVID-19 and no community transmission for 28 days. On 20 August, a new community outbreak emerged bringing the total number of cases to 1122 by the completion of the survey. During this time, businesses were operating with COVID-safe plans and the state borders were closed. On 22 August 2020, Queensland Health announced restrictions limiting visitors to hospital.

*Purchased food/drinks at work* was assessed with a single question, 'During the past 7 days, how many times did you purchase food/drinks on site at work?' with response options including 'most days', 'occasionally or sometimes' and 'I haven't purchased food/drinks at work'. *Overall diet quality* was assessed with the item, 'In general, how healthy is your overall diet?' Responses were categorised as 'excellent or very good' and 'good, fair or poor'. *Home-cooked dinner* was assessed with the question, 'During the past 7 days, how many times did you or someone in your family cook food for dinner at home?' with responses categorised as five or more times a week and less than five times a week. *Shared meal with family* was similarly assessed with a single question and responses dichotomised at the same frequency. Overall diet quality, home-cooked dinner, and shared meal with family were dichotomised so there were similar numbers in each group.

*Fruit consumption* and *vegetable consumption* were assessed with two items asking 'What is your usual



number of serves of (fruit/vegetables) per day'. Fruit consumption was dichotomised according to recommendations set by the Australian Dietary Guidelines.<sup>22</sup> Because too few staff met the recommendations for vegetable consumption, responses were dichotomised at three or more serves per day. Consumption of *sugar-sweetened beverages* was assessed with the item, 'How often do you consume sweetened drinks (e.g. soft drinks, energy drinks, flavoured milk, cordial)?' with responses dichotomised as weekly or more often and less than weekly to achieve similar numbers in each group.

Support for strategies to create a healthier food environment for staff was assessed with the item, 'How should (hospital) improve the food environment on site for staff? (choose all that apply)'. Participants could then select from a list of 14 ideas and include free text as an 'other' option.

Age and gender were self-reported by participants. Age was calculated by subtracting participant's reported year of birth from the year of the survey. Participants were asked to respond to 'what is your gender' by selecting 'male,' 'female' or 'not specified'. Participants were asked to describe their *work role* through free text. Responses were classified as 'doctor', 'nurse', 'allied health' (e.g. physiotherapists, dietitians), 'professional services' (e.g. executive, research) and 'administration and support staff' (e.g. ward services, phlebotomists, office support).

In total, 501 staff (88% female; 10% male; 2% not specified) completed the survey. Of the participants, approximately 20% were under the age of 30, 24% were 30–39 years, 24% were 40–49 years, 23% were 50–59 years and 10% were over the age of 60 years. Most participants were nurses (39%), 24% were hospital support staff, 17% were allied health workers, 15% were professional support staff, and 10% were doctors.

All analyses were conducted using STATA/IC 16.1 software (College Station, TX). The proportion of staff purchasing food and drinks at work as well as proportions by socio-demographic subgroups were generated; 95% confidence intervals [CIs] provide estimates of the precision of the proportions and allow for between-group comparisons. Multiple regression models (all logistic regression) were constructed to describe the associations between purchasing food/drinks from work (independent variable) and indicators of healthy eating (all binary, dependent variables), while controlling for age, gender and work role. All differences were considered to be statistically significant at  $p < 0.05$ . All free-text was analysed by the lead author following a general inductive method.<sup>23</sup> High-level categories were derived through close-readings of the text to align with the aims of the study.

### 3 | RESULTS

Purchasing food and/or drinks on site at work was common for healthcare staff (Table 1). More than 60% of staff purchased food/drinks in the past week (63%). Purchasing food/drinks was common for both males and females, across all age groups and among all professions.

Purchasing food/drinks at work was inversely associated with indicators of healthy eating (Table 2). Among those purchasing food/drinks at work on most days, only 18% reported their overall diet as excellent or very good, compared to 50% of those who did not purchase food/drink at work. These differences were statistically significant when accounting for the independent effects of age, gender and work role (odds ratio [OR] = 0.24; 95% CI = [0.12, 0.48]). Similarly, purchasing food/drinks at work was significantly inversely associated with having home-cooked dinners, sharing meals with families, and consumption of fruits and vegetables. In contrast, purchasing food/drinks at work most days was associated with consuming sugar-sweetened beverages weekly or more often (OR = 2.45; 95% CI = [1.3, 4.7]).

In general, participants were supportive of a wide range of initiatives to improve the food environment for staff (Figure 1), and open-ended comments from participants were consistent with these findings (Table 3). For example, more than 70% of staff were supportive of more affordable meals in the hospital. Comments included descriptors such as 'very very expensive' and 'totally over-priced' in reference to the cafes in the hospital. Nearly half of participants endorsed items to increase the range of services and options to purchase food (after-hours options and quick-service options). Suggestions including 'food delivery service', 'pre-ordered meals for pick-up' and 'pay deduction' were made by participants. There was a high level of support for an increase in healthier meals (59%) and healthier vending options (39%). Specifically, participants noted requests for 'more variety, more fresh options', 'more natural/whole food ingredients' and 'fresh sandwiches made to your choice'. In addition, multiple comments were made with regard to special dietary requirements including vegetarian options, gluten-free and low-carbohydrate options. Last, there was a high level of support for initiatives to improve hospital infrastructure, such as outdoor eating areas (59%). Multiple comments for improving staff rest areas were made, notably around availability of food storage and preparation equipment, and opportunities for a meaningful break. As one participant noted, 'increase lunch break by 15 min, to allow staff to heat lunch and get outside'.

TABLE 1 Frequency of purchasing food and drinks from work, by characteristics of staff

	Purchased food and drinks at work, past week								
	Most days			Sometimes/occasionally			None		
	<i>n</i>	%	CI <sup>a</sup>	<i>n</i>	%	CI	<i>n</i>	%	CI
Total	76	16.7%		214	47.0%		165	36.3%	
Gender									
Male	10	23.8%	[13.3, 38.9]	22	52.4%	[37.5, 66.9]	10	23.8%	[13.3, 38.9]
Female	65	16.1%	[12.8, 20.0]	188	46.5%	[41.7, 51.4]	151	37.8%	[32.8, 42.2]
Not specified	1	11.1%	[1.5, 50.1]	4	44.4%	[17.6, 74.9]	4	44.4%	[17.6, 74.9]
Age (years)									
>30	12	15.8%	[9.2, 25.8]	38	50.0%	[39.0, 61.0]	26	34.2%	[24.4, 45.5]
30–39	25	22.9%	[16.0, 31.8]	49	45.0%	[35.9, 54.3]	35	32.1%	[24.0, 41.4]
40–49	16	14.4%	[9.0, 22.2]	51	46.0%	[36.9, 55.3]	44	39.6%	[31.0, 49.0]
50–59	16	15.5%	[9.7, 24.9]	49	47.6%	[38.1, 57.2]	38	36.9%	[28.1, 46.6]
60+	6	13.0%	[6.0, 26.2]	23	50.0%	[35.9, 64.1]	17	37.0%	[24.3, 51.7]
Role									
Nurse	23	13.9%	[9.4, 20.1]	77	46.7%	[39.2, 54.3]	65	39.4%	[32.2, 47.1]
Doctor	10	41.7%	[24.0, 61.7]	8	33.3%	[17.6, 53.9]	6	25.0%	[11.7, 45.7]
Professional services	7	11.5%	[5.6, 22.2]	32	52.5%	[40.0, 64.6]	22	36.1%	[25.0, 48.8]
Allied health	9	11.8%	[6.3, 21.2]	38	50.0%	[38.9, 61.0]	29	38.2%	[27.9, 49.5]
Admin and support staff	21	20.4%	[13.7, 29.2]	48	46.6%	[37.2, 56.3]	34	33.0%	[24.6, 42.7]

Abbreviation: CI, Confidence interval.

<sup>a</sup>95% CI for the prevalence estimate.

TABLE 2 Relationships between purchasing food and drinks at work and indicators of healthy eating

	% <sup>a</sup>	OR <sup>b</sup>	CI <sup>c</sup>	%	OR	CI	%	OR	CI
	Overall diet			Home-cooked dinner			Shared meal with family		
	Excellent or very good			5+ a week			5+ a week		
Purchase food and drinks at work, past week									
Most days	18.4%	0.24	[0.12, 0.48]	36.0%	0.29	[0.15, 0.54]	40.5%	0.4	[0.22, 0.74]
Sometimes, occasionally	34.7%	0.58	[0.38, 0.90]	52.8%	0.68	[0.44, 1.1]	56.6%	0.94	[0.61, 1.45]
None	50.3%	Ref	Ref	63.8%	Ref	Ref	58.0%	Ref	Ref
	Fruit consumption			Vegetable consumption			Sugar-sweetened beverages		
	2+ a day			3+ a day			Weekly or more often		
Purchase food and drinks at work, past week									
Most days	36.0%	0.44	[0.23, 0.82]	44.0%	0.36	[0.19, 0.67]	40.8%	2.45	[1.3, 4.7]
Sometimes, occasionally	51.5%	0.80	[0.51, 1.25]	56.3%	0.57	[0.36, 0.90]	28.0%	1.26	[0.76, 2.09]
None	56.5%	Ref	Ref	68.9%	Ref	Ref	23.0%	Ref	Ref

Abbreviations: CI, Confidence interval; OR, odds ratio.

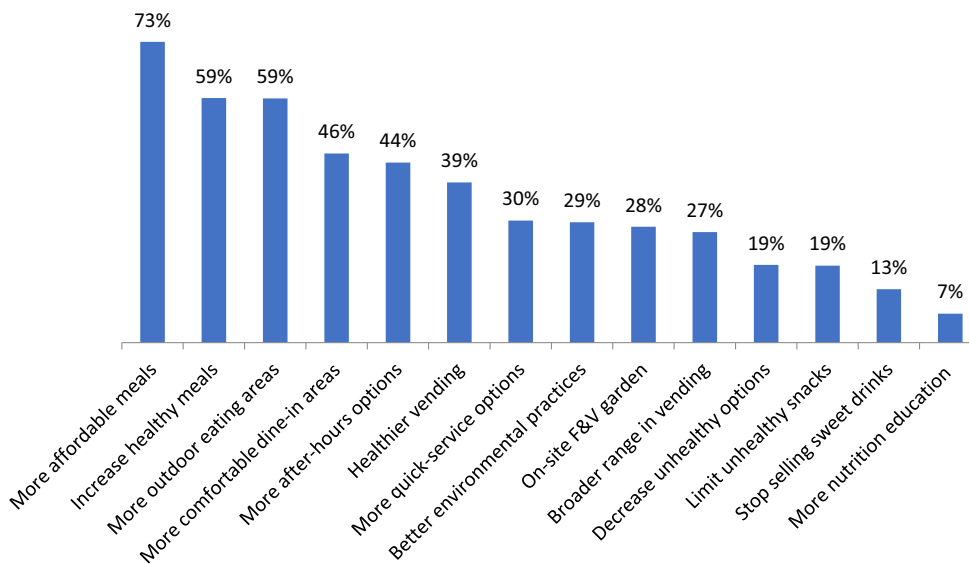
<sup>a</sup>Percentages are unadjusted.<sup>b</sup>OR adjusted for age, gender and work role.<sup>c</sup>95% CI for OR estimates. If the CI includes 1, the result is non-significant.

## 4 | DISCUSSION

Results from the current study suggest that purchasing food and drinks from work is common among healthcare staff and is associated with indicators of less healthy eating

overall. These findings are consistent with a study of American healthcare workers<sup>19</sup> that found that those who bought the healthiest foods at work ate healthier outside of work. In some regards, these results are not surprising, given that foods prepared away from home are generally

**FIGURE 1** Proportion of participants supporting strategies to create a healthier food environment for staff. F&V, Fruits and vegetables



**TABLE 3** Key suggestions from participants on how to improve the food environment in the hospital

Category	Example quotes
Cost of food	‘Reduce the cost of eating in the cafe it is very expensive’ ‘Bring on board another company. (Food Retailer) is so very very expensive...’ ‘... salads are full of carbs and totally over-priced’
Range of food retail services	‘pay deduction like parking card’ ‘cafe to have hot dinner meals available to 12 hr night shift and late shift staff that haven’t been packaged for hours. Fresh hot options’ ‘Healthy, quick options that are more easily accessible. 10–15 minutes of my 30 minute break is getting to a cafe, being served and getting back to the staff room’ ‘Have a delivery menu and service for staff to pre-order meals to their tea room. Have a general menu available in staff rooms for staff to pre-order their meals for pick up’.
Healthier options	‘more variety, more fresh options, more options for those with dietary requirements’ ‘more natural/whole food ingredients’ ‘The food is the same everyday we need some variety’ ‘Would love a sandwich bar to have fresh sandwiches made to your choice’ ‘More vegetarian and vegan options’
Hospital infrastructure	‘Refrigeration for lunch boxes, small cupboards for pantry items. Microwave toaster, sandwich press, hot water facilities. Basic supply of bread sugar milk tea, coffee...’ ‘Open up the outdoor staff’ ‘Making sure staff have to opportunity to have their lunch break, increase lunch break by 15 minutes to allow staff to heat lunch and get outside’ ‘Provide more options for staff to be able to be away from their work area and also away from public areas’

less healthy than home-prepared meals.<sup>24</sup> However, the healthcare setting is a unique one as staff generally have a high level of education and the hospital food environment in the current study is prioritising adherence to government direction to promote healthy eating.<sup>25</sup>

Findings from the current study suggest that, overall, staff were supportive of work site initiatives to promote healthy eating. Staff were particularly supportive of initiatives that increased the accessibility and affordability of healthy foods on site. These findings were similar to a survey of employed adults in the United States, which

found that staff most supported access to free water, and better affordability and availability of healthy meals.<sup>20</sup> Improving accessibility and affordability of healthy meals at work shows some promise in improving what staff eat. An intervention in work site cafeterias found that by increasing the number of healthy options and decreasing the number of unhealthy options available, staff purchased fewer calories.<sup>26</sup> Moreover, staff were generally in favour of the changes. Similarly, an intervention to offer financial incentives to purchase healthy foods, combined with influencing social norms of the work site, was

effective in increasing the number of purchases of the healthiest food items at work.<sup>27</sup>

Strengths of the current study include the large sample size and timeliness of the data. However, there are a few limitations to consider when interpreting these findings. First, the response rate for the current staff survey is low, and the respondents may not represent all employees or any subcategory of employee. In addition, the survey was framed as a wellbeing survey during the COVID pandemic and that may have biased who responded. It is worth noting though that in Australian hospitals, approximately 40% of the staff are nurses and 10% doctors,<sup>28</sup> and this breakdown is similar to respondents to the current survey. Second, the direction of the relationship between purchasing food at work and overall indicators of healthy eating cannot be established with a cross-sectional study design. It is possible that staff who eat poorly overall are more likely to purchase food at work. Regardless, the findings suggest that improvements to the food environment at work would be welcomed and appreciated by staff, and may ultimately have a positive impact on their nutritional intake. Last, the measures of dietary indicators in the current study were brief and not previously tested for validity and/or reliability. That said, these measures do not attempt to measure dietary intake comprehensively, rather they attempt to describe the key dietary behaviours associated with health.

Good nutrition plays an important role in the health and wellbeing of healthcare staff. Findings from the current study suggest that improvements to the retail food environment in hospitals could have a positive impact on the healthy eating behaviours of staff. In addition, improvements to the availability and affordability of healthy foods are heavily favoured by staff. Future work in health promotion and evaluation may consider innovative opportunities to improve the hospital food environment and strategies to build food skills for staff that extend to their families and their communities. Future research can evaluate the impact of novel interventions to promote better nutrition among healthcare workers on diet quality and broader indicators of health and wellbeing. Last, researchers may explore opportunities to promote healthier eating initiatives in hospitals, as perceived by retailers and food-service providers.

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## CONFLICT OF INTEREST

The authors declare that they have no conflicts of interest to disclose.

## AUTHOR CONTRIBUTION

Jennifer Utter and Sally McCray conceived the research question and Jennifer Utter drafted the manuscript. Jennifer Utter and Simon Denny designed the questionnaire and collected and analysed the data. Jennifer Utter, Sally McCray and Simon Denny interpreted the findings and critically reviewed the manuscript. All authors approved the final submission.

## DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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**ERRATUM**

The authors would like to draw the reader's attention to an error in the following article:

Barbour L, Bicknell E, Brimblecombe J, et al. Dietitians Australia position statement on healthy and sustainable diets. *Nutrition & Dietetics*. 2022;79(1):6–27. doi:10.1111/1747-0080.12726

The 'Conflict of Interest' statement should read as below:

**CONFLICT OF INTEREST**

Liza Barbour, Ellyn Bicknell, Stefanie Carino, Molly Fairweather, Mark Lawrence and Juliet Slattery are members of Dietitians Australia. Elizabeth World is a staff member of Dietitians Australia. Mark Lawrence is a representative of Dietitians Australia's Advocacy and Policy Advisory Committee (APAC). The first author received funding from Dietitians Australia to lead the development of this paper.

The publisher apologises for the error and any inconvenience it may have caused.