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Published in:
Nutrition and Dietetics

DOI:
[10.1111/1747-0080.12724](https://doi.org/10.1111/1747-0080.12724)

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Recommended citation(APA):
Utter, J., McCray, S., & Denny, S. (2022). Work site food purchases among healthcare staff: Relationship with healthy eating and opportunities for intervention. *Nutrition and Dietetics*, 79(2), 265-271.
<https://doi.org/10.1111/1747-0080.12724>

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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^{1–3} and obesity.⁴ A systematic review reported that half of the nurses in the United States eat poor-quality diets

and approximately 60% are overweight or obese.² Similarly, in the United Kingdom, more than half of healthcare professionals eat too few fruits and vegetables³ and are overweight or obese.⁴ 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.¹ This is only slightly

Funding: No additional funding was provided for this research.

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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.⁵

Unhealthy eating behaviours can impact the physical health and emotional wellbeing of healthcare workers⁶ 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.⁷⁻⁹ Additionally, nutrition-related health concerns, such as obesity, result in financial costs to organisations through absenteeism, presenteeism and losses in productivity,¹⁰ and work site nutrition interventions have been demonstrated to improve productivity and performance among employees.¹¹

Work site nutrition initiatives in healthcare settings hold promise in their ability to improve health outcomes among staff.¹² However, the majority of these interventions have emphasised individually-focused behavioural and educational strategies rather than environmental changes.^{12,13} 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.¹² 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.^{14,15} 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.¹⁶⁻¹⁸

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 workers¹⁹ 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.²⁰ 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.²¹

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.²² 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.²³ 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 ^a	<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.

^a95% CI for the prevalence estimate.

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

	% ^a	OR ^b	CI ^c	%	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.

^aPercentages are unadjusted.^bOR adjusted for age, gender and work role.^c95% 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 workers¹⁹ 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

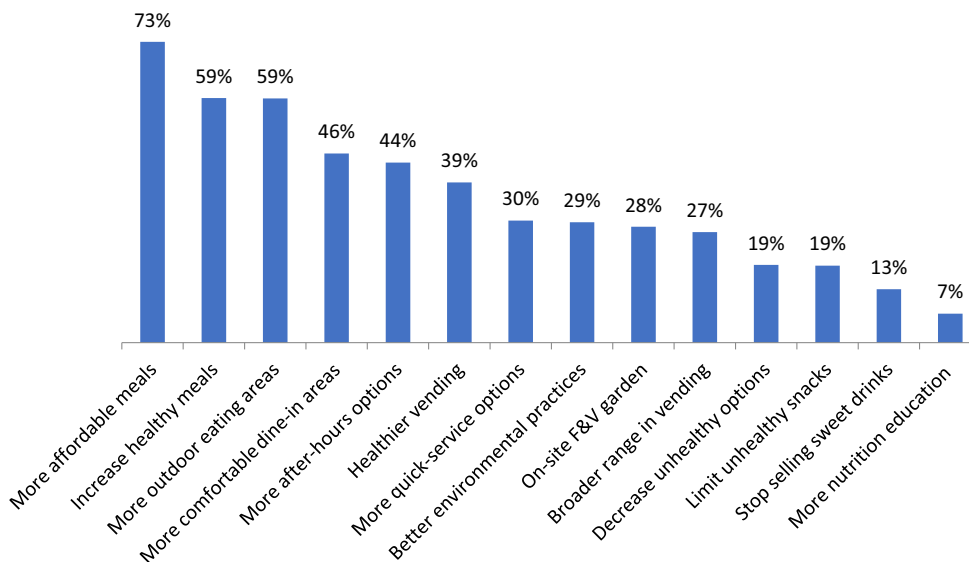


TABLE 3 Key suggestions from participants on how to improve the food environment in the hospital

Category	Example quotes
Cost of food	<ul style="list-style-type: none"> ‘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	<ul style="list-style-type: none"> ‘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	<ul style="list-style-type: none"> ‘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	<ul style="list-style-type: none"> ‘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.²⁴ 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.²⁵

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.²⁰ 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.²⁶ 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.²⁷

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,²⁸ 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.

ACKNOWLEDGMENT

Open access publishing facilitated by Bond University, as part of the Wiley - Bond University agreement via the Council of Australian University Librarians.

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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How to cite this article: Utter J, McCray S, Denny S. Work site food purchases among healthcare staff: Relationship with healthy eating and opportunities for intervention. *Nutrition & Dietetics.* 2022;79(2):265-271. doi:10.1111/1747-0080.12724