What is the food security status, self-rated health, and diet of students using a university-based food bank?

by

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Abstract

Background: Food insecurity is the limited or uncertain ability to obtain the quantity and/or quality of food that an individual or household needs. The topic of household food insecurity has been investigated in myriad vulnerable groups, including low-income families, women, black and Hispanic households, immigrants, and indigenous populations. Very little work has been conducted on post-secondary students who experience food insecurity.

Objectives: This study aimed to describe the food security status and characteristics of students using the Campus Food Bank, and to compare the self-rated health and well-being, diet, and academics between students with severe and non-severe food insecurity.

Methods: Face-to-face, structured interviews were conducted with university students who use a campus-based food bank. Descriptive statistics, Chi-square tests, t-tests, and logistic regression were used to process the data on SPSS 21.

Results: Fifty-eight students were recruited; the average age was 30.0 ± 8.3 years, 60% were females, 47% were international students, and 50% were graduate students. The majority of students (90%) experienced some degree of food insecurity. Students with severe food insecurity were more likely to experience poor overall health (OR 4.06, 95% CI 1.10-14.78) and mental health (OR 4.96, 95% CI 1.28-19.19), and consume fewer daily fruits, vegetables and legumes (t=2.72, p=0.009) compared to students with non-severe food insecurity. While most students perceived that their academics suffered because of food insecurity, the academic outcomes were more pronounced among students with severe food insecurity. Compared to the University of Alberta student

population, and all students who use the Campus Food Bank, our sample had significantly more graduate students, and international students.

Discussion / Conclusion: The findings are a testament to the variety of adverse outcomes that food insecurity can have on students' lives. Freezing tuition and compulsory fees and instating a Guaranteed Annual Income for all Canadians could improve the food situation of post-secondary students. Further, food banks could better cater to their clientele by implementing more empowering forms of food aid (such as grocery store gift cards), and asking clients about the foods they would like to receive. This research has provided foundational knowledge about students who access campus food banks. Longitudinal research is needed to ascertain directionality of the association between food insecurity and well-being, and to explore longer-term outcomes of post-secondary student food insecurity, such as graduation rates and employability.

Preface

This thesis is an original work by Jasmine Farahbakhsh. The research project received ethics approval from the University of Alberta Research Ethics Board, "Hunger on Campus – Food insecurity among students", No. Pro00032195, March 12, 2013.

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1 Introduction

Food security can be defined as the state in which people at all times have access to enough food for an active, healthy life (Campbell, 1991). Conversely, food insecurity "exists whenever the availability of nutritionally adequate and safe foods or the ability to acquire acceptable foods in socially acceptable ways is limited or uncertain" (Anderson, 1990). Food insecurity is experienced along a graded continuum of severity ranging from food anxiety, compromised food quality and quantity, and finally, to hunger (Kirkpatrick & Tarasuk, 2008). Food insecurity is an important determinant of health (McIntyre, 2004), and has been associated with poor health in a number of studies (Gundersen & Kreider, 2009; Stuff et al., 2004; Willows, Veugelers, Raine, & Kuhle, 2011). In general, the topic of food insecurity has been a focus of research among children (Chilton et al., 2009; Dubois et al., 2011; Grutzmacher & Gross, 2011; Metallinos-Katsaras, Sherry, & Kallio, 2009), immigrants (Rosas et al., 2009; Rush, Ng, Irwin, Stitt, & He, 2007; Sharkey, Nalty, Johnson, & Dean, 2012), and individuals of low socioeconomic status (Dachner, Ricciuto, Kirkpatrick, & Tarasuk, 2010; Kirkpatrick & Tarasuk, 2010; Loopstra & Tarasuk, 2012; Seligman, Laraia, & Kushel, 2010). However, food insecurity among post-secondary students has remained largely unaddressed in the literature; in developed countries, this topic has received some attention in Australia, Canada, and the United States (U.S.) (Chaparro, Zaghloul, Holck, & Dobbs, 2009; Gaines, Robb, Knol, & Sickler, 2014; Hughes, Serebryanikova, Donaldson, & Leveritt, 2011; Maroto, Snelling, & Linck, 2014). There are numerous strategies that individuals and households may employ to cope with food insecurity. One common strategy is accessing the services of charitable food assistance, such as food banks (Tarasuk, 2001). The research study

completed for this thesis is the first to measure the prevalence of food insecurity among a sample of post-secondary students who use the services of a university-based food bank in Canada. Findings of this research have the potential to impact university and government policy, stimulate discussion on the efficacy and potential alternatives to current food assistance programs on campuses, and spur future research on the topic of food insecurity among post-secondary students.

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2 Literature Review

2.1 Dimensions of food insecurity

Researchers in the U.S. (Radimer, Olson, Greene, Campbell, & Habicht, 1992) developed a conceptual framework for considering food insecurity. In this framework, there are four dimensions of food security (quantitative, qualitative, psychological, and social), which are experienced differently on the individual and household levels. In terms of the food quantity dimension of food insecurity, individuals and households experience insufficient food intake and insufficient food supply, respectively. For the dimension of food quality, individuals experience nutritionally inadequate intake patterns, and households have unsuitable foods, or food of inferior quality (Tarasuk, 2001b). The psychological dimension of food insecurity is related to feeling deprived of food, which translates to a lack of food choice among individuals, and food anxiety and preoccupation with access to enough food among households. Lastly, the social dimension is evident at the individual level in that eating patterns may not conform to social norms, and at the household level in that food acquisition behaviours deviate from social norms (Tarasuk, 2001b).

2.2 Food insufficiency

Assessment of food insufficiency was one of the earliest attempts at measuring food insecurity. Food insufficiency has been defined as "an inadequate amount of food intake due to a lack of money or resources" (Briefel & Woteki, 1992), and was

assessed using a single question about the quantity and quality of household food intake. Food insufficiency differs from measures of food insecurity in that it is most closely associated with the most severe measure of food insecurity – given its reference to quantitative deprivation – and does not have a time reference (Tarasuk, 2001b).

2.3 Transitory and chronic food insecurity

The experience of food insecurity can take a number of forms. Food insecurity can be chronic (occurring over a long period of time) or transitory (occurring over a short period of time) (Food and Agriculture Organization, 2008). Post-secondary students who visit food banks most likely experience transitory food insecurity, or the "sudden drop in the ability to produce or access enough food to maintain good nutritional status" (Food and Agriculture Organization, 2008), due to the factors associated with university life and living away from home. Specifically, post-secondary students in Canada are facing increasing expenditures, relating to tuition and compulsory fees, food costs, travel back home, and accommodations. Many of these expenses are specific to student life, and subside once students are out of school and are able to work full-time. On the other hand, chronic food insecurity may result from long-term poverty, lack of assets, or insufficient access to financial resources. This differs from transitory food insecurity in that individuals are not able to meet their food needs over a long period of time (Food and Agriculture Organization, 2008).

2.4 Food security measurement tools

Indicators of food insecurity that have been employed in Canada include the Food Sufficiency Status Question, the Community Childhood Hunger Identification Project (CCHIP), Radimer/Cornell Questionnaires, and the U.S. Food Security Core Module (Tarasuk, 2001b). The Food Sufficiency Status Question was originally one question, which asked the respondent to assess the quantity and quality of food eaten in their household. Later on, this measure was equated with a severe form of household food insecurity (Rose, 1999). This method does not ask about the respondents' food situation with respect to a time frame (e.g., over the last month or last year), which led to inconsistent results. This question was used from the 1970s to the 1990s (Tarasuk, 2001b).

The CCHIP and Radimer/Cornell Questionnaires were created as researchers learned more about the multi-dimensionality of food insecurity (Bickel, Nord, Price, Hamilton, & Cook, 2000). Both of these questionnaires are additive, which means they use the number of affirmative responses to classify respondents into categorical food security groupings. To be more specific, the CCHIP has eight questions about qualitative and quantitative aspects of food insecurity on the household, adult, and child level (Wehler, Scott, & Anderson, 1992), and the Radimer/Cornell instrument has 12 questions (Radimer et al., 1992). Both instruments have good agreement between the food secure and food insecure classification, which shows that they are measuring the same concept (Tarasuk, 2001b).

The most recent food security measurement instrument used in Canada is a version of the United States Food Security Core Module (FSCM). The FSCM was created to be a national measure of food insecurity, and built upon the CCHIP and Radimer/Cornell surveys. The conceptual framework behind this survey represented a major advance over previous surveys; food insecurity was considered a "'managed process' of decision making and behaviour in response to increasingly constrained resources" (Carlson, Andrews, & Bickel, 1999). This allows household food insecurity to be measured along a scale of severity. To ensure that the lack of food in a household relates to financial insufficiency, each question includes financial insufficiency as a qualifier. One limitation to this instrument in its measurement of food insecurity is that the operational definition of food insecurity is much more limited than the regular use of the phrase, thus the FCSM does not effectively capture the psychological and social dimensions of food insecurity (Tarasuk, 2001b).

In North America, the most frequently-used food security assessment tools were created by the United States Department of Agriculture (USDA), and were designed to assess food security status as it relates to financial insufficiency (Health Canada, 2006). There are several variations of the original FSCM; there is a short version (six questions), and surveys designed for children (eight questions), adults (ten questions), and households (eighteen questions). Each of these surveys classifies respondents into a food security status based on the number of affirmative responses to the questions.

Since the USDA food security surveys were designed to measure hunger as a result of inadequate financial resources, the USDA surveys overlook food insecurity that has different root causes, such as food insecurity resulting from mobility issues. These surveys are also limited because the questions primarily focus on reduced food intake and worrying about food, which only addresses the quantitative and psychological dimensions of food insecurity, respectively (see section 2.1). The surveys fail to take into account the food quality and social dimensions of food insecurity because they do not query the quality of food, or the social acceptability of food intake patterns.

2.5 Prevalence estimates of food insecurity using these tools

The CCHIP and Radimer/Cornell surveys were first administered 25-30 years ago in the U.S. and Canada. Although the prevalence of food insecurity reported using those surveys are out-of-date, they do indicate that food insecurity has been prevalent for several decades. Based on a CCHIP report published in 1991, 5.5 million American children under the age of 12 were hungry (Food Research and Action Center, 1991). One study that used the Radimer/Cornell surveys reported that 96.5% of low-income mothers and children in Atlantic Canada experienced food insecurity over the previous year (McIntyre et al., 2002).

2.6 Food insecurity prevalence in Canada, and vulnerable populations

2.6.1 National food insecurity

There is little documentation on the long-term trend of household food security in Canada. The first national food security assessment using a validated tool was initiated by Health Canada in 2004 as part of the Canadian Community Health Survey (CCHS), and since 2005, food security status has consistently been measured using the CCHS at a population level (Health Canada, 2012). The most up-to-date information on household food security in Canada from the CCHS is from 2011-2012 (Statistics Canada, 2013); current household food insecurity prevalence ranges from approximately 7% in Québec to 29% in Nunavut (Health Canada, 2012). The CCHS assesses food security status using the USDA Household Food Security Survey Module (HFSSM) (discussed in detail in section 5.4.1).

Based on the most current CCHS data, certain household types experience higher levels of food insecurity than others. Such households include those: at the lowest income adequacy; on social assistance; that are off-reserve Aboriginals; that are black; renting accommodation; and with children (Tarasuk, Mitchell, & Dachner, 2014). With regards to off-reserve Aboriginal and black households, prevalence of food insecurity was found to be approximately two times that of the general Canadian population (Tarasuk, Mitchell, et al., 2014).

Gender is one factor that is related to food security status. According to CCHS data, more women are food insecure compared to men; nationally, 8.6% of women are food insecure, while 6.9% of men are food insecure (Statistics Canada, 2013). On the CCHS, households headed by female lone-parents are particularly vulnerable to food insecurity; the prevalence of food insecurity for this group has been found to be three times greater than that of male lone-parent households (Health Canada, 2007). Recent research has investigated whether socioeconomic or respondent characteristics contribute to the higher prevalence of food insecurity among females; in non-married households, higher female food insecurity was associated with socioeconomic characteristics; but was neither associated with socioeconomic nor individual characteristics in married households (Matheson & McIntyre, 2013).

Many studies regarding food security have been conducted with families of low-socioeconomic status, with schoolchildren, and in different countries. Post-secondary students in Canada are a group potentially vulnerable for food insecurity, but research in this area is limited. There is not specific information on the CCHS to determine whether post-secondary students are a group vulnerable for food security. Current CCHS data demonstrate that 10.4% of 20-34 year olds are food insecure compared to 7.8% among the general population (Statistics Canada, 2013), which suggests that students in this age group may be at increased risk.

2.6.2 Barriers to food security

Food insecurity is a challenge that impacts an ever-increasing number of Canadians. The fundamental factors that put households at risk for food insecurity are inadequate income, the cost of food and non-food essentials, geographic isolation, lack of transportation, and low food literacy (Howard & Edge, 2013).

Across Canada, the amount of social assistance that a family would receive is insufficient to cover the cost of a Nutritious Food Basket (Howard & Edge, 2013), making it difficult for those who rely on social assistance to afford a nutritious diet. Geographic isolation is often a barrier for achieving household food security; if a household is located in a rural or remote area, food insecurity is more likely due to reduced food availability and quality, and increased food price (Pollard et al., 2014). Access to transportation can impact food security status. For households that cannot afford vehicles and do not have access to public transit, acquiring food can be challenging (Howard & Edge, 2013). For example, research has shown that the presence of a bus route in a neighbourhood reduces the likelihood of food insecurity (Baek, 2013). Lastly, food literacy, or the knowledge relating to selecting and preparing nutritious food, can affect food security status. Specifically, when households have low food literacy, they might not know which foods are part of a healthy diet, or how to prepare these foods (Howard & Edge, 2013).

2.7 Health and dietary outcomes of food insecurity

2.7.1 Negative effects of food insecurity on health and well-being

Food insecurity is an important determinant of health (McIntyre, 2004), and has been associated with negative health outcomes, such as higher levels of stress (Jilcott, Wall-Bassett, Burke, & Moore, 2011), poor general and mental health, and a weak sense of community belonging (Willows et al., 2011). Adults in food insecure households are significantly more likely to rate their health as poor or fair, and also score lower on mental and physical health scales, compared to adults in food secure households (Stuff et al., 2004). Not only do adults of food insecure households have poorer health and well-being, but children in these households are also at risk. Compared with children in food secure households, those in food insecure households are more likely to have poor health, including an unhealthy weight, psychosocial problems, and poor developmental outcomes (Gundersen & Kreider, 2009). In addition, food insecurity, or food insufficiency, has been linked to: more stomachaches, headaches, and colds; higher hospitalization rates of young children; lower physical function in 3 to 8 year olds; more anxiety and depression in school-age children; higher levels of chronic health conditions in children; lower math and arithmetic scores in kindergarteners and 6 to 11 year olds, respectively (Nord & Parker, 2010). These studies demonstrate that food insecurity is associated with innumerable adverse health outcomes among both adults and children.

Although the majority of the literature presents food insecurity as a contributing cause of poor health and well-being (Jilcott et al., 2011; Payab, Motlagh, Eshraghian, Rostami, & Siassi, 2014; Seligman, Laraia, & Kushel, 2010; Stuff et al., 2004; Willows et al., 2011), the opposite might also be true. Almost all research examining the relationship between food security and health is cross-sectional so causality cannot be determined. Based on longitudinal population health data, two studies (McLeod & Veall, 2006; Tarasuk, Mitchell, McLaren, & McIntyre, 2013) suggest that there is a stronger relationship between health status, and subsequent food insecurity as compared with food insecurity and subsequent health status. It may also be that poor health creates the conditions for food insecurity, which then further exacerbates poor health. Regardless of the direction of association, food insecurity indicates households experience challenges in terms of accessing food, and its association with poor health is cause for concern.

2.7.2 Dietary associations with food insecurity

Given that food insecurity includes the limited or uncertain availability of nutritious or safe foods, it follows that those who experience food insecurity would also experience setbacks in their diet. There is evidence for an association between food insecurity and nutrition in the literature. Women who were moderately or severely food insecure in the previous month reported lower intakes of fruit, vegetables, and meat and alternatives compared with those who were food secure (Tarasuk, 2001c). Research has also associated food security status with specific nutrient intake; women who reported hunger have lower

energy and nutrient intakes. Among these women, there were inadequacies of more than 15% for vitamin C, folate, iron, and magnesium, which could put women at risk for deficiencies (Tarasuk & Beaton, 1999). An example of a less direct effect of food insecurity on diet is the association between high BMI (and the potential poor health outcomes of obesity) and food insecurity, which demonstrates that food security status is associated with an anthropometric measure of nutritional status (Olson, 1999). Food-insecure children have also been shown to have iron deficiency and anemia; these conditions could create or worsen other health issues (Nord & Parker, 2010). These studies exemplify the varied effects that food insecurity may have on diet and nutrition, and emphasizes the need to consider the negative consequences of a poor diet among individuals at risk for food insecurity.

In addition to the potential negative health and nutritional consequences of food insecurity described above, food-insecure students may experience important adverse educational outcomes. Researchers have found that students of all ages (from grade five to post-secondary students) who had a poor diet quality also had lower academic performance compared to students who ate well (Florence, Asbridge, & Veugelers, 2008; MacLellan, Taylor, & Wood, 2008; Maroto et al., 2014).

2.7.3 Costs that compete with food

For students and non-students alike, there are essential costs that compete with food expenditures, including housing costs, electricity, water, other utilities, and school costs. For example, as individuals spend a greater proportion of income on housing, they spend a lower proportion on food. For households in the lowest income quintile, the proportion of household expenditure on food is insufficient to cover the cost of a nutritious diet. That is, individuals are more likely to spend an inadequate amount on food as their income decreases (Kirkpatrick & Tarasuk, 2007).

2.7.4 Dietary assessment tools

One of the aims of this thesis research study was to assess the dietary intake of the participants, and examine it in relation to their food security status. *Table 1* outlines instruments that can be used to assess dietary intake, and their strengths and limitations.

Table 1: Comparison of diet assessment instruments

Diet Assessment Instruments	**Strengths**	**Limitations**
Dietary screeners	Capture information about particular aspects of the diet Low respondent burden	Do not collect information about all aspects of the diet Are not accurate in terms of

	Used in population-level studies, so potentially comparable	quantities consumed, so dietary adequacy cannot be assessed
Diet records	High level of detail captured (quantity and type)	Misreporting is common Difficult to estimate portions
24-hour diet recall	Low respondent burden Suitable for large-scale surveys	May be poor representation of actual diet Difficult to estimate portions Dependent on memory
Food frequency questionnaire	Low respondent burden Can be self-completed	Can be lengthy
Diet history	High level of detail, food preparation method included	Not standardized Lengthy

(Wrieden, Peace, Armstrong, & Barton, 2003)

(Coulston, Boushey, & Ferruzzi, 2012).

Based on the strengths and limitations of each dietary assessment method as shown in *Table 1*, dietary screeners were chosen for this study. With the balance of low respondent burden and ability to capture information about particular aspects of diet, dietary screeners were well-aligned with the objectives of the study.

The Dietary Screener Questionnaire (DSQ) is a tool that was created by the Risk Factor Monitoring and Methods Branch (RFMMB) of the U.S. National Cancer Institute (NCI). The RFMMB has created many dietary screeners to assess the intake of a variety of nutrients and foods (National Cancer Institute, 2014). Of all dietary screeners listed on their website, the DSQ gathers information on the most foods and nutrients.

2.8 Responses to food insecurity

2.8.1 Community responses to food insecurity

Food insecurity is garnering attention among community groups and in the press. There are organizations in Canada other than Health Canada that explore various aspects of food insecurity. Some of these include: the Canadian Association of Food Studies; Food Secure Canada; Research to identify policy options to reduce food insecurity; Food Banks Canada; and Meal Exchange, to name a few.

The creation of food banks was a community response to food insecurity. Food banks are volunteer-run organizations that collect and distribute food to those in need (Tarasuk, Dachner, & Loopstra, 2014). In Canada, there are nearly 2,000 food banks or equivalent programs, and food bank use has increased 25% since the 2008-2009 recession. In Alberta, that increase was 48%, with nearly 50,000 Albertans using the services of food banks monthly (Pegg & Stapleton, 2014).

Poverty is the underlying issue behind both food bank usage and hunger (Yadlowski & Thériault, 1998). Food assistance programs, like food banks, are used by those in poverty because they serve as a type of income transfer; by providing clients with food, the money they otherwise would have spent on food can be spent on non-food needs (Tarasuk & MacLean, 1990). Some other programs and services offered by food banks, such as daycare, laundry, and bargain centres, also act as income transfer (Yadlowski & Thériault, 1998).

The first Canadian food bank was opened in Edmonton in 1981, and soon after, every city centre across Canada had at least one food bank (Tarasuk & MacLean, 1990). The number of Canadian food banks began to increase in response to the 1980s economic recession, aiming to address emergency food shortages of that time (Yadlowski & Thériault, 1998). Following the recession, usage of food banks did not decrease; instead, it continued to grow alongside stricter eligibility for social assistance and employment insurance. As the government scaled back on its policies to address poverty and unemployment, food banks filled the gap between the amount of food that individuals could afford and the amount of food that they required (Tarasuk, Dachner, et al., 2014).

Apart from charitable food assistance, like food banks, communities have also attempted to introduce more sustainable solutions to food insecurity. Such programs are designed to empower individuals by improving their knowledge and

skills in the realms of food shopping and meal preparation, and include community kitchens (Tarasuk, 2001a).

2.8.2 Individual responses to food insecurity

Individuals or households who are food insecure may employ various strategies to cope with their lack of food or lack of money for food. Coping strategies are "the specific efforts, both behavioral and psychological, that people employ to master, tolerate, reduce, or minimize stressful events" (Taylor, 1998). For example, coping strategies are actions used to deal with a threatening situation such as food insecurity, often to the household's disadvantage (Hoisington, Shultz, & Butkus, 2002; Kempson, Keenan, Sadani, & Adler, 2003). Accessing the services of a food bank is one way in which people can cope with food insecurity. As mentioned in *Section 2.8.1*, food banks were created by communities to help community members deal with difficult economic times. Households and individuals use food banks as a means of supplementing their food supply, and often as income transfer. Tarasuk (2001) reported that women who sought food assistance for their families used the following to cope with food insecurity: delaying bill payments; selling belongings; giving up services; and taking their children to a friend's or family member's house for meals (Tarasuk, 2001c). Furthermore, some post-secondary students steal food or pawn their possessions to get enough food to eat, and others may work over 10 hours each week outside of school in order to make money to pay for food (Hughes et al., 2011), which could lead to negative academic outcomes.

2.8.3 Post-secondary student food insecurity

A handful of studies have documented food insecurity on post-secondary campuses in the U.S. and Canada, which sought to shed light on the prevalence and contributing factors to food insecurity (Chaparro et al., 2009; Maroto et al., 2014; Meldrum & Willows, 2006; Patton-López, López-Cevallos, Cancel-Tirado, & Vazquez, 2014). Three studies that measured the prevalence of student food insecurity at American and Australian post-secondary institutions have been conducted. Among the general university population, the levels of student food insecurity in these studies ranged from 21% to 59% (Chaparro et al., 2009; Hughes et al., 2011; Maroto et al., 2014; Patton-López et al., 2014). Research groups in Hawai'i and the southwestern U.S. concluded that more work should be done to determine how food insecurity affects academics, and to investigate strategies that students employ to cope with food insecurity (Chaparro et al., 2009; Gaines, Knol, Robb, & Sickler, 2012). While no studies have documented the prevalence of food insecurity among Canadian post-secondary students, the prevalence of American and Australian student food insecurity suggests that Canadian students may also suffer.

Considering that post-secondary education costs have increased much more than costs for housing, healthcare, and food (Canadian Alliance of Student Associations, 2011), it follows that students may be having difficulty paying for both educational and non-educational costs. Instead of minimizing fees that post-secondary students pay, provinces have recently increased tuition fees in an

attempt to optimize funding, while letting students know of these increases in advance. This may make tuition increases less shocking for students, but it does not make progress towards a universally accessible education (Shaker & Macdonald, 2014).

The highest compulsory post-secondary fees in Canada are found in Alberta (Shaker & Macdonald, 2014); undergraduate and graduate students pay $1,069 and $1,333, respectively (Statistics Canada, 2014). In addition, the rise in food prices can be seen in the historical prices of a food basket program in Edmonton; there has been a 45.3% increase in price from 2006 to 2014 for a family of four (Agriculture and Rural Development, 2006, 2014). Thus, students at post-secondary institutions in Alberta might be food insecure.

2.8.4 Food banks on post-secondary campuses

While a few studies highlight food insecurity across campuses in general, even fewer studies examine food security among students with the most need – those who access the services of food banks. Post-secondary students represent 3.2% of all food bank users nationwide (Pegg & Stapleton, 2014). In Canada, the first campus food bank opened in 1991 at the University of Alberta (UAlberta), and in the 2011-2012 academic year, this food bank (the Campus Food Bank, or CFB) distributed 1,100 food hampers to members of the UAlberta community (Campus Food Bank Statistics Committee). Based on descriptive statistics from the CFB between 2011 and 2013, an average of 284 clients used the food bank each year,

the vast majority whom are students. Post-secondary food banks at other academic institutions have appeared over the past several years (Gordon, 2011).

The nutritional quality of food distributed from the CFB (Jessri, Abedi, Wong, & Eslamian, 2014; Willows & Au, 2006), and qualitative data on clients' experiences at the CFB (Nugent, 2011) are aspects that have been documented. While food hampers supplied by campus food banks ease some of the food insecurity that students experience, studies have shown that those receiving food hampers are still food insecure (Jilcott et al., 2011). In particular, one study found that for a period of three days, food baskets obtained from a large urban food bank failed to provide adequate fruits and vegetables, meats and alternatives, as well as vitamins A, D, B12, C, riboflavin, niacin, calcium, magnesium, and zinc (Irwin, Ng, Rush, Nguyen, & He, 2007).

The food security status of campus food bank clients has never been investigated. The dearth of research in this field and the increasing prevalence of food bank usage on campuses emphasize the need for investigation into the topic. This will be the first study of its kind to be conducted in Canada that will examine the relationship between food insecurity and health, diet, and academic quality.

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3 Rationale

Food insecurity is a social problem afflicting a wide range of individuals, from children and the elderly, to immigrants and lone-parent households. Post-secondary students represent a demographic group that may be at risk for food insecurity, yet they have received little attention in the academic literature. A few studies have investigated the prevalence of food insecurity among post-secondary students in the U.S. and Australia, however Canadian post-secondary students have yet to be examined. The general purpose of this research is to gain a better understanding of food insecurity among post-secondary students. Specifically, we aimed to describe the students who use a university-based food bank, and explore whether food insecurity among students is associated with negative health and nutritional quality indicators, and perceived academic outcomes. Another aim is to understand which coping strategies are employed by post-secondary students who are food insecure. Findings from this study will be enlightening for Canadian post-secondary institutions that have or need a food bank, may act as an impetus for other post-secondary institutions to investigate and address the issue of food insecurity on their campuses, and may help the CFB and other food banks to improve their operations. Lastly, the findings will potentially alert the provincial government as to how it could approach post-secondary tuition and compulsory fees to eradicate student food insecurity.

4 Objectives

The objectives of this study were to: (1) describe the food security status, food insecurity coping strategies, sociodemographic and educational characteristics, and experiences of student clients of the CFB; (2) compare self-rated health and well-being, dietary factors, perceived academic outcomes of food insecurity, and reliance on the CFB hampers between students with severe and non-severe food insecurity; and (3) compare characteristics of the sample with all clients of the CFB, and the general university population in order to determine representativeness.

5 Methodology

This cross-sectional study was comprised of a 42-question face-to-face structured interview and an online dietary screener. The CFB Board of Directors and a UAlberta Health Research Ethics Board approved the study.

5.1 Study design

A cross-sectional study design was selected for our study because the design was applicable to our goal of describing the sample, ascertaining the prevalence of variables of interest at a particular point in time, and examining associations between food security status and health and well-being. We recruited students who used the CFB between April 2013 and April 2014.

5.2 Recruitment

Non-probability, specifically convenience and snowball, sampling were employed to recruit respondents. Convenience sampling was the most logical choice for recruitment of the sample for a number of reasons, despite the possibility of participation bias and systematic differences between the respondents and non-respondents. First, due to the stigma associated with accessing a food bank (Nugent, 2011; Tarasuk & MacLean, 1990), it is unlikely that a probability sample of this population would result in high enrolment. If the population was very large, this may not have been a concern, but the population of approximately 284 individuals who use the CFB yearly (the majority of whom are students), would likely yield a small sample. Second, the population in question was not well-understood with regards to the variables of interest, thus convenience sampling aligned well with the primary objective of determining the characteristics, food security status, and health status of CFB clients. Snowball sampling, or referral sampling, was also used to recruit respondents. This technique is useful for studies in which the subject matter is sensitive or private (Biernacki & Waldorf, 1981), as was the case with the research.

Inclusion criteria were student clients of the CFB, which is where we recruited participants. Exclusion criteria were non-students who accessed the CFB, including staff and alumni. The researchers, who were three graduate students studying different aspects of food insecurity, used posters and flyers in the CFB to inform student clients of the study. In addition, when the CFB volunteers registered new clients, they distributed a study flyer to the new clients with other food and nutrition

documentation. Volunteers of the CFB were informed of the study, and could explain basic study details to the clients. If a client expressed interest in the study, their contact information was entered into an online form. The volunteers provided the researchers with this list. The researchers contacted listed individuals to talk with them about the study, and arrange a time for the interview to take place.

5.3 Procedures

Face-to-face structured interviews were conducted over a one-year period, from April 2013 to April 2014, with 65 students who used the CFB. Of these students, one withdrew from the study, and six were used as external pilots, leaving 58 students in our sample. Respondents provided informed written consent, and interviews were held in a private office on the UAlberta campus. Respondents were given a copy of the survey to follow along as questions were asked. The interview and screener took approximately 40 minutes to complete, and participants were compensated with a $35 grocery store gift card for their time. Since the participant pool was a vulnerable population, especially in terms of access to food, the compensation of a $35 towards groceries was of value to them. The gift card provided motivation to participate, without offering so much money as to make CFB clients feel as though they had no choice.

When collecting data regarding sensitive topics, such as food insecurity, face-to-face interviews elicit more accurate responses than interviews where the interviewee and

interviewer do not interact directly, such those over the Internet or phone (Bryman, Bell, & Teevan, 2012). One characteristic of structured interviews is the standardized presentation of questions and response options, which minimizes errors due to inter- and intra-interviewer variability. However, closed-ended surveys may not have an exhaustive list of response options. We mitigated this by attempting to identify all logical options through research and formative evaluation. In the event that the desired response was not present, the respondent could select the 'Other, please specify' response, and elaborate.

Another aspect of the study was the assessment of respondents' dietary intakes (specifically daily intake of fiber, calcium, added sugar, added sugar from sugar-sweetened beverages, whole grain, dairy, and fruit, vegetable and legumes) in order to determine if diet quality indicators were associated with food security status.

5.4 Measures

The two components of data collection included a face-to-face structured interview and an online dietary screener. The structured interview had questions about food security status, self-rated health and well-being, strategies to cope with food insecurity, food security-related behaviours, perceived academic outcomes of food insecurity, and demographics. The dietary screener was a 26-item questionnaire inquiring about intake frequency of particular foods over the past month.

5.4.1 Adult Food Security Survey Module.

Food security status was measured using the validated 10-item *USDA Adult Food Security Survey Module (AFSSM)* (United States Department of Agriculture, 2014). The 6-item short form of the food security survey module was deemed unsuitable for the study because it does not measure all levels of food insecurity, has less precision and reliability than longer item surveys, and its use is recommended only when the 10-item and 18-item measures create too much respondent burden (United States Department of Agriculture, 2014).

In Canada, Health Canada uses a classification scheme which groups respondents into categories based on the number of affirmative responses to the survey questions. The categories are: 'food secure' (0-1 affirmative responses), 'moderately food insecure' (2-5 affirmative responses), and 'severely food insecure' (6-10 affirmative responses).

The present study employed the classification scheme of Health Canada, and responses were dichotomized to create two groups: 'severely food insecure' and 'non-severely food insecure'. We considered visiting a food bank to be an indicator of some degree of concern about food supply. Thus, students classified as 'food secure' were grouped with students classified as 'moderately food insecure'.

Given that the AFSSM was first developed for use in the U.S., but has been adapted and translated for, and administered among, numerous populations worldwide (Derrickson, Fisher, & Anderson, 2000; Hromi-Fiedler, Bermúdez-Millán, Melgar-Quiñonez, & Pérez-Escamilla, 2009; Payab et al., 2014; Pérez-Escamilla et al., 2004), new surveys deviate slightly from the original survey. Health Canada adapted the scoring of the USDA food security survey tool to suit the Canadian population. The questions of the AFSSM are identical in the U.S. and Canada. However, compared to the U.S. version, the Canadian version has a couple of notable adjustments.

First, Canada employs two scales with separate scoring to measure adult and child food insecurity, whereas the U.S. has a single scale that measures both (Health Canada, 2007). Using a single scale to encompass adult and child food insecurity may be problematic in the event that adults and children have differing food security statuses. Further, the opportunity to compare adult and child food security status in the same household is lost. Adults often try to shield their children from food insecurity, so there is typically two times the prevalence of food insecurity (and seven times the prevalence of severe food insecurity) in adults as compared with children who live with them (Nord, Hooper, & Hopwood, 2008). This difference between the USDA and Health Canada methods means that the Health Canada method will often yield a lower estimate of food insecurity prevalence compared with the USDA (Nord et al., 2008).

The second difference between the AFSSM of USDA and Health Canada relates to scoring. To be considered food secure in the USDA classification, two or fewer affirmative responses are needed, whereas for Health Canada, one or fewer affirmative responses are needed. Research has indicated that the USDA classification system may be too stringent, and may wrongly exclude households that show signs of food insecurity, albeit small signs (Health Canada, 2007). This difference only applies to households without children, and results in a higher estimate of food insecurity when scored using the Health Canada method (Nord et al., 2008).

Despite the fact that the aforementioned differences have opposite effects on food security classification, the Health Canada method produces a consistently higher prevalence of food insecurity compared with the USDA method; when both methods are applied to a U.S. dataset, the prevalence of food insecurity is 40% higher with the Canadian method (14.2%) compared to the U.S. method (10.2%) (Nord et al., 2008).

Another deviation of our survey to the original version pertains to the time frame for each question. Questions in the original AFSSM ask respondents about their food situation in the past 12 months, whereas this study employed a version that asks respondents about their situation in the past 30 days. This decision was made for several reasons. First, students who access the CFB may have recently moved away from their families and/or to a new city, and an inconsistent household

status over the preceding 12 months might cause misleading survey results if the original wording was used. For example, if food insecurity was only experienced since moving away from home, then their response to questions asking about the last 12 months would likely yield answers that reflect their situation at home, which would be interpreted as food security. Second, there might have been time-of-year-specific costs incurred by the students, which necessitated a visit to a food bank. At the beginning of the academic year or semester, students often experience increased expenses in the form of tuition payments and course materials. In this scenario, asking about their food security status over the past year would not capture the level of food insecurity experienced in their time of food shortage. Since the food insecurity would be experienced over a period of one or two months, the survey designed for one year would not detect food insecurity. This study is concerned with why students are accessing the CFB, thus it is more appropriate to ask about the past 30 days. Furthermore, it has been found that asking about food insecurity in the past 30 days instead of 12 months enables a more exact view of the food security status at the time of the survey rather than over the past year (Nord, Andrews, & Carlson, 2009). Scoring for questions inquiring about length of time was changed from three or more months out of a year to three or more days in a month (United States Department of Agriculture, 2012). Given that 30 days is a relatively short period of time, there is a possibility that surveying food security status over the previous 30 days rather than 12 months may be too short to gain a complete understanding of the food

security situation of students. However, it was felt that the aforementioned benefits of the 30-day time reference outweighed the potential limitations.

One limitation of using the AFSSM is that it assesses the food security status of the household; this could be problematic because students often live with other individuals. Cohabitation does not imply that all members of the household have the same food security status. Since students may not share income or food, the fact that one household member has a particular food security status does not mean that their cohabitants have the same status. To remedy this issue, through consultations with individuals with expertise in food security, the wording of questions was modified to reflect the respondents' living arrangements and food-sharing status. If respondents said that they lived with others and shared food, then questions in the AFSSM would use the pronouns 'our' and 'we', and questions referred to the person as, 'your household or living group'. Conversely, if respondents either lived with others and did not share food, or lived alone, then the pronouns 'I' and 'my' were used, and questions referred to the person as 'you'.

5.4.2 Canadian Community Health Survey questions (self-rated health and well-being).

Self-rated health and well-being were measured using questions from the 2004 (Cycle 2.2) Canadian Community Health Survey (CCHS) (Health Canada, 2006). The self-rated health questions were designed to be administered to individuals in all provinces and territories of Canada, thus these were suitable questions for

students who access the UAlberta CFB, and who might be from various regions of Canada (Statistics Canada, 2014a). The CCHS questions for self-rated health and well-being were also selected for use in this survey because these questions were administered on a national scale. This would allow comparisons to be made between the self-rated health of our sample and that of all Canadians.

5.4.3 Coping strategies for food insecurity.

One question queried the coping strategies that students used when they did not have enough money for food. The following strategies have previously been identified by researchers in the field: purchase food on credit; give up services such as telephone or cable TV; sell or pawn possessions; delay bill payments; go to a food bank or emergency food service such as a soup kitchen (Tarasuk, 2001); get food or borrow money for food from friends or relatives; and go to a friend or relative's home for a meal (United States Department of Agriculture, 2002).

Lastly, considering the target sample of university students, the research team created the coping strategy: delay buying textbooks / supplies or not purchasing textbooks / supplies at all.

5.4.4 Food security-related questions

Given the psychological and physiological effects of having limited food, we were interested in exploring perceived negative academic outcomes of food

insecurity. We asked the in-house question: "Some students have reported that the quality of their university experience has been adversely affected by lack of money for food. As a student, have you experienced any of the following because you didn't have enough money for food?" Respondents chose all options that applied to them from seven responses.

We were also interested in the extent to which respondents used the CFB as a food source. To assess their reliance, we created and asked the question, "Which statement about food hampers from the Campus Food Bank most accurately describes your situation?" Respondents could choose from one of three options ranging from low reliance to high reliance.

5.4.5 Perceived academic outcomes of food insecurity

In order to assess the perceived outcome, if any, of food insecurity on academics, we asked, "Some students have reported that the quality of their university experience has been adversely affected by lack of money for food. As a student, have you experienced any of the following because you didn't have enough money for food? *Choose all that apply".* Respondents could choose as many options as applied to them from the following responses: "I was unable to attend

class", "I was unable to complete an assignment", "I was unable to study for an exam", "I could not concentrate in class or during an exam", "I failed a course or withdrew from a course", "None of the above applies to me", and "Don't know or declined to answer".

5.4.6 Demographic questions

Demographic questions inquired about: age, marital status, degree type, international student status, whether parents were born in Canada, full-time or part-time student status, year of program, whether respondents live alone, whether respondents live with family members, whether respondents share the cost of food with co-habitants, whether they have children, and their primary source of income.

5.4.7 Dietary Screener Questionnaire

The DSQ was the tool selected to gather information about aspects of participants' diets. This screener was particularly convenient for inclusion in our survey because the results are collected through an online form and are automatically amalgamated into a database. In addition to amalgamation, scoring algorithms provided by the National Cancer Institute (National Cancer Institute, 2014c) were used to convert all responses involving a frequency of consumption to identical units, and daily

nutrient consumption is derived from individual food item consumption (National Cancer Institute, 2014b).

5.5 Reliability and Validity

Researchers ensured both reliability and validity throughout the research process. In order to reduce error due to interviewer variability, the structured interview was scripted, which minimized differences in the presentation of questions and potential responses. In addition, face-to-face interviews have been shown to develop better rapport with participants, which leads to more honest responses, especially with sensitive questions (Bryman et al., 2012). The questions regarding food security status, self-rated health and well-being, and food items and dietary factors, have been shown to have high reliability and validity (Health Canada, 2012; National Cancer Institute, 2014a; Statistics Canada, 2015).

After developing the survey, we consulted, and received feedback from, experts in the field to ensure content validity. In order to establish face validity, the survey was pilot-tested with 19 UAlberta graduate students, who were asked to provide feedback on what the questions seemed to be asking and comprehensibility.

5.6 Data Management

Identities of respondents remained anonymous, and names and interview results were stored in separate locations. All data collected was stored on password-

protected computers and in locked filing cabinets in a private office. Five years following the completion of the study, this information will be destroyed.

5.7 Data analysis

All of the structured interview questions were pre-coded, with each of the fixed responses corresponding to a particular code. To examine Objective 1, descriptive statistics, including frequency tables and diagrams, measures of central tendency, and measures of dispersion, were calculated for all variables using SPSS 21. These data described student CFB clients in terms of demographic information, food security status, self-rated health and well-being, perceived academic outcomes of food insecurity, coping with food insecurity, and food-related behaviours.

To address Objective 2, logistic regression was used to compare health and well-being, and t-tests were used to compare food intake between severely food insecure and non-severely food insecure respondents. More specifically, through logistic regression, we determined the odds that respondents with severe food insecurity experienced poor health outcomes compared with respondents with non-severe food insecurity. The Chi-square test was used to compare nominal variables (i.e., reliance on food bank, coping strategies, perceived academic outcomes) between respondents with severe and non-severe food insecurity.

To investigate Objective 3, Chi-square tests and Z-tests for two population proportions were calculated for our sample compared with all student clients of the CFB, and the general university population, respectively.

5.8 External pilot data collection and analysis

The first six interviews conducted with student clients of the CFB were used as external pilots. Based on an assessment of the flow of the interview, we adjusted the structure of certain questions, added a couple of questions, and finalized the survey.

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6 Results

The present study recruited 65 students in a one-year period. Of these, one person dropped out, and six were external pilots. The 58 respondents included in the study represented approximately 27.2% of CFB clients who accessed the CFB over a one-year period.

Our analysis focused on a comparison between students with severe food insecurity and those with non-severe food insecurity, which included food secure and moderately food insecure students (see Section 5.4.1). We repeated the same statistical tests to compare students with moderate and severe food insecurity (omitting food secure students from the analysis). Compared to tests that included food secure students, the tests excluding food secure students showed the following differences: students with severe food insecurity did not have greater odds of experiencing poor mental health; and students with severe food insecurity were not significantly more likely to report having academic consequences. Apart from these differences, the statistical tests yielded comparable results when food secure students were excluded.

The results, interpretation, and discussion of this research are included in the following two manuscripts that have been submitted to peer-reviewed journals.

7 Paper 1: How do student clients of a university-based food bank cope with food insecurity?

This manuscript was submitted as a revised short report to the Canadian Journal of Dietetic Practice and Research on March 9, 2015 (manuscript # DCJOURNAL-D-14-00051R1). The editor specified a 1500 word maximum for the body of the paper (excluding abstract, references and tables). The style of Paper 1 is according to journal requirements.

How do student clients of a university-based food bank cope with food insecurity?

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ABSTRACT

Purpose: To describe the food security status, food insecurity coping strategies, characteristics, and experiences of student clients of the Campus Food Bank (CFB) at the University of Alberta in Edmonton, Canada.

Methods: A convenience sample of 58 students completed a survey from April 2013 to April 2014. Food security status was determined using the *Adult Food Security Survey Module*.

Results: Ninety percent of CFB student clients who participated in this study were food insecure, which included both moderately and severely food insecure groups. The most prevalent coping strategies for food insecurity included applying for a loan or bursary (86.2%), seeking employment or working more hours (84.5%), and purchasing food using a credit card (77.6%). Participants were a diverse mix of students, including graduate students (50.0%), international students (46.6%), and caregivers of children (24.1%). The most common primary sources of income were government student loans (29.3%) and research assistantships (20.7%). Most participants (82.8%) liked the food they received from the food bank.

Conclusions: Food insecurity is highly prevalent among student clients of this university-based food bank. Students used a variety of coping strategies to increase their disposable income, highlighting the need for additional strategies to alleviate food insecurity among vulnerable students.

INTRODUCTION

While there are many definitions of food insecurity, as measured on the Canadian Community Health Survey, food insecurity is considered to occur when households are unsure of having, or are incapable of acquiring, adequate food to meet all members' needs because of lack of money for food (1). Among Canadians aged 20 to 34 years, there is a 10.4% prevalence of moderate or severe food insecurity due to limited financial resources, which is higher than the national prevalence of 7.8% (2). There is little knowledge of food insecurity prevalence among post-secondary students in this age range. Such individuals may be considered to have a low risk for food insecurity by virtue of their ability to afford to attend college or university; however, some are likely food insecure because of their limited earning potential, high tuition and compulsory fees, and lack of financial support from family (3).

One Toronto study found that 94% of municipal food bank clients were food insecure (5). Similarly, studies in the Netherlands and Connecticut (United States) found that 72.9% and 83.8% of municipal food bank clients were food insecure, respectively (6,7). Given the high prevalence of food insecurity among food bank clients, the proliferation of food banks at post-secondary institutions across North America (4) is evidence that food insecurity likely exists among the student population. There has been little research to explore the food security status of post-secondary students utilizing campus food banks or the food insecurity coping strategies used by these students.

The aim of this study was to describe food security status, food insecurity coping strategies, sociodemographic characteristics, and experiences of students accessing the services of the Campus Food Bank Society (CFB) at the UAlberta. This registered charity

provides hampers containing non-perishable and perishable foods (depending on availability) to UAlberta students, staff, and alumni. At most, these community members can request a hamper to feed themselves and any dependents once every two weeks. Although the CFB tries to ensure that food hamper items meet Canada's Food Guide for a four-day period, hampers provided by the CFB are often nutritionally inadequate (based on the standards of the Canada's Food Guide and Dietary Reference Intakes) (8).

METHODS

Data collection for this cross-sectional study occurred from April 2013 to April 2014. A convenience sample of student clients recruited by researchers at the CFB completed a face-to-face structured survey. It was developed in consultation with researchers with expertise in household food security, which ensured content validity. Through cognitive interviews with 19 UAlberta students, the survey was pilot-tested to optimize comprehension and face validity (9).

Food insecurity over the past 30 days was measured using the 10-item *Adult Food Security Survey Module* (AFSSM) (10) based on the Health Canada (1) and United States Department of Agriculture (USDA) scoring methods (10). Each question asked whether a condition or behaviour occurred because of a lack of money and other resources to obtain food. There survey also had closed-ended questions that queried students' sociodemographic characteristics (age, gender, degree type, student type, primary income source, parents born in Canada, living situation, marital status, children). Students selected from a list of known coping strategies used when there is not enough money for food (11,12) using the question, "Since being a student, how often have you used the following strategies when you didn't have enough money for food?". In response to the

statement, “Think of the last hamper that you received. What was your experience of the food that you received in the hamper? (*Choose all that apply)*”, participants chose from several options: ‘I liked the food’; ‘I didn’t like the food’; ‘I didn’t know how to prepare some of the food in the hamper’; ‘The food items were unacceptable (please explain)’; and ‘Other experiences (please explain)’. Two open-ended questions asked, “How did you learn about the Campus Food Bank?” and “If the Campus Food Bank did not exist, where would you get the food you need?” Summative content analysis was used to categorize responses to open-ended questions (13).

The CFB Board of Directors and a UAlberta Health Research Ethics Board approved the study. Participants provided informed written consent.

RESULTS

Fifty-eight students completed the survey, representing about 20% of annual CFB clients. The average age of participants was 30.0 ± 8.3 years, 10.3% were food secure, 44.8% were moderately food insecure (‘there was an indication that quality and/or quantity of food consumed was compromised’ (2)), and 44.8% were severely food insecure (‘there was an indication of reduced food intake and disrupted eating patterns’ (2)). According to the USDA classification, 82.8% had very low or low food security, and 17.2% had marginal or high food security.

The months in which the greatest number of participants registered for their first CFB food hamper were September (19.0%) and January (19.0%). Government student loans (29.3%) or a research assistantship (20.7%) were the primary sources of income. Of the 63.8% of students living with others, 62.2% lived with relatives, and 62.2% shared the cost of food with the people they lived with. Of participants living with relatives,

78.2% shared the cost of food or meals with them. Of the entire sample, 24.1% had children under the age of 18 years in their care; 64.3% had one child and 35.7% had two children. Of students caring for children, 35.7% were single parents, representing 8.6% of all participants. Additional participant characteristics are in *Table 1*.

Table 1. Sociodemographic characteristics of a convenience sample of student clients of the University of Alberta Campus Food Bank (n=58)

Age (mean ± SD)	30.0 ± 8.3 years
CATEGORICAL DATA	% (n)
Female	60.3 (35)
Undergraduate	50.0 (29)
International Student	46.6 (27)
Full-time student	96.6 (56)
Primary source of income	
Government student loan	29.3 (17)
Research assistantship	20.7 (12)
Scholarship or bursary	12.1 (7)
Savings	10.3 (6)
Family	8.6 (5)
Employment other than assistantship	8.6 (5)
Other	10.3 (6)
Parents born in Canada	24.1 (14)
Lives with others	63.8 (37)
Lives with family members or relatives	39.7 (23)
Single or Separated / divorced / widowed	68.9 (40)
Have dependent children under 18 years	24.1 (14)

Table 2 indicates the food insecurity coping strategies of participants. All participants used at least one strategy.

Table 2. Food insecurity coping strategies among a convenience sample of student clients of the University of Alberta Campus Food Bank (n=58)

	% (n)
Applied for a loan or a bursary	86.2 (50)
Sought employment or worked more hours	84.5 (49)
Purchased food using a credit card	77.6 (45)
Delayed buying university supplies or not bought them	75.9 (44)
Received food from a friend or relative, or gone to the home of a friend or relative for a meal	75.9 (37)
Delayed bill payments	60.3 (35)
Borrowed money for food from friends or relatives	51.7 (30)
Given up services such as telephone or TV	50.0 (29)
Sold or pawned possessions	41.4 (24)
Gone to a food bank (other than the Campus Food Bank) or emergency food service such as a soup kitchen	27.6 (16)
Other (Chose low-priced foods/budget)	12.1 (7)
Other (Stole food)	5.2 (3)

Considering the most recent food hamper participants received, 82.8% liked the food, 29.3% did not know how to prepare some food items, 25.9% wanted more or less of a certain food item, and 12.1% indicated not being accustomed to Western foods.

Common ways students learned about the CFB were through a friend (39.7%), the Student Financial Aid Information Centre (27.6%), and advertisements on the UAlberta campus or website (13.8%). If the CFB did not exist, students indicated that they would go to another food bank (31.0%), get food or money from friends or family (19.0%), eat cheap food (10.3%), go to a religious group that provides food (10.3%), or get food from a grocery store (10.3%).

DISCUSSION

The vast majority of post-secondary student clients of the CFB at UAlberta were food insecure. This is not surprising, since participants were accessing an emergency food resource. Despite not needing to provide evidence of financial shortfalls to access the CFB, the proportion of students with low or very low food security was similar to proportions among municipal food bank users where evidence of need is usually required to access services (6,7). Student clients of the CFB included an equal number of graduate and undergraduates, and a blend of international and domestic students. Of note was the high number of students caring for children. Given the diversity of our sample, many factors likely made students vulnerable for income-related food insecurity. An adjunct to the current study is qualitative research with student to better understand the reasons they are food insecure, and the outcomes of food insecurity they experience.

Most coping strategies that students used to deal with food insecurity had the effect of increasing disposable income, with the most common being “applying for a loan

or bursary." Federal student loans defer payment, and are zero-interest, until after graduation (14). While loans minimize short-term financial burden, financial aid is inadequate to support both direct and indirect costs of education (15). Other coping strategies (*i.e.,* delaying the purchase of – or not buying – university supplies) could compromise students' academic performance. Most students were buying food on credit, a practice which could incur high interest costs, pushing students further into debt. Food insecure students likely decide among the many trade-offs of coping strategies to increase income. Since food expenditure is flexible compared with rent or utility costs, food insecure students may sacrifice food quality or quantity instead of, or prior to, compromising other basic needs (16). Indeed, twelve percent of participants coped with food insecurity by purchasing lower priced food and another five percent stole food.

A limitation is that participants represented a convenience sample and may have differed systematically from non-participants, so caution must be used in generalizing findings. Participation bias, given the stigma associated with accessing a charity (17), may have manifested in two ways: those who did not use the food bank due to stigma, but were in need of its services, did not participate; and those who were clients of the CFB but did not want to be identified as a client may not have participated.

RELEVANCE TO PRACTICE

We observed a high prevalence of food insecurity among students using a university-based food bank. The fact that students employed myriad strategies to cope with food insecurity, yet were still reliant on food hampers, suggests that student financial assistance needs to be increased and alternate strategies to alleviate student food insecurity are required. Research suggests that only one-third of food-insecure Canadians

seek help from food charities (18,19); thus, there are likely many more students who are food insecure than the number who access food banks on Canadian campuses. Discussion surrounding income-related policies to support a diverse group of post-secondary students is required, and dietitians could advocate for such policy change.

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8 Paper 2: **Food insecure post-secondary students using a campus food bank have poor self-rated health, dietary intake, and perceived academic outcomes**

This paper was submitted May 19, 2015 as a research manuscript to the Canadian Journal of Public Health. The style of the paper is according to journal requirements.

Food insecure post-secondary students using a campus food bank have poor self-rated health, dietary intake, and perceived academic outcomes

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ABSTRACT

OBJECTIVES: In Canada, food insecure households are unsure of having, or are incapable of acquiring, adequate food to meet all members' needs because of lack of money. Individuals living with food insecurity experience more adverse health and dietary outcomes than the food secure. Post-secondary students are one group that may be vulnerable for food insecurity despite being able to finance their education. If food insecure students have suboptimal health and diet, their ability to learn and excel in their education could be compromised. This study examined the relationship of food security status to indicators of health and well-being, dietary intake, and academic quality among a convenience sample of 58 students receiving food hampers from the campus food bank at the University of Alberta.

METHODS: Respondents completed a survey between April 2013 and April 2014 that included the Adult Food Security Survey Module.

RESULTS: Based on survey responses, 10.3% of respondents were food secure, 44.8% were moderately food insecure and 44.8% were severely food insecure. Students with severe food insecurity were more likely to rate their overall and mental health as poor, and consume fewer fruits, vegetables, and legumes daily, compared to other students. Perceived negative academic outcomes were more numerous and grave among students with severe food insecurity. Students with severe food insecurity relied more heavily on the food bank than their non-severely food insecure counterparts.

CONCLUSION: These results emphasize that governmental and university-based policies should be implemented to improve the food security situation of post-secondary students.

MeSH Keywords: Food supply, students, social determinants of health, public health, hunger, nutritional status

INTRODUCTION

In Canada, food insecurity exists when households are unsure of having, or are incapable of acquiring, adequate food to meet all members' needs because of lack of money.[1] Since the direct measurement of food insecurity occurs at the household level in Canada, we refer to 'household food insecurity' in this paper. Household food insecurity is a nutrition indicator that reflects the lack of access to sufficient nutritious food to maintain good health.[2] Living in a food insecure household is associated with several negative health outcomes, including poor self-reported general and mental health, restricted activity, multiple chronic conditions, and a lack of community belonging.[3,4]

Household food insecurity disproportionately affects a range of financially disadvantaged groups, including: 'the working poor'; single parents; recent immigrants; some ethnocultural groups (Mexicans,[5] indigenous peoples,[6] black households[6]), and recipients of social assistance (e.g., welfare) and employment insurance.[2] Considering that approximately 425,000 Canadian post-secondary students take out a loan to finance their education,[7] this population sub-group may also be vulnerable to food insecurity, yet little is known about these students and their food security status. Over the last 20 years, governmental funding for post-secondary education in Canada has been declining.[8] To counter this reduction in funding, Canadian universities are increasing the enrollment of international students, who pay at least double the tuition fees of domestic students.[9] Universities are also compensating for the funding cuts by increasing tuition and compulsory fees for domestic students; these costs rose almost 20% between 1991 and

2011, making a university education less affordable for Canadian students from low- and median-income households.[8]

The proliferation of food banks at post-secondary institutions across Canada and the United States is a potential indicator of increasing food insecurity among post-secondary students. In 1991, the first food bank on a Canadian campus opened at the University of Alberta (UAlberta). There are now more than 75 campus food banks across the country.[10] Food banks are charitable organizations designed to alleviate food shortages by distributing donated food at no charge to those in need.[11] While the food hampers supplied by food banks ease some of the food insecurity that users experience, the hamper contents do not address the root causes of food insecurity,[11] nor do they typically provide adequate nutrients for the period of time they are intended to nourish recipients.[12] Individuals with food insecurity tend to rate their health as fair or poor.[3] Given the rise in the number of campus food banks, there is a need for information about the health and diets of post-secondary students who use them.

Few studies have captured the prevalence of food insecurity among post-secondary students. On select campuses in Maryland (USA) and Australia, 56% and 47% of post-secondary students, respectively, are estimated to be food insecure,[13,14] which is relatively high compared to that of other vulnerable populations. In the United States, the prevalence of food insecurity among black households and single women with children is 26.1% and 34.4%, respectively.[15] In order to gain a more complete understanding of this problem, it is important to further study post-secondary student food insecurity.

The primary objective of this study was to determine how the characteristics of student clients of the Campus Food Bank Society (CFB) at the UAlberta vary by food security status. Specifically, we compared data on students' self-rated health and well-being, dietary quality, perceived academic outcomes of food insecurity, and reliance on CFB food hampers. A secondary objective was to ascertain whether the study sample was representative of the general CFB clientele and the UAlberta student population. This research builds on previous studies designed to better understand post-secondary student food insecurity at the UAlberta.[12,16]

METHODS

Research Setting

The CFB is a registered charity that provides emergency food hampers to UAlberta students, staff, and alumni. On average, 284 students receive food hampers each school year.[17] Students do not need to provide evidence of financial need to receive a food hamper. At most, students can request a hamper to feed themselves and any dependents once every two weeks. Hampers include a four-day supply of non-perishable (e.g., canned and dried foods) and perishable foods (e.g., produce, dairy, bread), the latter depending on availability from donations.

Study Design

This study obtained cross-sectional data among student clients of the CFB. Data collection occurred through face-to-face, structured surveys. There was a convenience

sample of students recruited between April 2013 to April 2014 at the CFB using posters, flyers, and by approaching clients during peak hours of CFB usage. After finishing the survey, respondents completed an online dietary screener.

The survey was developed in consultation with researchers with expertise in household food security to ensure content validity. We tested the face validity and comprehensibility of the survey[18] with 19 UAlberta students prior to administering the survey to the target population.

Measures

Household adult food security status. Household adult food security status experienced over the last 30 days was measured using the United States Department of Agriculture's Adult Food Security Survey Module (AFSSM).[19] Some wording of the AFSSM was modified to account for the unique living circumstances of students. To account for students living with others and who do not consider themselves as a household, they were referred to as 'you/your household or living group' instead of 'you/your household'. Food security status was determined using the Health Canada scoring method.[20] Specifically, students with zero or one affirmative responses were categorized as *food secure*; two to five affirmative responses as *moderately food insecure*; and six to ten affirmative responses as *severely food insecure*.[20]

Self-rated health and well-being. Six measures of self-rated health and well-being were derived from the validated Canadian Community Health Survey (*Table 1*).[21]

Table 1: Measures of health and well-being, and their coding for analysis

	Question	**Responses**	**Dichotomization**
Overall health	In general, how would you describe your overall health?	1=excellent 2=very good 3=good 4=fair 5=poor 6=don't know or refuse	0=good (excellent, very good, or good) 1=poor (fair or poor)
Mental health	In general, how would you describe your mental health?	1=excellent 2=very good 3=good 4=fair 5=poor 6=don't know or refuse	0=good (excellent, very good, or good) 1=poor (fair or poor)
Physical health	In general, how would you describe your physical health?	1=excellent 2=very good 3=good 4=fair 5=poor 6=don't know or refuse	0=good (excellent, very good, or good) 1=poor (fair or poor)

Life satisfaction	How satisfied are you with your life in general?	1=very satisfied 2=satisfied 3=neither satisfied nor dissatisfied 4=dissatisfied 5=very dissatisfied 6=don't know or refuse	0=satisfied (very satisfied and satisfied) 1=dissatisfied (neither satisfied nor dissatisfied, dissatisfied or very dissatisfied)
Life stress	Thinking about the amount of stress in your life, would you say that most days are:	1=not at all stressful 2=not very stressful 3=a bit stressful 4=quite a bit stressful 5=extremely stressful 6=don't know or refuse	0=low stress (not at all stressful, not very stressful, a bit stressful) 1=high stress (quite a bit stressful, extremely stressful)
Sense of community belonging	How would you describe your sense of belonging to your local community? *(Respondent decides what their local community is.)* Would you say it is:	1=very strong 2=somewhat strong 3=somewhat weak 4=very weak 5=don't know or refuse	0=strong sense of belonging (very strong, somewhat strong) 1=weak sense of belonging (somewhat weak, very weak)

Dietary quality indicators. Respondents completed the online Dietary Screener Questionnaire (DSQ) of the National Cancer Institute, a 26-item questionnaire of foods consumed over the previous 30 days. Responses were converted to daily intake for seven categories: fiber; calcium; added sugar; added sugar from sugar-sweetened beverages; whole grain; dairy; and fruit, vegetables (excluding French fries), and legumes.

Impact of food insecurity on academic experience. Respondents were asked the in-house question, "Some students have reported that the quality of their university experience has been adversely affected by lack of money for food. As a student, have you experienced any of the following because you didn't have enough money for food?" Respondents chose all options that applied to them from seven responses ("I was unable to attend class", "I was unable to complete an assignment", "I was unable to study for an exam", "I could not concentrate in class or during an exam", "I failed a course or withdrew from a course", "None of the above applies to me", "Don't know or decline to answer").

Reliance on the CFB. To assess the extent to which respondents rely on the food they receive from hampers, they were asked, "Which statement about food hampers from the Campus Food Bank most accurately describes your situation?" Respondents chose one option from a list. Responses were dichotomized into high reliance ("I consistently need

food hampers in order to have enough food to eat") and low to moderate reliance ("I could manage without a food hamper, but getting one helps me to reduce my grocery bill" and "I need a food hamper once in a while in order to have enough food to eat").

Sociodemographic and educational characteristics. Questions inquired about students' educational characteristics. Data obtained from the survey were compared to aggregate data from all student clients of the CFB and to aggregate data from the entire 2011-2012 UAlberta student population, abstracted from the publicly-available website of the university.[22]

Data Analysis

The three food security status categories were collapsed into two categories of severe food insecurity and non-severe food insecurity (a combination of moderately food insecure and food secure) to ensure sufficient sample size for each grouping.

To address our primary objective relating to health and food security status, binary logistic regression models (adjusted for gender and age) were used to derive odds ratios (OR) and 95% confidence intervals (CI). The ORs and CIs determined the likelihood of students with severe food insecurity – compared with students with non-severe food insecurity (reference category) – for having poor self-reported general health, mental

health, physical health, low life satisfaction, high stress, and lack of community belonging. To meet our primary objective, we also used t-tests to compare average daily intake of specific dietary aspects between students with severe food insecurity and those with non-severe food insecurity. We applied the Chi-square test (or the Fisher's test, when the Chi-square assumptions were violated) to compare academic consequences reported by students with severe and non-severe food insecurity. We used a Chi-square test to determine whether reliance on the CFB differed between students with severe food insecurity, and students with non-severe food insecurity.

In order to address the secondary objective of evaluating representativeness of our sample, we compared sociodemographic and educational characteristics of study respondents versus the CFB student client population using the Chi-square test, and versus the entire 2011-2012 UAlberta student population using the Z-test for two population proportions.

For all group comparisons, statistical significance was set at $p < 0.05$. Data analyses were carried out using the Statistics Package for the Social Sciences (version 21, IBM Corp., Armonk, NY, 2012) or Microsoft Excel (version 14.4.7, 2010).

RESULTS

In total, 58 students completed the survey, representing 20.4% of all CFB student clients in 2013-2014.

Almost all (98.3%) students responded affirmatively to at least one item of the AFSSM, implying some level of food insecurity. Based on the Health Canada method, 10.3% of respondents were food secure, 44.8% moderately food insecure, and 44.8% severely food insecure. Students with severe food insecurity relied more on the food hampers than those with non-severe food insecurity (34.6% vs. 9.7%, χ^2=5.57, p=.018).

In terms of health and well-being indicators, the majority of respondents indicated good general, mental, and physical health. The majority of students indicated high life stress, and most students rated their life satisfaction as high. The majority of students with severe food insecurity indicated a strong sense of community belonging, whereas among students with non-severe food insecurity, an equal number indicated a weak and strong sense of community belonging (*Table 2*). After adjusting for gender and age, students with severe food insecurity had greater likelihood of reporting poor overall health and mental health than those with non-severe food insecurity (OR 4.03, 95% CI 1.10 – 14.78; OR 4.96, 95% CI 1.28 – 19.19).

Table 2: Health and well-being indicators by household food security status

	Total % (n=58)	Severely food insecure % (n=26)	Non-severely food insecure % (n=32)
General health			
Good	67.2 (39)	53.8 (14)	78.1 (25)
Poor	32.8 (19)	46.2 (12)	21.9 (7)
Mental health			
Good	72.4 (42)	57.7 (15)	84.4 (27)
Poor	27.6 (16)	42.3 (11)	15.6 (5)
Physical health			
Good	62.1 (36)	53.8 (14)	68.8 (22)
Poor	37.9 (22)	46.2 (12)	31.2 (10)
Life stress			
Low	32.8 (19)	26.9 (7)	37.5 (12)
High	67.2 (39)	73.1 (19)	62.5 (20)
Life satisfaction			
High	58.6 (34)	53.8 (14)	62.5 (20)
Low	41.4 (24)	46.2 (12)	37.5 (12)
Community belonging*			
Strong	53.4 (31)	57.7 (15)	50.0 (16)
Weak	44.8 (16)	38.5 (10)	50.0 (16)

* One respondent selected 'Didn't know or refuse'; data for this outcome does not total 58

Students with severe food insecurity consumed fewer fruits, vegetables and legumes daily (t=2.72 p=.009) than their peers with non-severe food insecurity.

The perceived adverse academic outcomes of food insecurity are shown in *Table 3*. Sixty percent of respondents reported at least one adverse academic outcome as a result of not having enough money for food. Compared to students with non-severe food insecurity, those with severe food insecurity were more likely to report adverse academic consequences of food insecurity (76.9% vs. 46.9%, p=.02), and were less likely to be able to concentrate in class or during an exam (73.1% vs. 40.6%, p=.01).

Table 3: Perceived academic outcomes of food insecurity by household food security status

Since being a student, how often have you done the following when you didn't have enough money for food? (choose all that apply)	**Overall Frequency % (n=58)***	**Severely food insecure % (n=26)***	**Non-severely food insecure % (n=32)***
Could not concentrate in class or during an exam	55.2 (32)	73.1 (19)	40.6 (13) †
Unable to study for an exam	19.0 (11)	23.1 (6)	15.6 (5)
Unable to complete an assignment	8.6 (5)	15.4 (4)	3.1 (1)
Failed or withdrew from a course	5.2 (3)	11.5 (3)	0
Unable to attend class	3.4 (2)	7.7 (2)	0
Don't know or declined to answer	2.7(1)	0	3.1 (1)
None of the above applies to me	39.7 (23)	23.1 (6)	53.1 (17) †

* Total of percentages exceeds 100% because respondents selected as many options as applied to them.

† Significant p-value based on Chi-square test

Sociodemographic characteristics of respondents compared to all CFB clients and the general UAlberta student population are reported in *Table 4*. Respondents were

significantly more likely to be graduate students (50.0%) than the general CFB student clientele (33.3%, p=0.02) or UAlberta student population (19.3%, p<0.001). They were also more likely to be international students (46.6%) than general CFB student clients (31.0%, p=0.04) or UAlberta student population (13.7%, p<0.001).

Table 4: Sociodemographic and educational characteristics of study respondents, UAlberta CFB student clients, and UAlberta student population

	Study Respondents 2013-2014 % (n=58)	**CFB Clients 2010-2013 % (n=568)**	**University Population 2011-2012 % (n=38774)**
Age (years)	30.0 ± 8.3	28.0 ± 8.0	23.9
Female	60.3 (35)	58.8 (334)	54.9 (21289)
Undergraduate	50.0 (29)	64.8 (368)*	80.7 (31300)*
International	46.6 (27)	31.0 (176)*	13.7 (5296)*
Full-time	96.6 (56)	94.4 (536)	90.9 (35236)

* Significantly different from study respondents

DISCUSSION

In the present study, almost all student clients of a food bank at a Canadian university were food insecure or from a food insecure household. Of the food insecure students, half were severely food insecure or from a severely food insecure household. Despite students' attempts to alleviate food insecurity through this form of charitable food

assistance, most students, or the individuals with whom they shared accommodations, consumed food of diminished quality or quantity due to financial resource constraints.

Considering the fact that food security is a social determinant of health in Canada,[23] it is not surprising that students in the present study had a higher prevalence of self-perceived poor health and well-being compared with the general Canadian population, or that self-rated poor overall and mental health was more prevalent among the severely food insecure students. Compared to the general Canadian population, three times the number of students in the present study rated their overall health as poor or fair (11.0% vs. 32.8%); and over four times the number of students rated their mental health as fair or poor (6.3% vs. 27.6%).[24] Regarding life stress, nearly triple the number of students reported their life to be quite a bit or extremely stressful compared with other Canadians (23.0% vs. 67.2%).[25] In Canada, life satisfaction is typically high, with only 8.3% of Canadians reporting that they are very dissatisfied, dissatisfied, or neither satisfied nor dissatisfied with their life. In contrast, 41.4% of students reported such life dissatisfaction. While 34.1% of Canadians have a somewhat weak or very weak sense of community belonging, 44.8% of the sample reported this level of weak community belonging.[24] In the general Canadian population, there is a positive relationship between health and social relationships, the latter being measured in surveys using community belonging.[26] The feeling of not being connected to their local community suggests that social isolation among students reliant on the services of a campus food bank may have contributed to their perceived sense of poor health and well-being.

Students with severe food insecurity consumed less dairy, and significantly fewer fruits, vegetables, and legumes than those with non-severe food insecurity. These findings suggest that students may be forgoing the purchase of produce, milk, and cheese as a cost-saving measure. Canadian student loans have not kept up with rising costs of post-secondary tuition and books.[27] Consequently, students reliant on loans to fund their education may sacrifice food quantity or quality in order to meet the cost of their education and other basic needs. Food prices have also been rising in Canada, as exemplified by the cost of Edmonton's Nutritious Food Basket, which measures "the cost of basic healthy eating" and food affordability. From 2006 to 2014, there was a 45.3% increase in the cost of the Edmonton Nutritious Food Basket for a four-person family.[28]

While the majority of respondents perceived they suffered academically because of food insecurity, severely food insecure students perceived they experienced more adverse academic outcomes, including not being able to study for exams. Although we did not ask students how this affected their grades, a recent study found food insecure college students in Maryland (USA) to have a lower grade point average compared with their food secure counterparts.[13] Research is required to examine if student food security status affects student graduation rates.

In spite of the potential stigma surrounding food bank use,[29] there has been an increasing number of UAlberta students who request food hampers. In the present study, students with severe food insecurity relied more heavily on CFB food hampers compared to

students with non-severe food insecurity. The CFB might not be able to provide food to everyone in need if this trend continues. Food charity does not eradicate food insecurity in the long-term;[11] given limited supplies of food at food banks, those who need food can only access the food bank sporadically thus, while students may be sating their short-term hunger by accessing the CFB, they remain food insecure. Also, food hampers students receive may contain a limited number of items and be nutritionally inadequate.[12] Campus food banks do not address the root causes of student food insecurity, which are likely inadequate student loans, lack of well-paying youth employment, and high tuition and compulsory fees.

The number of food insecure Canadians far exceeds the number of Canadians using food banks.[30] Similarly, the number of food insecure students likely exceeds by several fold the number using campus food banks. A study of food insecure Australian students found that while 6.6% reported knowledge of food banks in their local area, only 2.3% utilized them.[14] It could be that feelings of shame or embarrassment, and stigma, around campus food bank use prevents students from using them.[29] Food banks are only one coping strategy used by food insecure students; other coping strategies used by Australian students were stealing food or pawning assets to get enough to eat.[14]

A limitation of this study was that it was a convenience sample that included a fraction of total CFB clients. Generalization of our findings to all CFB students should be done with caution, particularly since graduate and international students were overrepresented in our sample compared to typical CFB student clients. Due to the small sample size, we

may not have had sufficient statistical power to observe differences between groups. Given the stigma associated with accessing a charity such as a food bank,[29] many student clients of the food bank may not have wanted to be identified as such, and thus may have hesitated to participate in the study.

Considering its association with poor health, inadequate nutrition, and compromised academic performance, student food insecurity is a serious issue that needs to be considered by campus administrators. There has been limited rigorous examination of food insecurity among post-secondary students, how the health of post-secondary students as a low-income group is affected by food insecurity, or of campus food banks as a response to student food insecurity. Larger-scale and longitudinal studies of post-secondary students should be conducted to determine causality of the outcomes of food insecurity. The findings also highlight the need for concerted public policy responses among university and government to establish more public funding for post-secondary students, and ameliorate food insecurity among students.

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9 Discussion

The prevalence of food insecurity was high Among student clients of the CFB. This is unacceptable, considering that one of the universal human rights is access to adequate, safe, and nutritious food to maintain good health and a good standard of living (United Nations, 2009). In light of the finding that, compared with students with non-severe food insecurity, those with severe food insecurity had poor health outcomes, diminished dietary intake, and perceived negative academic outcomes, student food insecurity is a topic that cannot be overlooked.

The fact that the severity of food insecurity was significantly associated with diminished health status and one aspect of diet suggests that the experience of severe food insecurity may lead to poor health outcomes and an inadequate diet, or vice versa. It is conceivable that a combination of food insecurity and poor diet both lead to diminished health. This conjecture is consistent with studies showing food insecurity to be a significant predictor of poor health, and that individuals from food-insufficient households are more likely to report poor health (Stuff et al., 2004; Vozoris & Tarasuk, 2003).

Our data suggest that food insecurity and poor diet may result in poor health outcomes for students. Previous research suggests that income inadequacy is the underlying issue (Tarasuk, Fitzpatrick, & Ward, 2010), with food insecurity and diet acting as mediating variables. In both men and women, socioeconomic status (comprised of household income adequacy and education levels) was related to the

nutritional quality of Canadians' food intakes (Tarasuk et al., 2010). Data from the CCHS showed a higher prevalence of food insecurity, and a greater proportion of severe food insecurity among the lower income adequacy categories compared to higher income categories. In the highest income adequacy category, 15% of all food insecure individuals were severely food insecure, and in the lowest income adequacy category, that percentage was 50% (Health Canada, 2007). This means that, while we may deem poor diet and severe food security status to be the leading contributors to poor health, those variables may only be indicators of the larger issue relating to income inadequacy.

In Canada, household income is the primary socioeconomic predictor of food insecurity (Howard & Edge, 2013). Households that do not have an adequate income are more sensitive to fluctuations in prices of their expenditures, and more likely to experience food insecurity (Emery, Fleisch, & McIntyre, 2013). For example, low-income households are affected more when food prices rise because they spend a greater proportion of their income on food. Even small shifts in the price of food or non-food essentials can lead to income insufficiency and food insecurity (Howard & Edge, 2013).

Students using the CFB had a diminished diet quality, as evidenced by their relatively lower fruit and vegetable intake, and low dairy consumption. If food banks were acting only as emergency food assistance resources, the nutritional quality of the food distributed would be less of a concern since food banks would rarely supply the

majority of a person's diet. However, food banks have become a pervasive, but unofficial, part of the welfare system in Canada, thus it is important to consider the nutritional quality of food hampers (Jessri et al., 2014; Meldrum & Willows, 2006). Food banks were originally implemented as a means to alleviate temporary, but severe, food shortages (Tarasuk, Dachner, & Loopstra, 2014). As such, they have a dubious ability to address the needs of chronic food bank clients, and to supply food representative of a balanced diet (Tarasuk & MacLean, 1990). Due to the fact that food banks are distributing food that has been donated, there is often a limited stock, which leads to a rationing of food (Power, 2011). With this in mind, food banks may be able to mitigate the effects of short-term hunger, but ending chronic hunger is not a likely outcome (Power, 2011). In addition, continued food bank use does not decrease the likelihood of severe food insecurity (Loopstra & Tarasuk, 2012), and further, 75% of people who go hungry do not even access food banks (Power, 2011). Even if food bank operations could be improved through more substantial, and higher quality, resources, they would still not be helping the individuals or families who do not use food banks (out of their own volition or due to other barriers) (Loopstra & Tarasuk, 2012).

On top of the nutritional, physical, and health concerns of continually accessing a campus food bank, stress and mental health were also pronounced in our sample. Students participating in the present study, especially those who were severely food insecure, had high levels of stress and poor mental health as measured by self-reported responses to questions about health and well-being. This stress and mental

health is troubling, especially considering the numerous sources of stress in students' lives: homesickness; pressure to get good grades; anxiety about having enough money to pay for tuition (especially for international students); and the imminent need to find a job in a competitive market. All of these pressures contribute to mental health issues among post-secondary students. At Ryerson University in Toronto, Ontario, there was a 200% increase in demand from students in crises in from 2010 to 2011, and at Cornell University in Ithaca, New York, there were six student suicides in the 2009-2010 academic year (Lunau, 2012). The prevalence of such issues can be seen at the UAlberta through the overcrowding of the mental health services on campus. Based on a survey of 1600 students at the UAlberta, 51% reported that in the last year, they felt hopeless and overwhelming anxiety, 7% said they had 'seriously considered suicide' and 1% had attempted suicide (Lunau, 2012). The same trend can be seen at two other post-secondary institutions in Edmonton (Northern Alberta Institute of Technology and Grant MacEwan University), where there were twice as many crisis appointments in September 2013 compared with the year prior, and up to a six-week wait for counseling, respectively (Gerein, 2014).

Building on the mental health concerns of students, the stigma and powerlessness associated with accessing a food bank is a major aspect of mental health among students who use food banks. Choice in food bank clients' diet is limited and food banks often require clients to prove they are poor enough to receive food deemed unfit for the rest of society (Tarasuk & MacLean, 1990). As stated by Tarasuk and MacLean (1990), "an institutionalized dependence on charitable food assistance must

be recognized as a significant barrier to good health". Food banks are unsuitable for dealing with an income-related issue this extensive (Tarasuk & MacLean, 1990). While food banks are instrumental for emergency food aid, they are also part of the problem because they alleviate pressure on the Canadian government to be accountable for the health of Canadians (Tarasuk & MacLean, 1990). As has been previously suggested, there is no one answer to the problem of household food insecurity. The ideal solution would be a combination of sustained efforts from food assistance programs, like food banks, in addition to governmental support (Howard & Edge, 2013).

9.1 Financial approaches to alleviating household food insecurity

For post-secondary students and other Canadians, food banks should not be a primary means of obtaining food; income support strategies should be enacted to support the needs of Canadians. One suggestion would be for the government to phase in a Guaranteed Annual Income (GAI) for all Canadians (Emery et al., 2013), including post-secondary students, and for food banks to be reinstated as charities that provide only temporary and emergency food aid. In the transition period where the mandates of food banks would be shifting, additional or alternative food assistance strategies could be put into place.

Instating a universal GAI for Canadians is one previously suggested strategy to address the growing problem of poverty in Canada (Emery et al., 2013; Forget, 2011; Segal, 2012). They would serve as a type of 'consumption insurance' in times of

expenditure fluctuation for individuals with a small income buffer (Emery et al., 2013). At present, only Canadians over the age of 65 have GAIs, which is comprised of the Old Age Security (OAS) and a Guaranteed Income Supplement (GIS). Among Canadians younger than 65, no such poverty-reduction programming exists. Instead, this demographic relies on a combination of welfare, provincial social assistance, and employment supports (which, at maximum, is only two-thirds the basic OAS and GIS), plus charitable assistance in dire circumstances (Emery et al., 2013).

When comparing the food security status, self-rated health, and poverty rate between individuals older than 65 years and those younger than 65, there are some marked differences. Higher rates of food insecurity were found in younger groups; the food insecurity prevalence among individuals between 55 and 64 years of age was double that of individuals between 65 and 74 years of age (Emery et al., 2013). A similar trend is seen with the health status of these demographic groups. Those who received seniors' benefits had improved self-rated general and mental health, and had lower poverty rates (Emery et al., 2013). This trend, combined with the finding that food bank use was positively associated with having a low income and the receipt of welfare (Loopstra & Tarasuk, 2012), suggests that seniors' benefits and employment provide similar protection against food insecurity. It also suggests that reliance on employment insurance and welfare is associated with increased food bank use, and thus food insecurity.

With these data in mind, a way to potentially reduce poverty would be to extend a GAI to Canadians under the age of 65. This action could also help to lessen the adverse effects of poverty, such as food insecurity, poor overall health and mental health, and the costs associated with these health concerns. To qualify for a GAI, Emery *et al*. (2013) suggested that only an income test, rather than an income and age test, should be applied (Emery et al., 2013). It may be argued that GAIs have disincentive effects on the labour market. This may be the case, but rather than dismissing a universal GAI on this basis, this potential disadvantage should act as a guide for implementing a GAI. For example, a GAI could first be introduced for individuals with disabilities as a pilot (Emery et al., 2013), and adjustments could be made prior to extending the GAI to more of the population.

One strategy that could ameliorate the financial strains on Canadian post-secondary students is freezing tuition and compulsory fees for students. In general, Canada is regressing in the way that it funds post-secondary education; as public funding for post-secondary education is reduced, tuition increases have become the pervasive means of funding, which leads to a lower net transfer from higher- to lower-income households (Shaker, Macdonald, & Wodrich, 2013). Finland has a more progressive system for funding post-secondary education; 95.9% of all post-secondary funding comes from public sources in Finland, while only 56% does in Canada. The highly public means of funding post-secondary education in Finland may play a role in making post-secondary education accessible; 42% of 20 to 29 year olds in Finland attend post-secondary institutions, and only 25% of Canadians in that age group do so

(Shaker et al., 2013). A recent cut to university budgets in Alberta means that university students shoulder a greater percentage of tuition and compulsory fees. Considering that tuition and compulsory fees in Alberta have been above average since the 1990s, this makes a university education even less accessible to Canadians.

By implementing set fee structures, post-secondary institutions in Canada focus on predictability at the expense of affordability. A study conducted by the Bank of Montreal found that students expected to have more than $26,000 in debt by the time they graduate. While some provinces have a limit on the amount of public debt that students can accumulate, students rely increasingly on private debt. In Canada, the provincial strategies for student aid are inconsistent in terms of type of strategies offered, and the policies for changing, implementing, or cancelling such strategies (Shaker et al., 2013). In order to make post-secondary enrollment accessible for all Canadians, the federal and provincial governments should consider freezing tuition (already the strategy in Newfoundland and Labrador) in order to facilitate a greater role for public funding in the post-secondary system. This would also apply to out-of-province and international students, and professional and graduate programs. In addition, the federal government could enact universal student aid programs, in order to ensure consistency across Canada (Shaker et al., 2013).

In addition to a lack of income buffer and high tuition, another factor that may contribute to food insecurity is financial mismanagement. For many students attending post-secondary institutions, it is the first time living independently, paying

for their own expenses, and having to budget their money. Thus, it would be prudent for post-secondary institutions to offer short seminars for new and / or interested students to help mitigate finance management issues. Such courses could include budgeting, personal finance, and food shopping and preparation.

9.2 Non-financial approaches to alleviating food insecurity among students

Apart from implementing a universal GAI and freezing post-secondary tuition and compulsory fees, other steps could be taken to address the issue of food insecurity. As mentioned in *Section 2.8.3*, the cost of food has been rising, which is particularly challenging for low-income households, as they spend a large proportion of their household income on food (Kirkpatrick & Tarasuk, 2007). Given the discrepancy between the cost of food and social assistance provisions (Howard & Edge, 2013), the federal government could re-evaluate the amount it provides for the various types of social assistance in order for Canadians to have sufficient funds to buy nutritious food. For post-secondary students specifically, the provision of student loans helps to enable students to have adequate funds for all of their expenses, but it would be useful to consider increasing the provision of non-repayable types of aid, such as bursaries, for students in need. Alternatively, the federal government could consider subsidizing nutritious foods, like fruits and vegetables, in order to make such food more affordable for Canadians.

Accessibility and affordability of transportation are factors that can affect food security status. The presence of a bus route in a neighbourhood has been shown to

reduce the likelihood of food insecurity (Baek, 2013), and affordable public transportation would also help to reduce food insecurity. All UAlberta students pay for a highly subsidized city-wide transit pass as part of their compulsory fees, so the barrier of transportation is moot for UAlberta students. For non-students living in Edmonton, affordable public transportation will be available for certain individuals beginning in 2016; Edmonton is slated to have a reduced-price transit pass for new immigrants, children under government care, low-income families, and recipients of Assured Income for the Severely Handicapped (Dubois, 2015).

In order to reduce the effect that low food literacy has on food security status, corporations, governments, communities, and post-secondary institutions could create programs to educate Canadians on what constitutes a healthy diet, where to find these foods, how to read and assess food labels, and how to prepare healthy foods. Such programs can be seen on the UAlberta campus. For example, in the newly constructed Physical Activity and Wellness Centre, a community kitchen will be available to students, and will aim to help improve students' knowledge of cooking ("Breaking ground on the PAW centre," 2012). Further, in the spring, summer, and fall, there is a garden located in East Campus Village of UAlberta, where students and community members can go to learn more about gardening, volunteer in the garden, and take fresh produce home with them (Sustain SU, 2015).

9.3 Recommendations for existing food bank and charitable food assistance programs

Of low-income families who chose not to use a food bank, 22% of them cited that the food distributed by food banks was unsuitable for their needs; specifically, the food was poor quality and not worth their time (Loopstra & Tarasuk, 2012). This exemplifies one area of weakness among food banks. Similarly, a study in Calgary compared the perceptions of a common food distributed at food banks (Kraft Dinner®) among food secure and food insecure individuals. They found that, while people who were food secure perceived Kraft Dinner® to be a comfort food, people who were food insecure associated Kraft Dinner® with monotony, an incomplete meal, and a last resort to sate hunger (Rock, McIntyre, & Rondeau, 2009). This study shows the gap in understanding between food secure and food insecure individuals (Rock et al., 2009).

Applying this concept to the CFB, one recommendation is for the CFB (and food banks in general) to poll clients on their preferred non-perishable foods. Instead of arbitrarily choosing which foods to include in a food hamper, or letting the public decide what to donate, food bank clients might be more satisfied with the food types if they had some input.

In order to provide food of greater quantity and quality, food banks and other charitable food assistance organizations could increase their solicitation of food donations from grocery stores, cafés, or caterers, for example. Such groups may be averse to donating food because they do not want to be liable for potential illness

caused by the food. Every province and territory in Canada has a Good Samaritan Food Law, which means that organizations are not liable for damages resulting from the consumption of food that they donate. As long as the food in question is not adulterated or rotten, and the donors do not intend harm, donors are not liable (Food Banks Canada, 2013). Tax credits for food donation would help to increase the quality of foods available in food banks, since corporations would be more likely to donate food that otherwise would have been thrown away. Tax credits would also create corporate citizenship opportunities for manufacturers and food producers (Loopstra & Tarasuk, 2012).

Looking to other post-secondary institutions, there is a range of food assistance programs that are available to students. Many have the same structure as the CFB, and differ mainly in the frequency of allowed visits to the food bank. Another institution with a different approach to food assistance is Simon Fraser University (SFU) in Burnaby, British Columbia. At the end of 2013, SFU closed its campus food bank after having operated since the early 2000s. The food bank was experiencing ongoing issues related to lack of space for food storage, expired foods, and insufficient healthy options (Student Services, n.d.). In place of the food bank, SFU instituted one new program for undergraduate students, and another new program for graduate students. Undergraduate students can apply to receive a $25 gift certificate to a grocery store, to a maximum of three times per semester (Simon Fraser University, 2014), whereas graduate students can apply for a $50 gift certificate one time each semester (Simon Fraser University, 2015). Graduate students must also

disclose at least two other sources from which they sought help, and identify which of those helped to alleviate their financial difficulties. One major difference between these two programs is that the undergraduate program is meant to replace a traditional food bank (Simon Fraser University, 2014), whereas the graduate program is not meant to replace the service of the SFU food bank, or other long-term remedies (Simon Fraser University, 2015).

The style of food assistance that SFU employs is favorable because it provides more autonomy to students who need its services. The grocery store gift card enables the students to choose which foods they want to purchase. Also, it may be less stigmatizing to buy food at a grocery store compared to accessing a food bank on campus, and walking around campus with groceries. The major disadvantage with the programs available at SFU would be for individuals with chronic food insecurity; assuming that the gift card program was the only food assistance they were receiving, the frequency that students can access the gift cards would likely be inadequate, especially for graduate students.

The graduate food assistance program employed at SFU emphasizes the major problem with food assistance programs today; they are not intended to act as a source of income transfer, or as a continual supplement to an individual's diet, but are often used as such. Rather, food assistance programs should be used for short-term cases of food insecurity, or emergencies. As described earlier, governmental programming is needed to ensure that all people have the resources to acquire food and non-food

essentials. One major outcome of the aforementioned changes would be that a post-secondary education is accessible to all Canadians, regardless of socioeconomic status.

This research study has established invaluable groundwork for investigating many variables relating to food bank use on Canadian post-secondary campuses. The majority of post-secondary students who used the CFB was food insecure and experienced setbacks in their general health and mental health, and suffered nutritionally and academically. Campus food banks are limited in their capacity to address these adverse outcomes of food insecurity, considering the chronic nature of food insecurity that post-secondary students experience. The results emphasize the need for a more rigorous investigation, specifically a longitudinal study to ascertain directionality between food insecurity and negative health outcomes. In the future, recruiting a larger sample size may allow for generalization, could enable comparisons between all three food security categories, and would increase the power of statistical tests. Further, as the AFSSM covers only two of the four dimensions of food security (mentioned in *Section 2*.1), future studies could consider how to assess the social and psychological dimensions. At the UAlberta, two qualitative studies are underway to investigate sub-groups of CFB clients, and will likely shed light on the social and psychological dimensions of food security. The study results suggest that policy regarding income adequacy among the Canadian population, as a whole, should be created. Freezing tuition and compulsory fees would also be a way to

ensure that post-secondary education is as accessible to as many Canadians as possible.

It is important that further research be conducted in order to better understand, and prevent food insecurity among post-secondary students. Research could also bring awareness to the heightened need for food banks in order to both encourage donations of better-quality foods, and encourage policymakers and the federal government to enact systematic changes with regards to tuition and compulsory fees, income support, and food assistance programs.

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10 Appendices

10.1 APPENDIX A: Information sheet

Project Title: Hunger on Campus – Food insecurity among students

Investigators

Dr. Noreen Willows, Associate Professor*	Principal Investigator
Dr. Geoff Ball, Associate Professor§	Co-Investigator
Ms. Mahitab Hanbazaza*	PhD Student
Ms. Jasmine Farahbakhsh*	MSc Student

* Department of Agricultural, Food and Nutritional Science
§ Department of Pediatrics

Purpose of Research

The Campus Food Bank would like to know the impact it has on students. To prevent students from needing food hampers, information is needed about who uses the Campus Food Bank and if a lack of money for food is a major reason why students use the food bank. It is also important to know if lack of money for food affects the health, nutrition and academic experience of students. For students with children, it is important to know if not having money for food affects the health of children. Knowing more about these topics might help the Campus Food Bank to improve the services it provides to students. Policymakers might be able to use the information to make better decisions about student funding.

You are invited to take part in a survey about the Campus Food Bank and what happens when students run out of money for food. The objectives of the study are to:

(1) Describe the prevalence of Campus Food Bank clients lacking money for food.

(2) Understand if some student groups are more likely to lack money for food.

(3) Describe the self-rated health and well-being of students and their children who use the Campus Food Bank.

(4) Learn about what students do when they do not have enough money to buy food.

(5) Understand if lack of money to buy food affects a student's academic status.

(6) Describe the impact of the Campus Food Bank on students.

(7) Describe the diet quality of clients using a 26-item dietary screener.

Study Procedure

You will meet with a researcher in private. The researcher will be one of two graduate students at the University of Alberta. Mahitab Hanbazaza is doing her PhD in Human Nutrition and Jasmine Farahbakhsh is doing her MSc in Human Nutrition. Mahitab or Jasmine will ask you questions about your sociodemographic and student status, your children (if any), your food security status, your (and your children's) general health and well-being,

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the impact of the Campus Food Bank on you, what you would do if you did not have money to buy food and dietary information. Using a computer, you will then answer questions about foods and drinks you consumed in the past 30 days. The survey should take less than one hour to complete. As a token of our appreciation, you will receive a $35 gift card from a local grocery store for participating in this survey.

Risks
It is not expected that participation in this study will harm you in any way. If answering some questions makes you feel uneasy, you can choose to not answer them.

Benefits
This study will not have any direct benefits for you. The findings may help to improve the services of the Campus Food Bank for students. The findings may also enable policymakers to make better decisions regarding post-secondary funding, loan assistance and tuition costs for University students.

Confidentiality
Your name will not appear on the survey. The only people who will have access to the data collected are the researchers (faculty, trainees) affiliated with the study. All surveys will be stored in a locked cabinet at the University of Alberta for five years, after which time they will be destroyed. Electronic data will be kept on password-protected computers of University of Alberta researchers.

Voluntary Participation
You can choose whether to be in this study or not. Your decision to participate will not affect the services that you receive from the Campus Food Bank. If you are willing to participate, you must sign the 'Consent Form'. Even if you consent to the study, you can choose at any time to not answer the survey questions. After you complete the survey, you can ask that your responses not be used. Once the information from your survey has been analyzed with other participants' responses, it cannot be withdrawn from the study.

Use of Your Information
The combined information from all participants of this study will appear in graduate student theses, reports for the Campus Food Bank, publications, and conference presentations. None of the theses reports, publications, or presentations will include any identifying information about you; only group data will be presented. If you have any questions or concerns, please contact any of the researchers of this study at the University of Alberta or the Executive Director of the Campus Food Bank.

Contact Information
If you have any further questions about the study, don't hesitate to contact:

	Email	Phone
Dr. Noreen Willows	noreen.willows@ales.ualberta.ca	780-492-3989
Dr. Geoff Ball	geoffball@med.ualberta.ca	780-342-8465
Ms. Caitlin Phare	Caitlin.phare@su.ualberta.ca	780-492-8677
Ms. Mahitab Hanbazaza	hanbazaza@ualberta.ca	780-394-4980
Ms. Jasmine Farahbakhsh	farahbak@ualberta.ca	780-708-5311

If you have any questions or concerns regarding your rights as a participant, or how this study is being conducted, you may contact the Research Ethics Office, at 780-492-2615. This office has no affiliation with the study investigators.
If you wish to participate, please read and sign the 'Consent Form.'

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10.2 APPENDIX B: Consent form

Project Title: Hunger on Campus – Food insecurity among students

Investigators

Dr. Noreen Willows, Associate Professor*	Principal Investigator
Dr. Geoff Ball, Associate Professor§	Co-Investigator
Ms. Mahitab Hanbazaza*	PhD Student
Ms. Jasmine Farahbakhsh*	MSc Student

***** Department of Agricultural, Food and Nutritional Science
§ Department of Pediatrics

Purpose of Research: The purpose of this research is to identify and describe the experiences and outcomes of food insecurity among post-secondary students. The research also aims to understand the associations between food security status, self-rated health status, and academic experience. The study will be conducted through the Campus Food Bank at the University of Alberta.

Please check 'Yes' or 'No' for each statements below related to the information in the 'Information Sheet'.

	Yes	No
Do you understand that you have been asked to be in a research study?	☐	☐
Have you read and received a copy of the 'Information Sheet'?	☐	☐
Do you understand the benefits and risks involved in taking part in this research study?	☐	☐
Have you had an opportunity to ask questions and discuss this study?	☐	☐
Do you understand that you are free to leave the study, without having to give a reason and without affecting your present or future use of the Campus Food Bank?	☐	☐
Has the issue of confidentiality been explained to you on the information sheet?	☐	☐
Do you understand that only the research team will have access to the data?	☐	☐

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Have all your questions been answered by the researcher?	☐	☐
Do you agree to be contacted for future research studies?	☐	☐

I agree to take part in this study.

Participant Name (*please print*):
_____

Signature: _____ Date: _____

(Email):
_____

I have explained this study to the best of my ability to the participant. I believe that informed consent is being provided by the participant.

Researcher's Signature:

Mahitab Hanbazaza: _____ Date: _____

Jasmine Farahbakhsh: _____ Date: _____

Confirmation of Compensation Receipt

By signing below, I acknowledge that I have received $35 as compensation for participating in the above study.

Signature: _____

Date (mm/dd/yyyy): _____

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10.3 APPENDIX C: Structured survey

Campus Food Security Survey Study ID _____

Date (mm/dd/yyyy) _____/_____/_____ Interviewer _____

First, I am going to ask you some basic questions about yourself, your student status, and your living arrangements.

1. Which of the following categories best represents your student status?

    a Undergraduate
    b Master's
    c PhD
    d Post-doctoral fellow
    e Open studies
    f Other (*please explain)*: _____

2. Are you an international student?

    a Yes
    b No

3. Were both of your parents born in Canada?
    a Yes
    b No

4. Are you a full-time or part-time student? *(Full time is three or more courses per fall or winter term.)*

    a Full-time
    b Part-time

5. What year of your program are you currently in?

    a 1
    b 2
    c 3
    d 4
    e 5 or greater

6. Do you live alone?

    a Yes (go to #12)
    b No (go to #7)

7. Do you live with family members or relatives?

    a Yes
    b No

8. Do you share the cost of your food or meals with the people who live with you?

    a Yes
    b No

9. Are you the parent or caregiver of children under the age of 18 years who live with you?

    a Yes (go to #10)
    b No (go to #12)

10. How many children under 18 years old are in your care? _____

11. What is the age of the youngest child in your care? _____

12. What is your age? _____

13. What is your marital status?

    a Single
    b Married / living with a partner / common-law
    c Separated / divorced / widowed
    d Other (*please explain)*: _____

14. What is your <u>primary</u> source of income?

    a Government student loan
    b Scholarship or bursary
    c Bank loan
    d Research Assistantship
    e Savings
    f Family
    g Employment (other than assistantship)
    h Other (please specify) _____

Now I am going to ask you whether lack of money for food has influenced the quality of your university experience.

15. Some students have reported that the quality of their university experience has been adversely affected by lack of money for food. As a student, have you experienced any of the following because you didn't have enough money for food? *Choose all that apply.*

    a I was unable to attend class.
    b I was unable to complete an assignment.
    c I was unable to study for an exam.
    d I could not concentrate in class or during an exam.
    e I failed a course or withdrew from a course.
    f None of the above applies to me.
    g Don't know or declined to answer

Now I'm going to read you several statements that people have made about their food situation. For these statements, please tell me whether the statement was <u>often</u> true, <u>sometimes</u> true, or <u>never</u> true for you in the last 30 days. If you are not sure about a question, or you don't want to respond to a question, just let me know and we'll go on to the next one.

[IF THE PERSON LIVES WITH OTHERS AND ANSWERED "YES" TO QUESTION 7, OR IF THE PERSON HAS CHILDREN UNDER 18 YEARS IN THEIR CARE, USE "OUR" AND "WE" IN PARENTHETICALS. IF THE PERSON LIVES <u>ALONE OR ANSWERED "NO" TO QUESTION 7</u>, USE "I" AND "MY" IN PARENTHETICALS]

16. The first statement is "I worried whether (my/our) food would run out before (I/we) got money to buy more." Was that <u>often</u> true, <u>sometimes</u> true, or <u>never</u> true for (you/your household or living group) in the last 30 days?

    a Often true
    b Sometimes true
    c Never true
    d Don't know or Refused

17. "The food that (I/we) bought just didn't last, and (I/we) didn't have money to get more." Was that <u>often</u>, <u>sometimes</u>, or <u>never</u> true for (you/your household or living group) in the last 30 days?

    a Often true
    b Sometimes true
    c Never true
    d Don't know or Refused

18. “I couldn’t eat balanced meals because (I/we) couldn’t afford it.” Was that often, sometimes, or never true for (you/your household or living group) in the last 30 days?

    a Often true
    b Sometimes true
    c Never true
    d Don’t know or Refused

Questions 19 - 23 (ask if affirmative response (i.e., "Often true" or "Sometimes true") to one or more of #16 - 18; otherwise skip to #26)

19. In the last 30 days, did you ever cut the size of your meals or skip meals because there wasn't enough money for food?

    a Yes
    b No (skip #21)
    c Don’t know (skip #21)

20. How many days did this happen?

    a _____day(s)
    b Don’t know

21. In the last 30 days, did you ever eat less than you felt you should because there wasn't enough money for food?

    a Yes
    b No
    c Don’t know

22. In the last 30 days, were you ever hungry but didn't eat because there wasn't enough money for food?
    a Yes
    b No
    c Don’t know

23. In the last 30 days, did you lose weight because there wasn't enough money for food?
    a Yes
    b No
    c Don’t know

Questions 24 - 25 (ask if affirmative response to one or more of #19 - 23; otherwise skip to #26)

24. In the last 30 days, did you ever not eat for a whole day because there wasn't enough money for food?

    a Yes
    b No (skip #24)
    c Don't know (skip #24)

25. How many days did this happen?

    a _____day(s)
    b Don't know

Now I am going to ask you questions that deal with your health and well-being.

26. In general, how would you describe your overall health?

    a Excellent
    b Very good
    c Good
    d Fair
    e Poor
    f Don't know or refuse

27. In general, how would you describe your mental health?

    a Excellent
    b Very good
    c Good
    d Fair
    e Poor
    f Don't know or refuse

28. In general, how would you describe your physical health?

    a Excellent
    b Very good
    c Good
    d Fair
    e Poor
    f Don't know or refuse

29. How satisfied are you with your life in general?

a Very satisfied
b Satisfied
c Neither satisfied nor dissatisfied
d Dissatisfied
e Very dissatisfied
f Don't know or refuse

30. Thinking about the amount of stress in your life, would you say that most days are:

a Not at all stressful
b Not very stressful
c A bit stressful
d Quite a bit stressful
e Extremely stressful
f Don't know or refuse

31. How would you describe your sense of belonging to your local community? *(Respondent decides what their local community is.)* Would you say it is:

a Very strong
b Somewhat strong
c Somewhat weak
d Very weak
e Don't know or refuse

(Ask questions # 32 – 35 if affirmative response to #9. If negative, go to #36.)

Now, I would like to ask you questions about the health of the youngest child in your care living with you. That is, the child who lives with you who is _____ years old. [response to question 9]

32. Considering the youngest child in your care living with you, in general, would you say this child's health is:

    a Excellent
    b Very good
    c Good
    d Fair
    e Poor
    f Don't know or refuse

How true or false is each of these statements for the youngest child living with you?

33. This child seems to be less healthy than other children I know.

    a Definitely true
    b Mostly true
    c Don't know
    d Mostly false
    e Definitely false

34. I expect this child will have a very healthy life.

    a Definitely true
    b Mostly true
    c Don't know
    d Mostly false
    e Definitely false

35. I worry more about this child's health than other people worry about their children's health.

    a Definitely true
    b Mostly true
    c Don't know
    d Mostly false
    e Definitely false

Now, I will ask you some questions about the Campus Food Bank and what you do if you don't have enough money for food.

36. Since being a student, how often have you used the following strategies when you <u>didn't have enough money for food</u>? C*hoose all that apply.*	Daily	Weekly	Monthly	Yearly	Never
a Get food from a friend or relative, or go to their home for a meal					
b Borrow money for food from friends or relatives					
c Go to a food bank (other than the Campus Food Bank) or emergency food service such as a soup kitchen					
d Purchase food using a credit card					
e Delay buying textbooks and/or university supplies, or not purchase them at all					
f Delay bill payments					
g Give up services such as telephone or TV					
h Sell or pawn possessions					
i Seek employment or work more hours					
j Apply for a loan or a bursary					
k None of the above applies to me					
l Other (*please explain)*:					
m Don't know or refuse					

37. When did you first register with the Campus Food Bank?

a Month _ _
b Year _ _ _ _
c Don't know or refuse

38. When did you last receive a Campus Food Bank Hamper?

a In the past 7 days (within the past week).
b In the past 8 to 14 days.
c In the past 15 to 21 days.
d In the past 22 to 28 days.
e More than 28 days (one month) ago.
f Don't know or refuse

39. Think of the last hamper that you received. What was your experience of the food that you received in the hamper? (*Choose all that apply.)*

a I liked the food.
b I didn't like the food.
c I didn't know how to prepare some of the food in the hamper.
d The food items were unacceptable (*please explain)*: _____

_____

_____

e Other experiences (*please explain)*: _____

_____

_____

40. Which statement about food hampers from the Campus Food Bank most accurately describes your situation? *Choose one.*

a I could manage without a food hamper, but getting one helps me to reduce my grocery bill.
b I need a food hamper once in a while in order to have enough food to eat.
c I consistently need food hampers in order to have enough food to eat.

41. How did you learn about the Campus Food Bank? (e.g., from a friend, student financial aid, etc.)

_____

_____

_____

42. If the Campus Food Bank did not exist, where would you get the food you need?

_____

_____

Now, using a computer you will answer up to 26 questions about the different kinds of foods you ate or drank during the past month, that is, the past 30 days. When answering, please include meals and snacks eaten at home, at work or school, in restaurants, and anyplace else. Your response to each question will be entered automatically into a computer program which will determine the quality of your diet.

10.4 APPENDIX D: Output of variables from Dietary Screener Questionnaire

Daily nutrient and food intakes	Units provided
fiber	grams
calcium	milligrams
added sugar	teaspoons
whole grain	ounce equivalent
dairy	cup equivalent
fruit, vegetable and legume	cup equivalent
fruit, vegetable and legume minus French fries	cup equivalent
added sugar from sugar sweetened beverages	teaspoons