
ORIGINAL RESEARCH

Student food insecurity: The skeleton in the university closet

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Abstract

Aim: Food security is an important nutrition issue among vulnerable population groups such as the young and socioeconomically disadvantaged. The present study sought to identify and describe the prevalence, distribution and severity of food insecurity, and related behavioural adaptations, among a sample of Australian university students.

Methods: A cross-sectional survey design involving a self-administered questionnaire consisting of 39 food security-related and 15 demographic questions administered among a sample of university students.

Results: A sample of 399 students completed questionnaires representing a response rate of 71.5% of students invited to participate. Sample demography was representative of the total student population except for being overrepresented by full-time and international students. Food insecurity was evident in the student sample ranging from 12.7% to 46.5% (based on method of analysis). Student food insecurity was significantly associated with those renting, boarding or sharing accommodation, with low incomes or receiving government assistance. Coping strategies developed by students focused on income generation and austerity measures, included living with parents, working more than 10 hours per week outside of university and borrowing money and food. Students who reported food insecurity were more likely to rate their overall health status lower than those who were food secure.

Conclusion: The present study suggests university students are at significant risk of food insecurity in part attributed to inadequate income support. Further research is required to assess the broader determinants of food insecurity and appropriate strategy responses, including social support policies, in this population group.

Key words: food insecurity, risk factor, university student.

Introduction

Food security, considered as a basic human right, exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for a healthy and active lifestyle.¹ Food insecurity can refer to not having sufficient food; experiencing hunger as a result of running out of food and being unable to afford more; eating a poor-quality diet as a result of limited food options; anxiety about acquiring

food; or having to rely on food relief.² Ensuring food security is a major global challenge, particularly in the developing world economies,³ and is also a focus for concern in developed economies such as Australia.^{1,4} Food insecurity has been identified as a determinant of dietary quality, which can contribute paradoxically to overweight and obesity, and in severe forms, under nutrition.⁵ Although the Australian population is considered food secure as a whole, pockets of food insecurity have been identified among subpopulations such as single-parent households, people at social or geographical disadvantage, the homeless and the young.^{2,5}

Recent findings from Australian studies that university students are experiencing poverty and increasing financial stress increases the likelihood that university students may be at risk of food insecurity.^{6–9} A recently published Hawaiian study of the prevalence of food insecurity suggests that university students in other developed economies are also vulnerable during this life stage.¹⁰ At the same time, the Australian government is promoting greater participation in tertiary education as a strategy to address Australia's

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long-term economic challenges, particularly among socio-economically disadvantaged population groups that are at most risk of food insecurity,² and is beginning to implement selected recommendations of the 2008 Review of Higher Education (The Bradley Review).¹¹ The adequacy of student income support and social welfare has been criticised and under review since at least 2005 when the Senate Employment, Workplace Relations and Education Reference Committees inquired into student support measures.

There is a general consensus that access to an education provides a springboard to a rewarding and prosperous life by improving human and social capital.^{6,12} Food insecurity in this context therefore presents as a significant policy implementation dilemma that potentially undermines the socio-economic development agenda of tertiary education.

While there is limited evidence on the extent, determinants or consequences of food insecurity in university student populations, there is considerable evidence from multiple studies that food insecurity has negative impacts on academic outcomes among children of various age groups.¹⁰ Food insecurity is an issue that not only reduces an individual's physical and mental ability, it can also reduce the potential for social and economic development as a result of reduced social participation in tertiary education and increased risk of diet-related diseases.^{12,13} Poor nutrition because of inadequate, inferior or unpredictable food intake can lead to ill health within these population groups.²

Food insecurity has been reported to exist in 5.2% of the Australian population and at greater rates in men and women aged 19–24 years (10%), the unemployed (11.3%) and those paying rent or board (15.8%).^{2,14} The 2001 NSW Child Health Survey found that food insecurity occurred in 6.2% of the general population, of whom 74.6% reported eating the same meal for several days in a row; and 43.7% stated that their children were not fed balanced meals.² The prevalence of food insecurity in Queensland was found to occur in 6.4% of individuals and within 9.7% of households. There have been no published national studies to determine the prevalence of food insecurity within the Australian university student population. Internationally, the prevalence of food insecurity among university students has recently been estimated to be 21% in Hawaii.¹⁰ Canadian studies have highlighted the occurrence of food insecurity within their University student population in response to a rise in compulsory tuition fees and the inadequacy of the student loan system. These increased student costs have led to university-specific responses such as campus food banks.^{15,16}

The present study aimed to identify and describe the prevalence, distribution by socioeconomic and demographic attributes and severity of food insecurity, and related behavioural adaptations, among a sample of Australian university students.

Methods

This cross-sectional study received ethics approval from the Griffith University Human Research Ethics Committee. Participants were recruited at a Queensland-based University

campus by heterogeneous purposive sampling. The sampling strategy conservatively aimed to recruit approximately 400 students from a total sample frame of 13 800 students, based on sample size calculations using 95% confidence intervals and prevalence of food insecurity ranging from 5% to 21% (range derived from earlier studies).^{2,10} This suggested a sample size of greater than 250 would be required if the upper range of food insecurity prevalence was applied. Students were approached by the researchers (authors 2 and 3) at a strategic mix of geographical recruitment sites in order to incorporate students from a broad range of campus sectors. Once confirmed as a student and willing to participate via an informed consent process, students completed a self-administered questionnaire and returned the questionnaire directly to the researchers. Anonymity of participating students was ensured as questionnaire data were non-identifiable to the analysis team.

A questionnaire was developed to include items to collect demographic information, food habits, food experiences relating to food insecurity, use of support services, accommodation, transport and financial aspects of the respondents' experiences. The questionnaire concentrated on the students' food habits and experiences of food insecurity during their current year of university. The questionnaire took 10 minutes to complete.

Food insecurity measurement items were derived from the United States Department of Agriculture (USDA) Community Food Security Assessment Toolkit¹⁷ and included the single-item question from the Australian National Nutrition Survey (NNS) [*In the last 12 months, were there any times that you ran out of food and could not afford to buy any more?*], which has been widely used to assess food security within the Australian population (Table 1).^{2,13}

To estimate the prevalence and severity of food insecurity within the student population, single- and multi-item measures were formulated using questions from the Australian National Nutrition Survey and USDA questions (adapted to suit the Australian student population). The relative severity of food insecurity (food insecurity without hunger and food insecurity with hunger) was based on the severity rank in questions in the USDA food security scale (Table 1).¹⁷

Data were analysed using statistical analysis software SPSS (Statistical Package for the Social Sciences-v17 for Windows, Chicago). Campus data were provided by the relevant University Office of Quality, Planning and Statistics. Demographic attributes of the student sample were summarised using descriptive statistics.

Chi-squared analysis was used to compare food security measures with a range of categorical variables and Chi-squared goodness of fit used to compare University student data with existing Australian population data.

Results

A total of 399 completed questionnaires were returned from the 575 students approached to participate in the study, with a response rate of 71.5%. This represented 3% of all students on the Gold Coast campus (n = 13 800). The student sample

Table 1 Estimating food insecurity prevalence and severitySingle-item measure^{2,13}

An individual was classified as food insecure if they answered 'yes' to the following question

- In the last 12 months, were there any times that you ran out of food and couldn't afford to buy any more?

Multi-item measure¹⁷

Individuals were classified as food insecure without hunger if they answered 'often true' or 'sometimes true' to any of the following statements:

- I worried that my food would run out before I had money to buy more.
- I couldn't afford to eat balanced meals.
- The food that we (including only family members) bought just didn't last, and we (including only family members) didn't have money to get more.

And/or:

- If they answered 'sometimes not enough to eat' or 'often not enough to eat' to: 'Which of these statements best describes the foods eaten in your household (including only family members)?'

Individuals were classified at a higher severity of food insecurity (food insecure with hunger) if they answered 'yes' to any of the following questions:

- Did you or other adults in your household (including only family members) ever decrease the size of your meals or skip meals because there wasn't enough money for food?
- Were you ever hungry but didn't eat because you couldn't afford enough food?
- Did you lose weight because you didn't have enough money for food?
- Did you or other adults in your household (including only family members) ever not eat for a whole day because there wasn't enough money for food?

was representative of the total sample frame for level of study (undergraduate vs postgraduate; $\chi^2_{\text{goodness of fit}} = 1.85, P = 0.174$), gender ($\chi^2_{\text{goodness of fit}} = 1.41, P = 0.23$) and Aboriginal and Torres Strait Islander heritage ($\chi^2_{\text{goodness of fit}} = 0.39, P = 0.53$). The study sample was overrepresented by international students ($\chi^2_{\text{goodness of fit}} = 4.5, P = 0.032$) and full-time students ($\chi^2_{\text{goodness of fit}} = 2.8, P = 0.001$).

Table 2 summarises demographic attributes of the student sample and the prevalence of food insecurity using single- and multi-item measures.

The prevalence of food insecurity in this sample using the single-item measure derived from the NNS was 12.7%, which is more than double that observed in the broader Australian population (5.2%; $\chi^2_{\text{goodness of fit}} = 44.8, P = 0.001$).^{2,13} Use of the more sensitive multi-item measures of food insecurity derived from USDA questions indicated that 46.5% of the student sample population was food insecure without hunger, while 25.3% experienced a more severe form of food insecurity (food insecure with hunger).

Over one quarter of students reporting food insecurity according to the single-item measure, admitted losing weight

as a result of having inadequate money to buy food. This physical manifestation of food insecurity was 10 times more common than reported in food secure students (28.6% vs 2.9%; $\chi^2 = 66.78, P = 0.001$). Students reporting to be food insecure according to the single-item measure were less likely to rate their overall health as good to very good, when compared with their food secure counterparts (70% vs 87%, $\chi^2 = 9.22, P = 0.004$).

Cross tabulation of questions assessing the relationship between a range of environmental factors on food habits and food insecurity (categorised by the single-item measure), indicates that personal finances ($\chi^2 = 19.6, P = 0.001$) and time management ($\chi^2 = 13.2, P = 0.005$) had a greater association with food habits of food insecure students than the food secure. There was no significant difference observed for associations between cooking and preparation skills ($\chi^2 = 1.42, P = 0.7$), transport to shops ($\chi^2 = 1.54, P = 0.67$) and cooking and storage facilities ($\chi^2 = 2.88, P = 0.41$) between food insecure and food secure students. Students who had others cooking most of their meals were less likely to be food insecure ($\chi^2 = 5.65, P = 0.012$) than students who cooked most meals themselves. Students who reported higher takeaway food consumption frequency also tended to be more likely to be food insecure ($\chi^2 = 13.8, P = 0.003$).

Having a job, budgeting and relying on others for financial support were commonly associated with students experiencing food insecurity. A large majority (69.5%) of the students surveyed identified as being employed and this did not vary by food security status ($\chi^2 = 0.37, P = 0.83$). Of these students who worked, 46% worked between 10 and 19 hours per week and 30% worked more than 20 hours per week, with a whole sample of students who worked averaging 16.9 hours per week (± 8.9 hours). Most students reported spending 10–29 hours per week at university (10–19 hours: 29%; 20–29 hours: 41.2%) and more than 60% reported studying off campus for more than 10 hours per week. This suggests that the majority of students would have to spend 40–59 hours per week balancing work and study, with 72.9% of these employed individuals feeling that work reduced their study time.

Almost 40% of the university student population sampled were living with their parents and were significantly less likely to be food insecure ($\chi^2 = 0.45, P = 0.02$). Reasons stated for living with parents included financial benefits, convenience, student perception of being too young, enjoyment, parental wishes, emotional support, lack of vehicle access, study constraints and cultural and social expectations. Almost 40% of the sample had at some stage borrowed money from family, friends, neighbours, the university or financial institutions to pay for everyday expenses, while 22.3% used these supports to provide them with food after running out and being unable to afford more.

While only 3.1% of the student population reported having to resort to emergency measures such as stealing food or pawning assets to be able to obtain food; this behaviour was significantly more prevalent in the food insecure (8.0%

Table 2 Student sample socioeconomic and demographic attributes and food insecurity prevalence

Factor	Total (n)	%	Food insecurity measure (%)			χ^2 by single- item classification
			Single- item ^(a)	Multi-item ^(b)		
				Without hunger	With hunger	
Total students	399	100	12.7	46.5	25.3	
Gender						
Male	153	39.2	12.4	40.8	30.3	$\chi^2 = 0.036,$ $P = 0.49$
Female	237	60.8	13.1	49.8	22.1	
Year of study						
1st	160	43.3	8.1	44.6	27.4	$\chi^2 = 10.9,$ $P = 0.027$
2nd	65	17.6	23.1	46.2	27.7	
3rd	123	33.3	13.8	46.3	27.6	
4th	21	5.7	4.8	52.4	4.8	
Enrolment status						
Full-time	379	96.2	12.9	46.5	25.5	$\chi^2 = 0.51,$ $P = 0.41$
Part-time	15	3.8	6.6	46.6	20.0	
Level of study						
Undergraduate	311	79.1	12.2	46.3	25.9	$\chi^2 = 0.34,$ $P = 0.337$
Postgraduate	82	20.9	14.6	48.1	23.5	
Residency						
Domestic	273	70.2	13.6	43.2	26.9	$\chi^2 = 0.76,$ $P = 0.243$
International	116	29.8	10.3	54.8	21.7	
Age (years)						
≤ 24	303	80.2	11.2	48.3	24.0	$\chi^2 = 0.08,$ $P = 0.46$
25–64	75	19.8	18.7	40.0	28.0	
Relationship status						
Single	226	58	14.6	45.7	26.5	$\chi^2 = 1.53,$ $P = 0.14$
In a relationship	164	42	10.4	47.6	23.2	
Children						
0	366	93.7	12.8	46.3	25.3	$\chi^2 = 0.015,$ $P = 0.6$
≥ 1	25	6.3	12.0	48.0	24.0	
BMI						
Underweight	32	9.0	6.3	43.8	18.8	$\chi^2 = 2.48,$ $P = 0.48$
Healthy weight	254	71.5	13.0	44.6	28.3	
Overweight	54	15.2	16.7	46.3	22.2	
Obese	15	4.2	6.7	73.3	13.3	
Employment status						
Employed	269	69.9	13.1	46.6	25.9	$\chi^2 = 0.15,$ $P = 0.93$
Unemployed	118	30.1	12.7	45.3	23.1	
Government benefits						
Receiving	130	33.1	15.4	40.8	36.2	$\chi^2 = 1.2,$ $P = 0.17$
Not receiving	263	66.9	11.5	49.4	19.7	
Annual income after tax						
$\leq \$16\ 000$	253	71.9	13.3	47.4	27.1	$\chi^2 = 0.2,$ $P = 0.9$
$\$16\ 001–\$20\ 000$	44	12.5	11.4	52.3	25.0	
$\geq \$20\ 001$	55	15.6	13.0	44.4	16.7	
Living arrangements						
With others/independent	236	60.2	15.7	47.2	27.7	$\chi^2 = 4.5,$ $P = 0.02$
With parents	156	39.8	8.3	44.8	22.1	

^(a) Single-item based on NNS question.

^(b) Multi-item based on USDA questions.

vs 2.3%; $\chi^2 = 4.7$, $P = 0.05$). Approximately 10% reported that they knew of support services offered by the university, while only 3.8% had used such services. Similar findings were seen with 6.6% reporting knowledge of Food Banks in their local area and 2.3% actually utilising them.

Discussion

The present study has sampled a small cross-section of the University student population using a non-random sampling procedure susceptible to sampling bias. Analysis against the

total sample frame, however, suggests that the sample is largely representative of the student body by most demographic attributes, strengthening the generalisability of these findings to the whole campus population. An overrepresentation of full-time and international students in the study sample is probably a result of the campus-based recruitment method as both groups of students were more likely to be on campus at the time of recruitment. The limitations of self-reported measures of food insecurity are broadly recognised as well as the difficulties in capturing the complexity of food insecurity using self-administered questionnaires. The present study has attempted to address this issue by using widely used questionnaire items and by analysing responses in terms of both single-item measures (as per the NNS) and more sophisticated multi-item measures (as per USDA).

The present study demonstrates that food insecurity was reported within the sample student population at a rate more than double that found in the general Australian adult population at the last NNS. While there is a more than 15 years difference in these data collection periods, it does suggest university students are at higher risk than the general adult Australian. Because food insecurity is a function not only of economic access to food, but of the physical availability of and access to food and food utilisation,¹⁸ it is too simplistic to assume this experience is the result of relative poverty among students, limiting financial access to healthy food. It may also be a factor of spending priorities in this population group, which requires further investigation.

When the more sensitive multi-item measure considering different aspects of food insecurity was used, almost half of the student community was found to experience some degree of food insecurity (46.5%), with one quarter experiencing more extreme forms of food insecurity, including hunger (25.3%). While this can be partly explained by the socioeconomic and demographic attributes of the student body that has previously been identified as predictive of food insecurity, such as being young, unemployed, paying rent or board, in shared accommodation, low-income households,^{2,13,14,18-22} it does not detract from the significance of the prevalence and severity of food insecurity experienced in this context.

The cross-sectional nature of the present study limits assertions of causation between the experience of food insecurity and behavioural adaptations by students; however, the range of behavioural adaptations and coping strategies reported among students suggests that there is a link. These included living with parents; borrowing money and/or food from family, friends, neighbours, the university or financial institutions; seeking food from Food Banks and in limited but extreme cases, stealing or pawning items to obtain food. Many students were working many hours each week to support themselves despite reduced academic success. A Melbourne University study revealed that students can work a maximum of 12 hours per week before hindering academic potential.²³ This provides added weight to previous research that indicated students are under increasing financial pressure,^{7,8,24} and are resorting to coping strategies to avoid the harmful effects of food insecurity.

The expected relationship between low income and an increased prevalence of food insecurity status correlates with previous literature. The cost of food is considerable for people with limited economic access and is a determining factor on what they can purchase and how they allocate their disposable income for other needs.^{2,13,18,25} Students receiving government assistance are classified as at risk because such benefits are often 20–39% below the poverty line.⁶⁻⁸

The present study provides evidence of an association between food insecurity and lower students' self health assessment. While this relationship does not infer causation, it does suggest a need for further investigation. Food insecurity reduces physical and mental health, in turn diminishing an individual's ability to learn, work and care for themselves and reducing social participation.^{2,13,14,26} Irrespective of the harmful effects of food insecurity on health, the potentially detrimental effect on the educational experience and outcomes is in itself adequate cause for alarm and response.

These findings suggest that government ambitions for greater tertiary education involvement by young Australian are not being matched by student support measures resulting in undesirable over-reliance on income support measures that have opportunity costs in terms of educational participation and application. Individuals who obtain sufficient education are more able to improve their economic situation and have a greater chance of avoiding food insecurity in the future.^{25,27} Improving human capital through education leads to increased economic growth and allows individuals, who have relied on the government while studying, to return greater profits to society in terms of productivity and future tax payments.^{13,25}

The present study suggests that university students appear to be at risk of food insecurity, both as a product of their socioeconomic and demographic attributes, and also as a result of an apparent misalignment of government policy that promotes tertiary education participation with inadequate financial and other student supports. Further, more expansive and regionally representative investigation of university student food insecurity, related consequences and strategy responses by universities and the broader community, is needed, as is debate about the effects of existing tertiary education, social welfare and health policy misalignment.

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