Mental health of students reporting food insecurity during the transition to university

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Abstract

Purpose. The present study examined differences in mental health and well-being between students with and without suspected food insecurity during their transition to university.

Methods. We drew on existing data from four samples of first-year undergraduates enrolled at three large universities in three provinces (Alberta $N = 199$; Québec $N = 299$; Ontario $N = 461$ and $N = 510$). Students completed online surveys assessing a wide range of health-related behaviours and indicators, and students were classified as food secure or insecure based on their responses to screening questions.

Results. Mental health (depression, anxiety, low satisfaction with life) was consistently poorer in students classified as food insecure across all samples. The magnitude of mental health deficit was comparable to socioeconomic disadvantage associated with food insecurity.

Conclusions. Students experiencing food insecurity are disproportionately launching their university careers with poorer mental health, revealing a critical point of intervention for these socioeconomically higher-risk students.

Introduction

Food insecurity is a critical but largely hidden barrier to post-secondary education success in Canada. Nationwide, 12.7% of households are classified as *food insecure*[1], a spectrum of experiences that encompass worries about running out of food or making compromises in food quality because of limited funds, to missed meals and full days without food[1,2]. Rates of food insecurity among university students are many times higher than the general population—approaching 40%[3,4,5,6]. These students have more difficulty attending and performing well in class[7], and earn lower GPAs[8] than their food secure peers.

Students experiencing food insecurity are attempting to succeed in academics while struggling to meet basic needs. This balancing act is especially evident in strained mental health. Across five Canadian campuses, 1 in 5 food insecure students felt their mental health was impacted by food insecurity[5], and food insecurity has been linked to stress, depression, and anxiety in Canadian and U.S. students[9,10]. At the University of Manitoba, mental health was the second most frequently cited area of life impacted by food insecurity, after social life[3]. First-year students have not been a focus of prior research on food insecurity, but the transition to university might heighten risk for poor mental health for these students. During the first year, students can experience “transition overload”[11] while navigating new academic demands and social group changes, and also increased independence with respect to meeting their own basic needs, including meals[12]. In four independent samples, we test differences in mental health between students with and without suspected food insecurity, benchmarked against sociodemographic and related health differences, during this high-risk developmental window.

Methods

Participants and Procedures

We draw on existing samples of first-year undergraduates at the University of Alberta (*Making the Transition (MTT)*; $n=199$), Concordia University (*Student Mood Project (SMP)*, $n=275$), and two independent samples from Carleton University (*Carleton Transitions Study*, (CTS1); $n=461$ and CTS2; $n=510$). Students were recruited at campus orientation events, first-year classes, and through flyer distributions. In the MTT and CTS studies, only first-year students under age 20 and attending post-secondary for the first time were eligible. In the SMP, first-year, first-time students ages 18 to 25 were eligible. For consistency, we only used SMP data from students aged 22 and under. Students completed online surveys assessing a range of demographic, academic, mental health, and health behaviour measures. Surveys were completed in September (CTS1, CTS2), October (MTT), and at varying points across the academic year (SMP). Study procedures and sample characteristics are summarized in Supplement S1.

Measures

In three studies, *food insecurity* was assessed with a single item adapted from the Financial Strain Scale[13]: The SMP and CTS1 studies asked: “How often does it happen that you do not have enough money to afford food?”. Students were coded as food insecure in SMP if they replied “From time to time” or “Every month” ($n=60/259$; 23.2%) or food secure if “Never”. Students were coded as food insecure in CTS1 if they replied “Often” or “Always” ($n=77/439$; 17.5%) or food secure if “Never” or “Once in a while”. The MTT study asked: “How often does it happen that you do not have enough money to afford the kind of food you should have?” Students were coded as food insecure if they replied “Fairly often” or “Very often” ($n=25/199$; 12.6%) or food secure if “Never” or “Once in a while”. In CTS2, we administered the *Canadian Household Food Security Survey Module* and classified students as food insecure if they met criteria for moderate (compromised quality/quantity of food) or severe (reduced food

intake/disrupted eating) food insecurity[14]; $n=77/491$; 15.7%. Smaller sample sizes responding to food security questions are due to missing data.

Mental health measures included the Center for Epidemiologic Studies Depression inventory[15]; the Generalized Anxiety Disorder-7[16] inventory (CTS) and the anxiety subscale of the Hospital Anxiety and Depression Scale[17] (SMP); the Perceived Stress Scale[18] (CTS, SMP) and Daily Inventory of Stressful Events[19] (MTT); and the Satisfaction with Life Scale[20] (SMP). These were assessed alongside measures of sociodemographics and other health behaviours to benchmark the magnitude of group differences in mental health. Detailed measures information is given for each study in Supplement Table S1.

Data analysis

In each sample, we performed separate t - and χ^2 tests comparing students classified as food secure vs. food insecure on our suite of mental health, sociodemographic, and health behavior measures. Each test is a pairwise comparison between cases with available data (sample sizes by measure are in Table S1). All tests were corrected for Type I error inflation due to multiple comparisons using the Benjamini-Hochberg False Discovery Rate method[21]

Results

Summary statistics and sample characteristics are detailed separately for each study in Supplement S1. Figure 1 graphically presents all pairwise comparisons between students classified as *food secure* versus *food insecure*. To facilitate interpretation of comparisons across measures with different scales, we rescaled each measure onto a common index with possible values ranging from -1 to +1. For continuous variables, effects are the mean difference (food insecure – food secure) divided by the range of observed responses. For categorical variables,

Figure 1. Forest plot of group differences in mental health and comparison measures between students classified as food secure versus food insecure.

Note. Line ranges represent 95% confidence intervals around each estimate. Confidence intervals that do not include zero (no difference between groups; indicated by the vertical dotted line) represent statistically significant differences.

effects are the difference in observed proportions between the two groups. Group means, proportions, raw and rescaled differences, and test statistics appear in Table 1.

Students classified as food insecure reported more depressive symptoms (in 4/4 samples), anxiety symptoms (in 3/3 samples), and lower life satisfaction (SMP) than students classified as food secure. Perceived stress was only worse for students classified as food insecure in the CTS samples. Differences for depression and anxiety ranged from .09 to .15 (mean=0.11), indicating that on average, students reporting food insecurity endorsed 11% *more* symptoms than students who were food secure. Mental health differences were notably larger than other health-related behaviours, including sleep, binge drinking, and fruit/vegetable consumption, of which only sleep quality was significantly poorer for students with food insecurity in more than one sample. Differences associated with socioeconomic advantage (parent income and education) ranged from -.01 to -.24 (mean= -.14); on average 14% *less* socioeconomic advantage for students reporting food insecurity. The magnitude of poorer mental health in students with food insecurity was 79% as large as the magnitude of their socioeconomic disadvantage relative to food secure students.

Discussion

Poorer mental health was consistently associated with food insecurity in four separate Canadian first-year undergraduate samples. Rates of food insecurity ranged from 12.6% to 23.2% across samples from provinces with diverse tuition structures. Although notably lower than rates in other Canadian surveys of students at all years of study, we focused exclusively on first-year students, most of whom are 17 to 19 years old and not yet living independently or serving as heads of households (environments conducive to food insecurity when combined with low income). We found that students with food insecurity are disproportionately launching their

university careers with poorer mental health at a level commensurate with socioeconomic disadvantage. In our prior work, 38% to 50% of first-year students scored at or above clinical screening thresholds for depression[22] and risk for depression was greater for students with current financial stress[23]. This early disadvantage persists: on average, students entering university with poorer mental health tend to have lower well-being and less career success years later in adulthood[24].

A limitation was our single item assessing students' ability to "afford food" as a proxy measure of food insecurity in three samples. Results largely converged with the fourth sample using a gold standard measure, though we note that measuring *household* food security may be a limitation in post-secondary populations[25]. Another limitation is that the samples in this study, while demographically diverse, were not gathered using randomized, representative sampling procedures. Finally, our cross-sectional design also cannot describe changes in food insecurity and effects of improving versus worsening food security on later mental health and academic success. Addressing food insecurity may be one mechanism to mitigate recurrent depressive episodes and their concomitant impacts on academic success[26,27].

Relevance to Practice

Increasingly, young people from all socioeconomic strata enrol in university programs, and those at the lowest incomes have the most to gain with respect to post-university economic mobility[28]. Food insecurity may be a critical point of intervention to compensate for socioeconomic disadvantage and to promote mental health and academic success in post-secondary education contexts. To date, there have been no empirically studied interventions to address food insecurity in postsecondary settings[29]. We reiterate guidance by others that dietetic practitioners should consider food insecurity as part of the nutrition care process[30],

including for student clients. Universities should support regular campus-wide access to low-cost or free food for students, including students who live off-campus; extend emergency funding to students in crisis; and support campus food banks.

Table 1

Pairwise t-tests and χ^2 tests Comparing Students Classified as Food Insecure versus Food Secure on Mental Health, Sociodemographic, and other Health Behaviors in the First Year of University

	Food Insecure	Food Secure	Comparison	Difference	Range	Rescaled Diff
	M (SD)	M (SD)	<i>t, p</i>			
Depression						
SMP	21.4 (12.5)	15.5 (9.7)	3.80, $p=.0002$	5.94	60	.10
MTT	1.3 (.6)	1.0 (.5)	2.61, $p=.0097^a$	.27	2.3	.12
CTS1	12.4 (5.7)	9.4 (5.7)	4.20, $p<.0001$	3.04	27	.11
CTS2	13.7 (5.9)	9.6 (5.9)	5.70, $p<.0001$	4.17	28	.15
Anxiety						
SMP	9.5 (4.2)	7.8 (4.1)	2.79, $p=.0057$	1.69	19	.09
CTS1	9.3 (5.9)	7.1 (5.7)	3.08, $p=.0022$	2.22	21	.11
CTS2	9.0 (5.9)	7.2 (5.4)	2.63, $p=.0088$	1.81	21	.09
Stress						
SMP	7.3 (2.7)	6.9 (3.2)	0.42, $p=.44$	.78	16	.03
MTT	.38 (.34)	.42 (.36)	.47, $p=.64$	-.04	2.04	-.02
CTS1	1.9 (.6)	1.6 (.8)	3.30, $p=.0011$	.32	4	.08
CTS2	2.0 (.7)	1.6 (.8)	4.01, $p<.0001$	.39	4	.10
Life Satisfaction						
SMP	19.7 (7.7)	23.4 (6.3)	3.75, $p=.0002$	-3.67	30	-.12
Hours Sleep						
SMP	6.7 (1.1)	7.0 (1.0)	1.83, $p=.07$	-.29	6	-.05
MTT	7.6 (.8)	7.6 (.9)	.09, $p=.93$	-.02	6.1	-.003
CTS1	6.7 (1.5)	6.9 (1.1)	1.37, $p=.17$	-.20	7	-.03
CTS2	6.5 (1.4)	7.0 (1.0)	3.55, $p=.0004$	-.48	10	-.05

MTT	68.0	56.9	1.11, p=.29	.11
CTS1	35.1	33.9	.04, p=.84	.01
CTS2	32.5	35.8	.31, p=.58	-.03
Educated Parents				
SMP	53.5	63.8	2.14, p=.14	-.10
MTT	60.0	61.5	.02, p=.88	-.01
CTS1	55.3	70.7	6.90, p=.0089	-.15
CTS2	46.8	71.3	17.74, p<.0001	-.24

Note. SMP = Student Mood Project, MTT = Making the Transition Study, CTS1 = Carleton Transitions Study – Sample 1, CTS2 = Carleton Transitions Study – Sample 2, Difference = Raw difference between the mean or percent scores in the Food Insecure group minus the Food Secure group. Range = Observed range of scores of the measure, Rescaled Diff = Difference/Range.

^aGroup difference not statistically significant after correction for multiple testing using the Benjamini-Hochberg False Discovery Rate method.

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