Hunger on Campus: A Multi-Method Study of Food Insecurity among Post-Secondary Students at the University of Alberta

by

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Abstract

Individuals who are food insecure have insufficient access to food due to financial resource constraints. As an increasing number of students seek food assistance from the Campus Food Bank (CFB) Society at the University of Alberta (UAlberta), research is needed to understand why post-secondary students experience food insecurity. The primary focus of this multi-method research was to identify and describe food insecurity among post-secondary students using the CFB at the UAlberta. The secondary focus was to explore and understand the experiences and consequences of food insecurity among international post-secondary students using the CFB at the UAlberta. Three related studies were performed. First, a cross-sectional study was done to characterize the sociodemographic and educational characteristics of student clients (n=568) of the CFB using an existing database that housed data from registered users. These data were compared to publically available information on the UAlberta student body (n=38,774). Second, a cross-sectional study was conducted that involved a structured interview with student clients of the CFB (n=58). This study included the collection of data on participants' sociodemographic and educational characteristics, food insecurity status, general health and well-being, diet quality, coping strategies, and academic performance. Third, a descriptive, qualitative study was completed using semi-structured individual interviews with international student clients of the CFB (n=11) who had moderate or severe food insecurity. Collectively, data derived from this multi-method research provided a better understanding of food insecurity in post-secondary students, and international students in particular. Specifically, we found that the majority of CFB clients were students and that international and graduate students were overrepresented among CFB student clients. Compared to students with Canadian citizenship, international students were younger, more likely to be graduate students, and rated their mental health more positively.

Limited income was the main issue that contributed to food insecurity among post-secondary students. International students were less likely to ask for food from friends or relatives or apply for loans or bursaries to cope with food insecurity. The use of more severe coping strategies in response to long-term food insecurity might lead to adverse health effects in this population that can have a negative impact on their well-being and academic performance. Findings suggested that international students faced unique challenges and different experiences compared to their Canadian peers, which highlighted the value of targeted strategies to mitigate the influence of food insecurity within both domestic and international student groups. Post-secondary students require increased financial assistance and/or reduced education-related expenses to mitigate food insecurity. Longitudinal research with larger sample sizes is needed to provide a clearer picture on the long-term consequences of food insecurity on post-secondary students.

Preface

This thesis is an original work by Mahitab Hanbazaza. The research projects, of which this thesis is a part, received research ethics approval from the University of Alberta Research Ethics Board, first project name, "Retrospective analysis of Campus Food Bank users", No. Pro00035077, January 16, 2013. Second project name "Hunger on Campus – Food insecurity among students", No. Pro00032195, March 12, 2013. Third project name "Qualitative research with student clients of the University of Alberta Campus Food Bank" No. Pro00040231, August 20, 2013.

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List of Abbreviations

CFB	Campus Food Bank
UAlberta	University of Alberta
ECHA	Edmonton Clinic Health Academy
FSSM	Food Security Survey Module
HFSSM	Household Food Security Survey Module
AFSSM	Adult Food Security Survey Module
USDA	United States Department of Agriculture
CCHS	Canadian Community Health Survey
NFB	Nutritious Food Basket
NCI	The National Cancer Institute
DSQ	Dietary Screener Questionnaire

Table of Contents

List of Figures

List of Tables

CHAPTER 1: INTRODUCTION

Food security is a basic human right and is an important determinant of health (McIntyre & Rondeau, 2009; Mikkonen & Raphael, 2010). In developed countries, insufficient income is the key determinant of hunger and food insecurity, which is the limited or uncertain access to safe, nutritionally adequate foods or when food acquisition occurs in socially unacceptable ways (Anderson, 1990; Che & Chen, 2001; Health Canada, 2007; Nord, Andrews, & Carlson, 2005). Food insecurity has critical effects on life experiences and can lead to numerous economic, health and social difficulties (Rainville & Brink, 2001; Gorton, Bullen, & Mhurchu, 2010). Due to the physical and psychosocial consequences of not having enough food or money to buy food, food insecurity is an important public health and social issue that exists even in countries with advanced economies, such as Canada; to a great degree, a lack of financial resources is a strong indicator of personal and household food insecurity (Rainville & Brink, 2001).

The food insecurity status of individuals and households ranges in severity from no problems in obtaining food (food secure) to reductions in the quality of foods consumed; in the most severe form of food insecurity, there are decreases in the quantity of food consumed (Bickel, Nord, Price, Hamilton, & Cook, 2000). Food insecurity might differ among individuals living with a household. For instance, in a food insecure household, adults often sacrifice their own dietary needs to protect their children or other family members (McIntyre, Glanville, Raine, Dayle, Anderson, & Battaglia, 2003). At the individual level, food insecurity is characterized by inadequate nutritious food, insufficient food consumption, a lack of food choice and deprived feelings and disrupted eating patterns (Radimer, Olson, Greene, Campbell, & Habicht, 1992).

At the national level in Canada, there are insufficient government policies or programs designed to address the problem of food insecurity from coast to coast. Therefore, various local,

community-based food programs such as food banks have responded to the problem in order to help improve household and individual food access and food-related behaviours (Tarasuk, Mitchell, & Dachner, 2014). Food banks are charitable organizations that provide people in financial need with emergency food supplies. The term *food bank* includes food depots, food pantries, and other community-based food sites that distribute food free of charge. While food banks were intended to respond to short-term food source requirements and emergency needs for food, food banks have become a long-term food source for many individuals and families (Tarasuk, Dachner, & Loopstra, 2014). Indeed, they have become entrenched in Canadian civil society as a response to hunger. Post-secondary students are a new group visiting food banks and it appears the need within this group is increasing. In Canada, there are more than 70 campus food banks at universities and colleges across the country (Gordon, 2011). Campus food banks provide aid to a wide range of individuals and families, which can include students, staff, and alumni.

Post-secondary students are an understudied group that may be vulnerable to food insecurity due to their financial factors, including a limited earning potential, need for student loans / student debt, and academic expenses (tuition and fees) (Canadian Federation of Students, 2013; Luong, 2010; Meldrum & Willows, 2006). Little attention has been paid to the unique food security considerations of post-secondary students, or the services provided by food banks located at post-secondary institutions. Based on the available evidence, most research has examined the prevalence of food insecurity among post-secondary students in general, with little attention paid to international students. With these evidence gaps in mind, this thesis includes three interrelated studies with complementary research designs that were developed to identify,

describe, explore and understand the experiences and consequences of food insecurity among Canadian and international post-secondary students in Canada.

1.1 Problem Statement

Food insecurity among post-secondary students in general, and international post-secondary students in particular, is an emerging problem. Local data suggests that the demand for food hampers has increased over recent years (Campus Food Bank: Hunger for knowledge, not food., 2012) . High, and increasing, academic costs (tuition and fees) represent a challenge for many students with limited financial resources and reduced earning potential because of their student status. To date, most research has examined food insecurity issues in other vulnerable groups (e.g., children, low-income households). Exploring and examining food insecurity issues in post-secondary students are required because the data demonstrate that they represent a distinct group that is vulnerable to food insecurity. Research on post-secondary students in general and international students, in particular is needed to inform local, regional, and national decisions regarding strategies that can help to ameliorate food insecurity.

1.2 Purpose of the Research

The purpose of this multi-methods research is to: (1) describe the demographic and educational characteristics of student clients of the CFB and compare and contrast student clients with the greater population of UAlberta students; (2) compare food security status and indicators of health and well-being, dietary intake, coping strategies, and academic performance between international and Canadian post-secondary students; and (3) explore and understand the experience of food insecurity among international post-secondary students.

This research is intended to fill gaps in the literature, to identify directions for future research and recommendations for practice that can improve food insecurity among post-secondary students, as well as help policy makers and post-secondary institutions implement policies and programs.

1.3 Research Objectives

A series of studies were planned to achieve the following objectives:

Study 1: Characterizing food bank users at the UAlberta

- Describe the sociodemographic and educational characteristics of post-secondary students who registered at the CFB from September 2010 to July 2013
- Compare and contrast CFB student clients' characteristics with the total population of UAlberta students

Study 2: Food insecurity: A comparison between Canadian and international post-secondary students

- Compare the demographic and food security status between international and domestic post-secondary students accessing the CFB at UAlberta
- Compare the coping strategies, self-rated health and well-being, diet, and academic consequences of food insecurity between international and domestic post-secondary students accessing the CFB at UAlberta

Study 3: Exploring food insecurity among international post-secondary students

- Explore and understand the reasons for accessing the CFB, experiences and perceptions of food bank services, and strategies for coping with food insecurity.
- Explore and understand the consequences of food insecurity on students' academic

performance and well-being and the non-financial barriers and challenges international postsecondary students face to overcoming food insecurity.

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CHAPTER 2: LITERATURE REVIEW

Objectives

The objectives of this narrative review were to *(i)* provide a detailed background of current knowledge about food insecurity, *(ii)* identify causes and consequences of food insecurity, and *(iii)* describe the role of food bank programs in addressing food insecurity.

Methods

A narrative review is a descriptive, non-systematic search of the literature and thus focuses on a particular subset of studies in food insecurity chosen by the author, which are often summarized subjectively (Green, Johnson, & Adams, 2006). This type of review was chosen because it allows the reviewer to subjectively summarize different studies and to generate a conclusion based on the research findings from the reviewer's own interpretation and experience.

To obtain the research articles used in this review, I completed three independent reviews of the literature between fall 2012 and spring 2015). Electronic searches were performed using online databases including PubMed, EBSCO, Scopus, Ovid Medline, ERIC, and Embase. Also, the references of identified articles were examined for additional relevant articles not found in my original search. Studies were included in this review if they:

- were published in English between 1995 and 2015;
- included adults;
- were conducted in Canada and USA.

Using the Boolean search operators "AND" and "OR", the following search terms were used in numerous combinations to help identify relevant articles: "food insecurity", "hunger", "food insufficiency", "poverty", "low income", "coping strategy", "management behavior", "coping behavior", "coping mechanism", "coping practice", "food acquisition practice", "food banks", "food supply", "food pantry", "diet", "nutrition", "food consumption", "nutrient inadequacy", "dietary intake", and "health". The terms used in the search were developed with the assistance of a librarian. The terms were tailored to the databases that were searched. Although the focus of this thesis is about food insecurity among post-secondary students, the narrative review presented in this chapter focused on the issue of food insecurity in general; the following section (Chapter 3) includes an accompanying review on the issue of food insecurity among post-secondary students in particular.

2.1 What is Food Insecurity and Who is at Risk?

2.1.1 Definitions of food security and food insecurity

There are more than 200 definitions of *food security* (Mechlem, 2004). For the purposes of my thesis, I used the following definition: "Food security is achieved when all people, at all times, have both physical and economic access to adequate, safe and nutritious food including at a minimum the availability of adequate healthy and safe foods and assured ability to get acceptable foods in acceptable ways without relying on emergency food supplies, scavenging, stealing, or other coping strategies" (Anderson, 1990). In order to attain food security, people must have the four As: *availability* means that sufficient foods are available on a regular basis; *accessibility* means there is economic and physical access to food; *adequacy* means the food should be nutritious and safe and food production should be sustainable; and *acceptability* means

that food is culturally-appropriate and accessed in socially acceptable ways without compromising individuals' dignity (Rocha, 2007). From these considerations, we understand that food security is more than having enough food to eat; the food should also be safe, nutritious, culturally-acceptable and obtained from a sustainable food system. Individuals should also not receive food from charitable organizations, as seeking food from such agencies may undermine personal dignity.

Conversely, *food insecurity* in the North American context has been defined as "limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially-acceptable ways" (Anderson, 1990). The important terms to highlight in this definition are "limited" and "uncertain"; as these terms indicate that some food might be present, but the choices would be limited and the access questionable.

Irrespective of which definition is used, food insecurity is related to poverty and lack of financial resources to obtain healthy and nutritious foods (Alberta Community/Public Health Nutritionist Food Security Subcommittee, 2008; Drewnowski & Eichelsdoerfer, 2010; Health Canada, 2007; McIntyre & Rondeau, 2009; McIntyre, 2003). The severity of food insecurity can range from worry and anxiety about from where to get the next meal, to the inability to consume an adequate variety and quantity of food in an appropriate way, to meal skipping, and lastly, complete food deprivation (McIntyre & Rondeau, 2009). In the context of this thesis, I used the term food insecurity because, in my research, I believe it best represented the issues and experiences of post-secondary students who experienced low food quality and quantity.

2.1.2 Prevalence of food insecurity in Canada and Alberta

Food insecurity in Canada is a public health concern. The most recent national estimates from Canada (from 2013) suggest that up to 1.4 million households, which include 2.4 million adults and ~1 million children, experience food insecurity. This estimate represents 12.5% of Canadian households (Tarasuk, Mitchell, & Dachner, 2015). The prevalence of food insecurity in 2013 is double the prevalence of food insecurity reported in 2007-2008 (Tarasuk, Mitchell, & Dachner, 2015). In Alberta, ~164,000 individuals experienced some level of food insecurity in 2013, of which ~4%, 6%, and 3% were marginally, moderately, and severely food insecure, respectively (Tarasuk, Mitchell, & Dachner, 2015).

2.1.3 Populations at risk of food insecurity

As the prevalence of food insecurity differ across Canada, the risk of food insecurity also differs according to the characteristics of the household (Tarasuk et al., 2014). Over the last two decades, food insecurity has increasingly become a problem among many low-income households. Numerous studies have been conducted in Canada and the United States to elucidate the degree and nature of the problem among households. For example, Rose (1999) identified factors in the United States that affected household food insecurity status other than income, such as unexpected job loss, an increase in the size of the household or loss of food stamps. Data from the 2013 Canadian Community Health Survey (CCHS) (Tarasuk, Mitchell, & Dachner, 2015) indicated that the prevalence of food insecurity in Canada was highest among low-income individuals who relied on social assistance, workers' compensation, or employment insurance as a primary source of income. In addition, households headed by lone mothers, households with children, recent immigrants, elderly, and Aboriginal households not on reserves

are at increased risk of food insecurity (Howard & Edge, 2013; Tarasuk, Mitchell, & Dachner, 2015). Couples without children had the lowest level of food insecurity (Tarasuk, Mitchell, & Dachner, 2015). In Canada, data from 2013 indicated that food insecurity among households with children under 18 years old was 16.5% compared to 10.8% among household without children (Tarasuk et al., 2015).

Although single-parent households represent the smallest proportion of all households in Canada, they have the highest prevalence of food insecurity. A study conducted by Che & Chen (2001) indicated that more than half of lone-parent, single mothers lived in households characterized by poverty, which was largely due to females having lower incomes than their male counterparts, placing them at increased risk of food insecurity. The prevalence of food insecurity among households headed by a single mother in 2013 was approximately two times greater than that among households headed by a single father and approximately three times greater than households headed by couples (Tarasuk et al., 2015). In addition, the prevalence of *severe* food insecurity in households headed by single mothers was six times higher than in households headed by couples (Tarasuk et al., 2015).

Immigrants to Canada represent another group at increased risk for food insecurity. For instance, in 2013 the percentage of recent immigrant households who were food insecure was higher (19.7%) compared to non-immigrant (12.1%) and non-recent immigrant (13.1%) households (Tarasuk et al., 2015). Recent immigrants often face several challenges that influence their food security status including unavailability or high cost of culturally appropriate foods, changes to their lifestyle, working restrictions, and adapting to a new culture (Koc & Welsh, 2001), which are similar to the challenges faced by international post-secondary students,

suggesting that international post-secondary students may have some degree of food insecurity, which is the secondary focus of this thesis.

Post-secondary students are another group that is considered at increased risk for food insecurity; however, limited research has been conducted among this group. No other Canadian studies have documented if post-secondary students particularly are vulnerable to food insecurity. The CCHS indicated that the prevalence of food insecurity was high among young adults between 20-34 year olds (8.9%-11.9%) compared to the general population (6.9%-8.6%) (Statistics Canada, 2013), suggesting that post-secondary students may have some degree of food insecurity which is the primary focus of this thesis.

2.2 Determinants of Food Insecurity

2.2.1 Income

In Canada, socio-economic factors are the strongest predictors of food insecurity (Howard & Edge, 2013). Insufficient income and financial insecurity are key factors that affect people's ability to achieve and maintain food security (Tarasuk, 2001a; Vozoris & Tarasuk, 2003). Several studies have established that individuals with a low income are at a high risk of food insecurity. For example, the lower the income, the higher the levels of household food insecurity (Health Canada, 2007). This is because the greater the poverty that is experienced, the less likely individuals and families will be able to afford their basic needs, such as healthy foods (Mikkonen & Raphael, 2010).

An individual's income level depends on several factors, such as an individual's ability to work, job skills and education, need for daycare, and working circumstances. Unemployment or job loss and poor working circumstances can lead to a reduction in one's ability to obtain a

regular income, creating circumstances that are often associated with food insecurity (Mikkonen & Raphael, 2010; Public Health Agency of Canada, 2014). Households relying on social assistance, employment insurance, employee compensation, child tax benefits, child support or alimony, or with no income are more likely to experience food insecurity compared to households that depend on employment income (Che & Chen, 2001). Households that rely on social assistance, have a high debt level, and possess an inability to access credit have higher rates of food insecurity (Gorton, Bullen, & Mhurchu, 2010).

There is not a simple linear relationship between income and food insecurity (Rose, 1999). Within low-income populations in both Canada and the United States, both food insecure and food secure households exist (Nord, Andrews, & Carlson, 2005; Tarasuk, Mitchell, & Dachner, 2015). There is also evidence of food insecurity among some high income households in Canada. Some possible financial problems that contribute to food insecurity in high income households are related to personal choices. Some individuals in these households spend more money than they earn, indicating that budgeting, money management, making impulsive financial decisions, gambling, smoking and other addictions can also contribute to food insecurity (Olabiyi & McIntyre, 2014).

2.2.2 Cost of food

The cost of food is substantial for individuals and households with inadequate funds because it determines, among other things, the quality and quantity of foods obtained. Overall, food insecure households need to choose between purchasing food and paying for other needs, including housing, utility costs for heating or cooling, and medication (if required) (Nord & Kantor, 2006; Sullivan, Clark, Pallin, & Camargo, 2010).

The cost of food is often considered a non-fixed expense and a flexible part of household spending. Food budgets are determined by the amount of money that remains after paying other bills including housing and utilities. Low-income households economize by using saving strategies, such as buying low-quality foods, generic brands, and large food package sizes, using coupons, and buying items on sale (Kaufman, MacDonald, Lutz, & Smallwood, 1997). Using such strategies, they can spend less on many foods per unit of weight or volume such as beef. In addition, their total grocery bill might be lower compared to the national average (Kaufman et al., 1997). However, low-income households are more sensitive to increases in commodity costs because they spend a larger share of their income on food compared to higher-income households (Howard & Edge, 2013). For example, in 2009, low-income households spent ~16% of their total household expenditures on food compared to ~8% among higher-income households (Statistics Canada, 2012).

Within 2009, in Canada, the average annual rate of food prices increased by 4.9%. During the same period, the prices of beef, pork, and perishable foods were higher compared to 2008 (Agriculture and Agri-Food Canada, 2011). Between 2010 and 2011, the cost of food commodities such as wheat, sugar and vegetable oil increased between 50 and 100% (Weeks, 2011). In 2011, the price of prominent baked goods and processed meats also increased (Howard & Edge, 2013). Even small increases in food prices strain the budgets of low-income households.

Complementing national data, local information is also available to provide context. As food prices have increased, the price of Edmonton's nutritious food basket (NFB), which measures "the cost of healthy eating" has also increased. The Edmonton NFB for a family of four increased by 64% between 2006 and 2014, from $142.02 to $ 222.64 (Alberta Agriculture and Forestry, 2013; Alberta Agriculture and Foresty, 2015).

Food pricing can become a significant challenge among low-income households in meeting Eating Well with Canada's Food Guide recommendations for fruits and vegetables (Cassady, Jetter, & Culp, 2007). Low-income households find it difficult to make healthful food choices, which places them at risk of not being able to meet their nutritional needs (Public Health Agency of Canada, 2014). Several studies have indicated that food insecurity is associated with lower consumption of fruits and vegetables, milk products, lean meat, fish, and fiber, as healthy foods tend to be more expensive per calorie than processed food. For example, low-income households have limited funds to buy these foods, which increases their consumption of energy-dense and high-fat foods (Darmon & Drewnowski, 2008; Irwin, Ng, Rush, Nguyen, & He, 2007; Kirkpatrick & Tarasuk, 2008). For instance, a study by Drewnowski and Specter (2004) indicated that high-fat and high-sugar foods were more affordable to low-income households than vegetables, fruits, whole grain products, and lean meats.

2.2.3 Cost of non-food essentials

Low-income households often struggle to cover the cost of non-food essentials (*e.g.,* housing, utility costs for heating or cooling, and medication (if required) (Dachner, Ricciuto, Kirkpatrick, & Tarasuk, 2010). A study found that affordability of housing threatens people's ability to feed their families and access necessary healthcare. Low-income households can spend more than 50% of their income on housing (Housing Assistance Council (HAC), 1997). The high costs of housing and utilities divert resources that otherwise could be used for food and medical needs (Bhattacharya, DeLeire, Haider, & Currie, 2003).

In addition, a reduction in the quantity or quality of food intake may have a negative impact on the health status of individuals, which may lead to increased medical needs. A

Canadian study found that the healthcare costs of people with food insecurity were more than twice as high as their peers with food security (Tarasuk et al., 2015). For example, in 2012, the annual estimated cost of the healthcare in Ontario, including emergency room visits, acute and psychiatric hospital stays, physician visits, day surgeries, home care and prescription drugs, for food secure individuals was, on average $1,608, compared to $2,806 for moderately food insecure individuals and about $4,000 for severely food insecure individuals (Tarasuk et al., 2015).

2.3 Consequences of Food Insecurity

2.3.1 Food insecurity and nutrient inadequacies

Income shapes overall living conditions and influences health-related behaviours, including dietary behaviours among food insecure individuals. Food intake affects the nutritional status, health and well-being of the population (Public Health Agency of Canada, 2014). One core concern for policymakers is the effect of food insecurity and hunger on nutrition and health (Public Health Agency of Canada, 2014). Food insecure households in Canada struggle with a variety of health problems related to food deficiencies (Kirkpatrick & Tarasuk, 2008; Leung, Epel, Ritchie, Crawford, & Laraia, 2014; Seligman & Schillinger, 2010). Food insecurity is an experience, which varies from eating less desired foods, to skipping meals, to not eating for a whole day (Bickel et al., 2000). Food insecurity has been associated with dietary inadequacies among adults (Kirkpatrick & Tarasuk, 2008), which is a consequence of eating cheaper foods that are less nutrient dense (Beydoun & Wang, 2008). Food insecure adults tend to have a less-varied diet, lower intake of vegetables and fruits, and are at risk for micronutrient deficiencies and malnutrition (Holben, 2006; Kendall, Olson, Frongillo, 1996).

2.3.1.1 Dietary intake

Young food insecure individuals consumed significantly fewer dairy products, vegetables and fruits (especially dark green leafy vegetables and citrus fruits), meat and alternatives, cereals, salty snacks and sweet desserts compared to food secure young adults (Dixon, Winkleby, & Radimer, 2001; Kirkpatrick & Tarasuk, 2008; Tarasuk, 2001b). A study conducted in the USA by Leung et al. (2014) found that in addition to low consumption of vegetables and sweets, low-income food insecure adults consumed more sugar-sweetened beverages, processed meat, salty snacks, high-fat dairy products, nuts, seeds, and legumes compared to low income food secure adults. The higher consumption of legumes, which tend to be nutrient dense, could be related to the fact that legumes are less expensive compared to vegetables and fruits (Leung et al., 2014). Another study of Americans found that food insecure men and women consumed fewer meals in a day (Zizza, Duffy, & Gerrior, 2008). Food insecure women had higher intakes of total fat, saturated fat, and energy derived from meals and snacks compared to food secure women. However, food insecure men had a lower number of meals and greater frequency of snacking and total energy intake from snacks. In this study, the main sources of energy in meals for both men and women were from grain products (30-34%), followed by meats (22-27%), and sugars and beverages (14-21%). The main sources of energy from snacking among both men and women were derived from sugar, sweets, and beverages (Zizza et al., 2008). Taken together, the evidence suggests that food insecure households experience inadequate food intake or have a dietary pattern that lead to suboptimal nutrient intakes.

2.3.1.2 Nutrient inadequacy

In a US-based study of adult women, food insecurity was associated with a low intake

(below two-thirds of the US Recommended Dietary Allowance (RDA)) of numerous nutrients including energy, vitamins A, C, E, B6, magnesium, phosphorus, zinc, iron, and calcium (Rose & Oliveira, 1997). Another study found that food insufficient young adults were more likely to consume below 50% of the RDA for protein, vitamin C, vitamin B6, vitamin E, folate, magnesium, iron, zinc, and calcium; they also had lower serum concentrations of total cholesterol, vitamin A, vitamin C, vitamin E, albumin and carotenoids compared to food sufficient young adults (Dixon, Winkleby, & Radimer, 2001). A Canadian study conducted among food insecure adults found that food insecure households had lower intakes of protein, fat and fiber. Furthermore, food insecurity was associated with inadequate consumption of vitamins and minerals including magnesium, vitamin A, zinc, vitamin B-6, vitamin B-12 and folate, along with a number of other vitamins and minerals (Kirkpatrick & Tarasuk, 2008).

2.3.2 Food insecurity and health

Income-related food insecurity is an important social determinant of health (Mikkonen & Raphael, 2010). Several studies have found that living in a food insecure household is associated with a variety of physical and mental health consequences. For example, in Canada, individuals living in food insecure households are more likely to report heart disease, diabetes, high blood pressure and food allergies compared to individuals living in food secure households (Holben & American Dietetic Association, 2010; Power & Dietitians of Canada, 2005; Starkey, Kuhnlein, & Gray-Donald, 1998; Vozoris & Tarasuk, 2003). Food insecurity among children, adolescents, and adults is associated with negative outcomes, including poor academic performance, insufficient intake of essential nutrients, and increased risk of chronic disease (Jyoti, Frongillo, & Jones, 2005; Kirkpatrick & Tarasuk, 2008). Mothers may compromise their food intake to

prevent other family members, especially children, from experiencing nutrient deficiency (McIntyre et al., 2003).

Women experiencing food insecurity have been found to be at increased risk of overweight and unhealthy weight gain, anxiety, and depression (Collins, 2009; Ivers & Cullen, 2011). In addition, food insecurity is associated with depression as well as poorer social and physical health among women (Vozoris & Tarasuk, 2003). A cross-sectional study found that food insecure adults with multiple chronic conditions were more likely to be severely food insecure than adults with no chronic conditions, however, the direction of the association is unknown (Tarasuk, Mitchell, McLaren, & McIntyre, 2013).

2.3.3 Coping strategies as a response to food insecurity

Individuals vulnerable for food insecurity use various coping strategies to help them to acquire food. Coping strategies are defined as "conscious, rational ways for dealing with the anxieties of life" (Reber, 1985). Coping strategies to address food insecurity are what people have to do when they do not have enough food or money to buy food, and the more people have to cope, the less food secure they are (Maxwell & Caldwell, 2008). Studies have found that as food insecurity becomes more severe, individuals are more likely to employ more extreme coping strategies (Hoisington, Shultz, & Butkus, 2002; Wood, Shultz, Edlefsen, & Butkus, 2007). Based on several sources (Anater et al., 2011; Hoisington et al., 2002; Kempson et al., 2003; Mello et al., 2010; Power & Dietitians of Canada, 2005; Rainville & Brink, 2001; Tarasuk, 2001b; Wood et al., 2007), examples of different coping strategies used in Canada and the United States are provided below (see Table 2.1). Studies among post-secondary students and homeless individuals were not included in the table.

Table 2.1: Coping strategies used by individuals in Canada and the United States to cope with food insecurity

Food management strategies	Income management strategies	Social and community support	Severe Coping Strategies[1]
• Changing eating behaviours or accepting other sources of food by changing the normal diet • Cutting the size of meals • Skipping meals • Buying food on sale • Buying non brand food items • Shopping at discount stores • Using shopping list • Going to more than one store to find cheaper food • Planning menus	• Purchasing food on credit • Delaying bill payments • Giving up services such as telephone or cable television • Selling possessions or personal belongings • Work extra hours • Getting a cash advance	• Borrowing food, borrowing money from family or friends • Seeking help from emergency government or community food pantries, emergency kitchens, and shelters • Sending children to stay with friends or relatives • Trade with family or friends one type of food for another • Go to church or other place of	• Donating blood for money • Selling drugs • Stealing • Taking food from the garbage • Eating rotten food • Eating road kill • Writing bad cheques • Committing crimes to be sent to prison for the purpose of having sufficient access to food

• Using coupons • Buy food in bulk • Eat leftovers • Hunting or fishing • Preserving food by canning, freezing or drying • Raised animals for food		worship for dinners • Use community garden	

[1]Severe coping strategies were criminal behaviours, or behaviours that could cause harm to the individual.

2.4 The Role of Food Banks to Address Food Insecurity

2.4.1 Emergency food distribution programs

In response to hunger and food insecurity, many programs have been established by the government, community groups, private organizations and individuals to help address the needs of food insecure individuals and families. Some programs were designed to provide lasting solutions to food insecurity problems using participatory, community development strategies to improve food security (Tarasuk, 2005). These programs usually offer food at a low price, which is often achieved through supplemental funding from community-based or governmental agencies. Examples of these programs include community gardens and kitchens, community greenhouses, good food boxes, community shared agriculture, and Meals on Wheels (Howard & Edge, 2013).

Community kitchens are places where people prepare meals together which give people the opportunity to share skills, socialize and reduce meal costs. There are more than 600 community kitchens in Quebec, more than 500 in British Columbia, along with numerous others operating throughout Canada (McIntyre, 2011; Nature Canada, 2014). Relatedly, community gardens are urban green spaces chosen as public places to grow plants. People contribute time, skills, and resources to design and manage gardens that often include a variety of different herbs, vegetables, fruits, and flowers (McIntyre, 2011; Nature Canada, 2014). However, the effectiveness of these programs in reducing food insecurity has not been evaluated (Loopstra & Tarasuk, 2013; Tarasuk, 2001c).

2.4.2 Food banks as a response to food insecurity

In the 1980s, a range of non-governmental, charitable food aid programs were established in Canada, including food banks (Tarasuk & Eakin, 2005). Food banks (also known as food pantries or food depots) are non-profit, charitable, voluntary and community-based food assistance programs that collect and distribute donated food, often from multiple sources (*e.g.,* public, grocery stores, food industry) to help people in need (Tarasuk, Dachner, & Loopstra, 2014; Tarasuk & Beaton, 1999; Wilson & Steinman, 2000; Wilson & Tsoa, 2002). Originally, food banks in Canada were intended to be a temporary measure to assist people with economic crises; however, as the need for food banks increased and people came to depend on this support, they evolved to become a permanent part of the food landscape (Food Banks and Soup Kitchens, 2010; Tarasuk, Dachner, & Loopstra, 2014). Reasons for the increasing need for food banks are a failure of governments to respond to poverty and unemployment, and to make efforts to redistribute wealth in the population (Food Banks and Soup Kitchens, 2010; Tarasuk et al.,

2014). Although there has been some stigma associated with food banks over the years, they have increasingly become socially acceptable options among many Canadians as awareness of the food banks and the needs of people living with food insecurity have increased over time (Allen & Newton, 1986; Food Banks and Soup Kitchens, 2010). Thus, another explanation for the increase in food banks is that the stigma of using the services of a food bank has diminished (Tarasuk, Dachner, & Loopstra, 2014).

Surveys of food bank clients and operators indicated that the demands for charitable food assistance exceeds the available supply (Tarasuk & Beaton, 1999; Wilson & Steinman, 2000; Wilson & Tsoa, 2002). However, food banks do not appear to be used by all food insecure households in Canada (Loopstra & Tarasuk, 2012). For example the 1998-1999 National Population Health Survey showed that only 22% of food insecure households had used food banks (Rainville & Brink, 2001). A more recent study in Toronto indicated that less than one-quarter of food-insecure households use food banks (Kirkpatrick & Tarasuk, 2009). The use of food banks is therefore not a good indicator of household level of food insecurity, and usage underestimates the number of people experiencing food insecurity (Loopstra & Tarasuk, 2015).

Even though food banks are important resources that provide immediate food to people in need, they are not structured to deal with long-term food insecurity or to provide help for all people in need. Food banks were not established to create sustainable change, to improve income or even to help food insecure household to become food secure on their own (Howard & Edge, 2013). Although some food banks are able to purchase limited quantities of food through cash donations, most food banks receive food donations from producers, manufactures, and retailers (Tarasuk & Eakin, 2005). The food supplies often have limited variety and include a large proportion of non-perishable foods, which have a longer shelf life. Therefore, it is difficult for

food bank clients to receive fresh and nutritious food. Because many food banks rely on donated food, they have little control over the quality and quantity of food available for distribution. Food banks usually accept food donations that cannot be sold from producers, manufactures and stores because of manufacturing errors or damage during shipping, handling, and storage, which means that they likely distribute some foods that are unacceptable or undesirable for the general public (Irwin, Ng, Rush, Nguyen, & He, 2007; Tarasuk & Eakin, 2005; Teron & Tarasuk, 1999).

Most food banks give clients enough food to last for four days (or less) and limit the number of food hampers that can be requested per month. In part, these limitations allow food banks to provide food to the maximum number of individuals as possible since, in most circumstances, demand exceeds supply (HungerCount, 2004). One study found that one-third of food bank clients received less than a three-day food supply. Furthermore, larger household received less food per person from hampers (Teron & Tarasuk, 1999). In addition, more than half of food hampers contained at least one damaged or potentially unsafe food item (*e.g.*, expired food) (Irwin, Ng, Rush, Nguyen, & He, 2007; Tarasuk & Eakin, 2005; Teron & Tarasuk, 1999; Tarasuk et al., 2014). Several studies indicated that the quantity and quality of food donated to the food banks does not meet basic nutritional needs of an individual or family, despite the efforts of many food banks to ensure that hampers adhere to Canada's Food Guide recommendations (Campbell, Hudson, Webb, & Crawford, 2011; Holben, 2012; Jessri, Abedi, Wong, & Eslamian, 2014; Teron & Tarasuk, 1999; Willows & Au, 2006). This may explain why in some studies, clients described the food they received from the food banks as junk food and insufficient for individuals with dietary restrictions (Loopstra & Tarasuk, 2012; Tsang, Holt, & Azevedo, 2011).

In general, food banks do not serve an effective role in addressing food insecurity

(Tarasuk, 2005). Although food banks provide some assistance and relief to many food insecure households, this support does not solve hunger or social inequalities (Loopstra & Tarasuk, 2012). Given their volunteer, non-profit status, they can also be vulnerable to financial shortfalls and limited donations of food for distribution (Power & Dietitians of Canada, 2005; Tarasuk & Eakin, 2003; Wie & Giebler, 2013).

2.4.3 Characteristics of food bank users

Food banks users consist of a range of people who have different challenges, although most food bank users are financially insecure. In a study conducted by Starkey, Kuhnlein and Gray-Donald (1998), researchers assessed the sociodemographic characteristics of people relying on food banks, and found that most food bank users were young adults who lived alone, received social assistance, and had completed high school / received some post-secondary education. They suggested that even though post-secondary students were well educated, their food insecurity might have been a result of their reliance on government assistance and/or student debt load (Canadian Federation of Students, 2013; Fredman, 2004; Starkey et al., 1998).

Food Banks Canada conducts the HungerCount survey in March of each year to measure food bank usage across the country. It is the only comprehensive report that offers a snapshot of food bank clients and charitable organizations that study hunger and food insecurity (HungerCount, 2015). In their most recent report (HungerCount, 2015), they highlighted that Canadian food assistance programs increased in 2015 compared with the previous year. For instance, food bank usage increased by 1.3% in 2015 compared to March of 2014 and there were 26% more people using food bank services than during the 2008 recession. More than one-third of those receiving help from the food banks were children under 18 years old. Close to one

million people in Canada received food from a food bank in March of 2015. At the provincial level, from 2008 to 2015, food bank use in Alberta increased by 82%. In March 2015, 67,443 Albertans received food from food banks (HungerCount, 2015).

2.5 Summary

In this review, I provided the definitions of food security and insecurity, prevalence of food insecurity, populations at risk for food insecurity, and coping strategies to deal with food insecurity. Food insecurity is a serious public health issue in Canada. The existing body of research provided some insights into the implications of food insecurity on health and nutritional well-being. Different coping strategies, including using food banks, have been used to deal with food insecurity. Food banks are important community resources that provide emergency assistance to households with food insecurity; however, they are unable (nor were they ever designed) to help people achieve food security, a goal that will only be met through long term supporting policies that improve income earning opportunities and address the needs of vulnerable groups to ensure access to affordable, safe and nutritious food.

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CHAPTER 3: LITERATURE REVIEW ON FOOD INSECURITY IN POST-SECONDARY STUDENTS

Objectives

The purpose of this narrative review was to *(i)* describe the existing literature examining food insecurity among post-secondary students and *(ii)* highlight the evidence gaps to inform future research directions.

Methods and Results

To obtain the research articles used in this review, electronic searches conducted between fall 2012 and spring 2015 were performed using online databases including PubMed, EBSCO, Scopus, Ovid Medline, ERIC, Embase and gray literature including Google Scholar and ProQuest Dissertations. The references of identified articles were examined for additional relevant articles not found in my original search. Studies were included if they were:

- published between 2000 and 2015;
- focused on the issue of food insecurity among post-secondary students;
- conducted in either developed or developing countries

Studies were excluded if they were:

- not written in English;
- not full text manuscripts (e.g., they were conference abstracts).

With the Boolean search operators “AND” and “OR”, the following search terms were used in numerous combinations to help identify relevant articles: “food insecurity”, “hunger”, “food insufficiency”, “poverty”, “low income”, “food banks”, “campus food bank”, “food supply”, “young adults”, “college”, “university”, “students”, “post-secondary”, and “tertiary”.

A total of 22 studies were included in the review, of which 20 were quantitative cross-sectional studies and two were qualitative studies. Only three of the 22 studies were conducted in Canada. Studies are organized in Table 3.1 by the country where the study occurred (Table 3.1). Based on these studies, I completed a narrative synthesis of the findings, the details of which are provided below.

Table 3.1: Results from the narrative review on food insecurity among post-secondary students

Reference	Study Sample	Setting	Study Design	Data Collection	Prevalence of Food Insecurity	Limitations
Chaparro et al., 2009	Convenience sample of 441 students	University Manoa, Honolulu, Hawaii (USA)	Cross-sectional	10-item HFSSM, demographic and spending variables	21% low food security	Selection bias
Maroto et al., 2013	Convenience sample of 301 students	Two community colleges Maryland, USA	Cross-sectional	10-item AFSSM, self-reported GPA, and demographic variables	56% food insecure	Selection bias
Patton-López et al., 2014	Convenience sample of 354 students	University Oregon, USA	Cross-sectional	6-item FSSM, socioeconomic and demographic variables	59% food insecure	Selection bias; severity of food insecurity not measured using 6-item FSSM
Gaines et al., 2012, 2014	Convenience sample of 557 students	Public university Alabama, USA	Cross-sectional	10-item AFSSM, demographic, cooking self-efficacy, and adequacy of food preparation skills and resources	21% were marginally food secure, 15% were food insecure.	Selection bias
Hanna,	Convenience	One	Cross-	Frequency of	19.4% food	Selection

2014	sample of 67 students	College California, USA	sectional	food insecurity, behaviours, and factors associated with food insecurity	insecure	bias, did not specify the tool used to measure food insecurity; small sample size
Ferudenberge et al., 2011	Convenience sample of 1,086 students	University New York, USA	University Cross-sectional	4 questions about food insecurity, demographic, housing instability, and food related services	39.2% food insecure, 22.7% food insecure with hunger	Selection bias; used questions derived from the USDA FSSM rather than the validated tool
Koller, 2014	Convenience sample of 53 students	University Bowling Green, Ohio, USA	Cross-sectional	Food insecurity using USDA definition; demographic, food attainment, and use of community resources	19% food insecure	Selection bias; used several questions derived from the USDA FSSM rather than the validated tool; small sample size
Espinoza, 2013	Convenience sample of 597 students	University California, USA	Cross-sectional	Food security status using 10-item AFSSM, academic performance, demographics, and coping strategies	15.7% very low food security, 14.9% low food security	Selection bias
Gorman, 2014	Convenience sample of 298 students	Kent Statue University Ohio, USA	Cross-sectional	Food security status using 10-item AFSSM, demographics	49.7% food insecure	Selection bias
Mi-TingLin et al., 2013	Convenience sample of 112 female students	University A south-western region of the United States	Cross-sectional	A dichotomous question defined food security status, self-esteem, partner conflicts, family connectedness, personal conflict resolution, and substance abuse.	n/a	Selection bias; used only one dichotomous question to define food security statues rather than a validated tool, did not report the prevalence of food insecurity
Hughes et al., 2011	Purposive sample of	University	Cross-sectional	Food insecurity using USDA	12.7% to 46.5% (based	Selection bias; not validated food

	399 students	Australia		Community Food Security Assessment Toolkit and included the single-item question from the Australian National Nutrition Survey; demographic, food habits, use of support services, accommodation, transport and finance	on method of analysis)	security measurement tool
Micevski et al., 2014	Convenience sample of 124 students	University Victoria, Australia	Cross-sectional	Food insecurity using USDA definition, demographic, living arrangements, employment status, government support	18% food insecurity without hunger, 30% with hunger	Selection bias, used several questions derived from the USDA AFSSM rather than the validated tool
Gallegos et al., 2014	Convenience sample of 810 students	University Australia	Cross-sectional	18-item FSSM, socio-demographic, diet, and health	25.5% food insecure	Selection bias
Munro et al., 2013	Purposive sample of 1,083 students	University South Africa	Cross-sectional	Demographic, university Student's Food Insecurity Questionnaire (USFIQ), eating habits, and spending habits.	20% experienced some level of food insecurity	Selection bias, did not use a validated tool to measure food insecurity
Kassier et al., 2013	Random sample of 269 students	University South Africa	Cross-sectional	Household Food Insecurity Access Scale (HFIAS), anthropometric measurements, food security,	53.1% moderately food insecure, 12.5% food insecure	n/a

				coping mechanisms, monthly food expenditure, dietary diversity, academic performance and nutritional knowledge		
den Berg et al., 2015	Convenience sample of 1,416 students	University South Africa	Cross-sectional	Food insecurity using a 10-item USDA Community Food Security Assessment Toolkit and included the single-item question from the Australian National Nutrition Survey, demographic characteristics, coping strategies and food procurement measures	65% food insecure; 60% food insecurity with hunger; 26% food insecurity without hunger (based on method of analysis)	Selection bias; not validated food security measurement tool
Sulaiman et al., 2013	Random sample of 484 students	Four public universities Peninsular, Malaysia	Cross-sectional	18-item HFSSM, demographic and socio-economic characteristics, coping strategies, dietary intake and health	44.4% low food insecurity, 22.7% very low food insecurity	n/a
Kaczerska et al., 2014	Convenience sample of 764 students	Seven Polish universities	Cross-sectional	11-point (modified) questionnaire for food security according to the "Guide to Measuring Household Food Security", nutritional status, and demographic	3% lack of food security, 2% food insecurity with hunger	Selection bias; not validated food security measurement tool

Nugent, 2011	Purposive sample of 15 students	University Alberta, Canada	Qualitative study	10-item AFSSM, Demographic, social determinants of health, coping strategies, causes, social supports, transportation, shopping, health problems, and food preparation	n/a	Food security status was not reported
Stewin, 2013	Purposive sample of 32 international students	University Guelph and Windsor, Canada	Qualitative study	Experiences with food insecurity, food availability, accessibility and preferences	n/a	Did not describe assessment tool for measuring food insecurity and food security status was not confirmed.
Abbott et al., 2015	Convenience sample of 22 students	University Nova scotia, Canada	Cross-sectional	Barriers to food security, reason for using the food bank, socio-demographic characteristics	n/a	Selection bias; did not measure food security status

3.1 Literature on Food Insecurity among Post-Secondary Students

3.1.1 Prevalence of food insecurity

The prevalence of food insecurity varied substantially between studies, from 12.7% to 67.1%, variability that was likely the result of a variety of issues, including sample composition, sample size and the method used to determine food security status. Although the three studies conducted in Canada (Abbott et al., 2015; Nugent, 2011; Stewin, 2013) did not indicate the prevalence of food insecurity among Canadian post-secondary students, the prevalence of student food insecurity documented in other countries suggests that Canadian post-secondary students may be similarly affected.

3.1.2 Consequences of food insecurity

3.1.2.1 Nutrient intake

Four studies investigated the association between food insecurity and nutrient intake (Gallegos et al., 2014; Kaczerska et al., 2014; Nugent, 2011; Sulaiman, Jusoh, & Razak, 2013). The study by Sulaiman et al. (2013) was unique as it was the only study that measured micronutrient intakes. Students reported low intake of micronutrients including vitamin C, vitamin A, thiamine and calcium (Sulaiman, Jusoh, & Razak, 2013). The study by Gallegos et al. (2014) indicated that food insecure students were less likely to consume adequate servings of fruits and vegetables per day compared to their food secure colleague. The study by Kaczerska et al. (2014) showed inverse correlation between nutritional status and food security. In addition, based on the Mini Nutritional Assessment test, 35% of students were at risk of malnutrition. Students have also reported a lack of financial support to maintain adequate nutritional intake (Nugent, 2011).

3.1.2.2 Health outcomes

Seven studies examined the association between food insecurity and health among post-secondary students (Espinoza, 2013; Gallegos et al., 2014; Hughes et al., 2011; Kassier et al., 2013; Kaczerska et al., 2014; Patton-López et al., 2014; Sulaiman et al., 2013). Food insecure students were more likely to self-report having *fair* or *poor* health compared to food secure students (Gallegos et al., 2014; Patton-López et al., 2014). Espinoza (2013) indicated that food secure students were three times more likely to report having very good health compare to food insecure students. The study by Hughes et al. (2011) also found that food insecure students were more likely to report having lower overall health status compared to their food secure peers. The

study by Kassier et al. (2013) indicated that participants' food security status and nutritional knowledge were both negatively associated with body mass index. That is, more food insecure students had a higher body mass index. Sulaiman, Jusoh, & Razak (2013) indicated that 17.4% and 8.1% of the food insecure students were overweight and obese, respectively. In addition, students' mean mental health status scores were lower (54.8%) compared to their mean physical health status scores (90.5%), which indicated that the physical health status of food insecure students was better than their mental health status. The study by Kaczerska et al. (2014) found no correlation between body mass index and food security.

3.1.2.3 Coping strategies

Coping strategies reported by post-secondary students were similar to those reported by non-students in Table 2.1. Nine studies identified coping strategies used by students to deal with food insecurity (den Berg & Raubenheimer, 2015; Ferudenberge, Nicholas et al., 2011; Hughes et al., 2011; Hanna, 2014; Kassier & Veldman, 2013; Micevski et al., 2014; Nugent, 2011; Patton-López et al., 2014; Sulaiman, Jusoh, & Razak, 2013). Students coped with their lack of food or money to buy food by relying on food management strategies (Hanna, 2014; Kassier & Veldman, 2013; Sulaiman, Jusoh, & Razak, 2013), income management strategies (den Berg & Raubenheimer, 2015; Hughes et al., 2011; Nugent, 2011; Patton-López et al., 2014; Sulaiman, Jusoh, & Razak, 2013), and social and community support (den Berg & Raubenheimer, 2015; Ferudenberge, Nicholas et al., 2011; Hughes et al., 2011; Kassier & Veldman, 2013; Micevski et al., 2014; Nugent, 2011; Patton-López et al., 2014; Sulaiman, Jusoh, & Razak, 2013). Severe coping strategies were rare; only the studies by Sulaiman et al. (2013) and den Berg et al. (2015)

included reports of more severe coping strategies among students. Examples of different coping strategies used by post-secondary students are provided below (see Table 3.2).

Table 3.2: Coping strategies of differing severities used by post-secondary students to cope with food insecurity

Food management strategy	Income management strategy	Social and community support	Severe Coping Strategies
• Reducing the number or size of meals • Skipping meals • Not eating balanced meals • Buying less expensive food • Drinking more fluids to feel full • Not eating for a whole day or fasting	• Living with parents • Buying food on credit • Working more hours per week outside of university • Budgeting • Delaying bills payment • Reducing personal expenditures	• Borrowing money or food from friends or relatives • Using food banks and other food assistance programs • Receiving government support	• Stealing food

3.1.2.4 Academic performance

Only four studies investigated the association between food insecurity and academic performance and reported mixed results (Espinoza, 2013; Gallegos et al., 2014; Kassier & Veldman, 2013; Maroto, Snelling, & Link, 2013). The study by Maroto, Snelling, & Link (2013) found that students with a GPA between 2.0 and 2.49 were more food insecure compared to the students with a GPA between 3.5 and 4.0. A study by Gallegos et al. (2014) indicated that food insecure students were more likely to defer university attendance until a later date as a result of financial problems and 23% of food insecure students compromised/ suspended their studies. In contrast, the studies by Kassier & Veldman (2013) and Espinoza (2013) found no relationship between academic performance and level of food insecurity.

3.2 Discussion

A finding of this narrative review is that not much attention has been paid to understanding and describing food insecurity among post-secondary students. Among the limited research conducted on food insecurity among post-secondary students, most studies have focused primarily on the prevalence of food insecurity among post-secondary students and did not deeply look into the impact of food insecurity on academic achievements, diet, and perceptions of health. However, studies conducted on the prevalence of food insecurity among post-secondary students indicated that the prevalence was higher than in the general population. Experiencing food insecurity was often associated with negative impacts on academic performance, diet and health. Findings showed that students experiencing food insecurity were more likely to rate their health as fair or poor and they were less likely to consume adequate diets. Long-term use of various coping strategies might lead to health complications in the food insecure student population, which could jeopardize their education.

Food insecurity among post-secondary students exists on university and college campuses and is considered a barrier to student well-being and success (Cady, 2014). Post-secondary students are struggling between their studies and multiple part-time jobs and high tuition costs. Post-secondary students often wonder what their next meal will be and where it will come from. Although there are gaps in the literature regarding food insecurity among post-secondary students, many colleges and universities have opened food banks on campus to help post-secondary students who are struggling with food insecurity. Today, there are more than 70 campus food banks including at universities and colleges across Canada (Gordon, A, 2011). This suggests that food insecurity is a salient problem for many post-secondary students. Although

campus food banks are one reaction to the challenges that students are facing as a result of food insecurity, campus food banks alone are not a solution to food insecurity.

3.3 Limitations of included studies

Of the available studies addressing post-secondary student food insecurity, most were quantitative, not qualitative in nature, and were conducted in Australia or the United States. Of quantitative studies, all were cross-sectional in design which limited that ability to draw causal associations from the data. Convenience sampling was the most common method of selecting the sample, which presented some bias as it may affect the generalizability of the studies. Studies were inconsistent in the way they measured food insecurity. Most of included studies used the 18-item or 6-item USDA FSSM which were valid and reliable measures. On the other hand, some studies used only a few questions based on food insecurity definition or different tools than the USDA FSSM, which were not comprehensive or validated measures. Therefore, not all studies may have accurately indicated the degree of food insecurity which makes it difficult to compare studies and to show a broader picture of the problem. Lastly, not all studies assessed health, coping strategies, diet quality, and educational outcomes among post-secondary students.

3.4 Limitations of the narrative review

In addition to the limitations of each study, the narrative review has several limitations which may have affected included and excluded studies. The review did not include conference proceedings and abstracts which means that some findings were not included. Further, only one person conducted the search and selected articles based on eligibility criteria. Therefore, some relevant studies may have been missed. Finally, the review did not include the number of studies

that were retrieved using the search criteria, or the reasons why studies were excluded. These limitations mean that readers cannot evaluate the comprehensiveness of the search and limit understanding of the review process. In addition, it means that readers will not be able to critically judge the evidence and or for future investigators to update the research.

3.5 Recommendations and conclusions

The narrative review allowed for making recommendations for future research studies, which should help to improve our understanding of the issue of food insecurity among post-secondary students. There has been little attention paid to the problem of food insecurity among post-secondary students in Canada. There is a need for further studies to identify and explore the scope of food insecurity and its consequences in different groups of students within different campuses in Canada. Particularly, longitudinal studies with large sample size should be conducted to provide a clear picture on the long-term outcomes of food insecurity on post-secondary students' health, dietary intake and academic performance. As well, these studies will improve our understanding of food insecurity among post-secondary students and identify the duration and level of food insecurity that is most associated with negative consequences. In addition, future qualitative work is also needed to understand and explore the causes and consequences of food insecurity among different group of post-secondary students (*e.g.,* students with or without children and international students). Also, it is important to consider income, place of residence, and transportation among post-secondary students as these can influence food insecurity. Lastly, only one study has focused on the issue of food insecurity among international post-secondary students, therefore, more studies should be conducted among international

students to determine the prevalence of food insecurity among this group and understand their experience of food insecurity.

Food insecurity exits on campus; however, limited data are available on how best to address food insecurity in post-secondary students. Universities should respond to the problem of food insecurity among post-secondary students as they are considering barriers to students' academic achievement and well-being. Therefore, community-based participatory research with relevant stakeholders (*e.g.,* students, community leaders, food bank staff, university administrators) would be valued to develop, implement, and evaluate approaches designed to reduce food insecurity.

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CHAPTER 4: METHODOLOGY

4.1 Setting: Campus Food Bank at the University of Alberta

In response to food insecurity, campus food banks have emerged to offer emergency food supplies. Founded in 1991, CFB at the UAlberta is a registered charity (#89241 4566 RR0001) that distributes emergency food hampers for free to all campus members including students, staff, and alumni who are in need of food (Campus Food Bank: Hunger for knowledge, not food, 2012). The CFB is governed by a Board of Directors that represents the diversity of the University Community. It accepts donations of food, cash and toiletries. The Executive Director is paid, but the CFB is primarily operated by volunteers. Over its first decade, the number of requests for food hampers and students relying on CFB at the UAlberta increased two-fold. In 2014 alone, enough food was distributed in hampers to feed over 2500 individuals (Campus Food Bank: Hunger for knowledge, not food, 2012); these numbers highlight the substantial food needs of UAlberta students. The number of students using the CFB likely underestimates the problem of food insecurity on campus as many food insecure students probably do not use the services of the CFB.

The UAlberta CFB is currently located at 1-81 Students' Union Building (SUB). During the fall and winter semesters, the CFB is open from Monday to Friday from 9:00 am to 5:00 pm. During the spring and summer semesters, the CFB is open from Tuesday to Friday from 12:00 pm to 4:00 pm and is closed on Monday.

I was a volunteer at the CFB for almost three months in 2012 before I started my thesis project. Working at the CFB opened my eyes to the food insecurity problems faced by post-secondary students. While I was working there, these statements from student clients really struck me: “I used to eat expired food” and “I never ate this much food before.” I was surprised

by the number of students who used the CFB service, which indicates the importance of my research in raising awareness of the problem.

The CFB has three main areas: The entrance, which included the registration desk and help yourself shelf, housing all of the just-expired non-perishable foods; a private office to register new clients that had a shelf full of toilet paper, soap, and toothpaste, and; the third room housed the non-perishable foods, perishable foods, the refrigerator and freezer. The non-perishables included canned tuna, canned beans and soup, juice, peanut butter, oatmeal, rice, pasta, lentils, noodles, cereals, bars and instant macaroni & cheese. The non-perishables were placed on the shelf in the order of the expiration dates. The corner of the room was where all perishables such as potatoes, onions, apples, and oranges, were stored. The fridges acted as storage for perishables such as eggs, salad bags, and yogurt. Lastly, the freezers acted as storage for bread and expired food such as yogurt and tofu, although freezing changed the texture of these foods.

CFB food hampers are currently designed to provide around a 5-day supply of food. At the time of my research, they were intended to provide a 4-day food supply. Even though, local research has indicated that the food hampers are inadequate to meet clients nutritional needs (Jessri, Abedi, Wong, & Eslamian, 2014; Willows & Au, 2006), hampers are modeled after Eating Well with Canada's Food Guide and follow a set menu. All clients receive four eggs per person, if available, in addition to a milk coupon that they can redeem from Lister Marina, located in a separate building from the Students' Union Building. The CFB website provides simple recipes that can be made with items contained in the food hamper such as bean and tuna salad and three-item chili. When possible and if requested, cultural foods are included. Examples of foods that clients might receive in their food hamper are shown below (see Table 4.1).

Table 4.1: Sample food hampers students might receive from the food bank at UAlberta

One Person Food Hamper	Four Person Food Hamper
2 cans each of: • Beans (kidney, brown, chickpeas etc.) • Meat/Fish (tuna, turkey, chicken) • Soup (chicken noodle, vegetable etc.) • Vegetables (carrots, corn, potatoes) • Fruit (peaches, apple sauce, pineapple) **1 can/jar of:** • Pasta/Tomato sauce **1 package each of:** • Instant Macaroni & cheese • Pasta, Rice, Rolled Oats (500g each) • Juice (1L if available) • 1L Milk Token redeemable at Lister Marina	**5 cans each of:** • Beans (kidney, brown, chickpeas etc.) • Meat/Fish (tuna, turkey, chicken) • Soup (chicken noodle, vegetable etc.) • Vegetables (carrots, corn, potatoes) • Fruit (peaches, apple sauce, pineapple) **2 cans/jars of:** • Pasta/Tomato sauce **3 packages of:** • Instant Macaroni & cheese **1 package each of:** • Rice (1.25kg), Pasta (1kg), Rolled Oats (1kg) • Cereal • Juice (2L if available) • 1L Milk Tokens redeemable at Lister Marina • Peanut Butter (clients with children only)

To receive a food hamper, members of the UAlberta community must first register in

person with the CFB. Registrants must provide ID for each member of the household sharing the hamper, their relationship to the University Community, their source(s) of income, their reason(s) for accessing the food bank, and, their dietary needs. At the time of the interview, Canadian students are provided information about how to access loans and bursaries, while international students (*e.g.,* students in Canada on a study permit) are informed about the possibility of receiving emergency loans or financial aid through the International Centre. Once registered, CFB clients must provide the following information when they request a food hamper:

- Client identification number which they received when they first register at the CFB
- Number of adults, children, and infants in the household that they included in the file
- Date and time that the client wishes to pick up the hamper
- Any medical conditions, allergies, or religious restriction clients have.

Registered clients can request a hamper every two weeks by visiting the CFB in person, or via email or phone. The one exception to this rule occurs prior to the Christmas break. Considering that the CFB is closed for an extended period over the break (*e.g.,* from December 18th 2015 to January 4th 2016), clients can pick up emergency hampers prior to its closure regardless of when they received their last hamper.

4.2 Overall Study Design: Multi-Method Research

Food insecurity among post-secondary students who use the CFB was studied using a multi-method design, which is a procedure involving two or more research methods. Each method is conducted rigorously and completed on its own, and then used together to form important components of one research program. Thus, each study in my thesis was designed and

conducted to answer a specific sub-question and provide its own worldview (Morse, 2003). It is important to mention that multi-method research design is different than mixed method research design. The major difference between multi-method and mixed method research design is that in multi-method design, all projects are complete in and of themselves (Morse, 2003), while mixed method research incorporates qualitative and quantitative analyses and interpretations at many or all the stages of the research process in a single study (Tashakkori & Teddlie, 2003a). The rationale for using a multi-method approach is that neither quantitative nor qualitative methods by themselves are enough to capture the details of the issue of food insecurity among post-secondary students. As inductive and deductive approaches complement each other, using both allows for a complete picture that helped us to understand the problem of food insecurity among post-secondary students (Creswell, 2012).

Each research design has its own strengths. Quantitative research design involves describing the research problem by collecting and analyzing numerical data to determine the frequency and association between an independent variable and dependent variables (Creswell, 2012). Qualitative research design is more naturalistic, interpretive and inductive (Mayan, 2009). Qualitative research attempts to subjectively understand and interpret peoples' experience in the form of words (Mayan, 2009). There has been a dramatic increase in the scope of multi-method research design in clinical research studies (Tashakkori & Teddlie, 2003b). This chapter provides a detailed description, and discusses the methodology, of both quantitative and qualitative studies of the research.

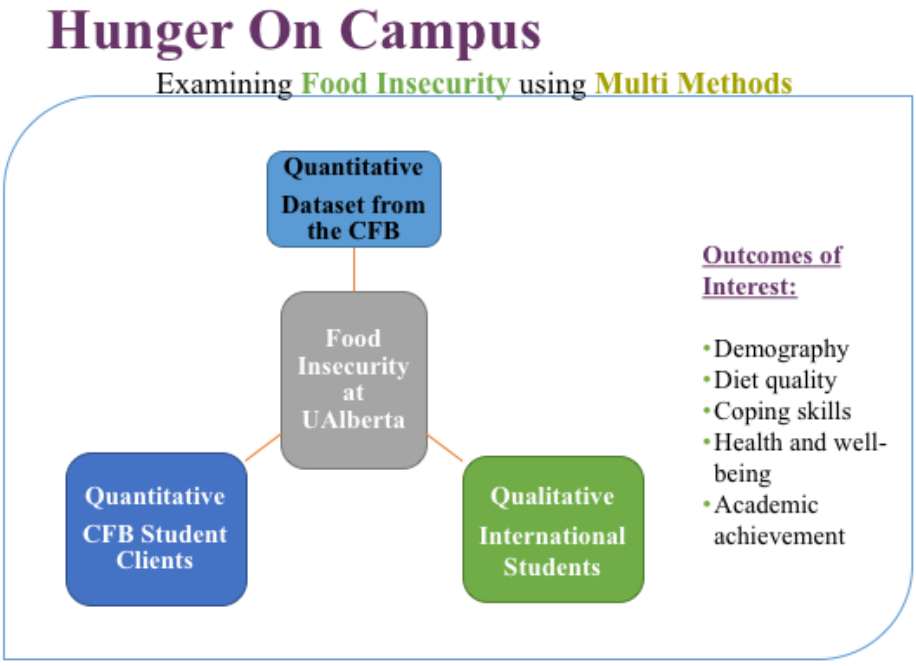

Figure 4.1: Framework of multi-method design

4.3 Quantitative Studies (Papers 1 and 2)

4.3.1 Design

The first two studies utilized a cross-sectional design to examine and describe the food insecurity experienced by post-secondary student clients of the CFB at the UAlberta. Since the purpose of this research was not to indicate causation, the cross-sectional design was useful for determining prevalence of food insecurity. A cross-sectional design was chosen because it focuses on one particular point in time, but data are collected with regards to several variables (Bryman, Bell, & Teevan, 2012). Also, it takes less time to complete, including the time required for running the questionnaire and collecting data (Creswell, 2012). No follow-up is required as data are collected only once and multiple outcomes are studied, and it offers considerable control over the measurements. Furthermore, the cross-sectional design is inexpensive and fewer resources are required to run the study than to do a longitudinal study (Mann, 2003).

4.4 Quantitative Study 1

4.4.1 Study population

I used the data for all UAlberta CFB clients who registered at the CFB between September 5, 2010 and July 19, 2013 (n=596). I included data from post-secondary students and excluded staff, alumni and postdoctoral fellows from the analysis which resulted in n=568 student clients. The reason for excluding post-doctoral fellows from the study was because they are no longer students and they are getting paid for their contribution.

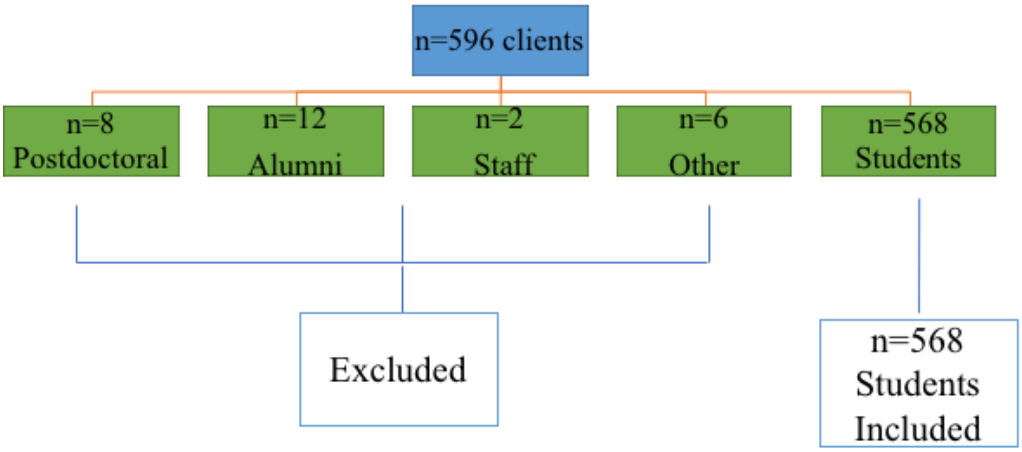

Figure 4.2: Study population for first quantitative study

4.4.2 Procedure

Data were collected from all clients who registered with the CFB from September 2010 to July 2013. The CFB data collected prior to September 2010 were not available for analysis. All individuals who registered to receive their first food hamper were required to provide

information regarding their socio-demographic and educational background, although proof of food insecurity or limited financial means was not required. Socio-demographic characteristics included gender, household type, primary source(s) of income, registration date, date of birth, and the birth dates of all individuals living with a CFB client who required food from the hamper. Educational characteristics included level of study (undergraduate or graduate), student nationality (Canadian or international), course load (full-time or part-time), and relationship to the university (student, staff, alumni or postdoctoral fellow). For the purpose of our research, only client information from undergraduate and graduate students was included in analysis. Identifying data including names, phone numbers, and email addresses were removed from the database prior to analysis. Aggregate data on characteristics of the 38,774 UAlberta students enrolled during the 2011-2012 academic year were abstracted from the university's publically-available website, in order to compare the CFB student clients' characteristics with the total population of UAlberta students (University of Alberta, 2014).

4.4.3 Data analysis

Descriptive statistics were used to characterize socio-demographic and educational characteristics of the student CFB clients. Differences between CFB clients and the total UAlberta student population were tested using Z-tests for two population proportions (Z Test Calculator for 2 Population Proportions, n.d.). For all group comparisons, a p-value <0.05 was considered to be statistically significant. Data were analyzed using SPSS, version 21.0 (Chicago, IL, USA).

4.5 Quantitative Study 2

4.5.1 Sample

The population of interest in this project was UAlberta post-secondary students who used the CFB from April 2013 to April 2014. We chose to focus on the CFB student clients because the majority of the CFB users were students (95%). We know little about the characteristics of students who use the CFB service or the reasons for their need. Also, we were uncertain about the food security status of student clients. If a large number of student clients are not food insecure, the CFB would benefit from knowing that about their clients, which may lead to changes in how best to support their clients. Therefore, we were interested to know if the CFB student clients really needed the service based on their food insecurity status. The CFB serves all members of the university community, including both local and international students who are in undergraduate or graduate programs, and non-students, including staff, alumni, postdoctoral fellows and their children. The sampling of participants was achieved through non-probability convenience sampling and snowball sampling, so only participants who were willing and available to participate were included. Snowball sampling is non-probability sampling and an alternate to convenience sampling. In snowball sampling, the researcher asks participants to identify other people they may know who fit the inclusion criteria to participate in the study. In this study, I asked participants to tell their friends who also used the CFB about the study. By using these types of sampling I cannot say with confidence that the sample is representative of the population (Creswell, 2012); however, this type of sampling was the best for recruitment due to the sensitivity of the topic and stigma associated with food bank use. Our sample provided useful information for answering the research questions. In total, 59 post-secondary students

participated in the study. Only one participant withdrew from the study, which brought the total to 58 participants.

Inclusion criteria: Post-secondary students at UAlberta who used the CFB during the aforementioned period were included in this study. The study included undergraduate/graduate students, full time/part time students, married/single, with or without children, and domestic/international students.

Exclusion criteria: Non-students, including university staff and alumni, were excluded from this study. There were no exclusion criteria for the participants on the basis of gender or age.

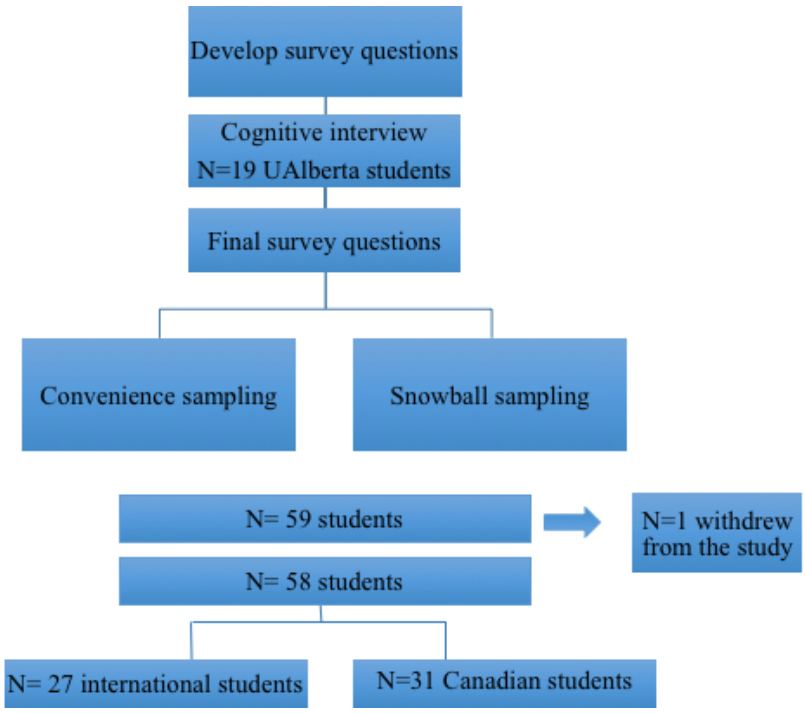

Figure 4.3: Flow diagram of sampling

4.5.2 Recruitment

To recruit participants, another graduate researcher or I was stationed in the CFB during peak hours of CFB usage and introduced the study to new clients, and to clients who came to pick up or order a hamper. Also, the study involved assistance from the volunteers in the CFB. Therefore, I met with CFB volunteers to explain the purpose of study and provided them with the information sheet so they could explain the study to the clients. Also, since every spring the CFB recruits new volunteers, I gave a short presentation to new volunteers about food insecurity and explained the purpose of the study and their role in the study. In order to receive a hamper from the CFB, all new clients need to complete an intake and registration form with a CFB volunteers. When new clients complete the intake form, a CFB volunteer or I asked them if they would like to be contacted about participating in a study concerning food insecurity at the UAlberta. In addition, volunteers or I told clients about the study when they came to pick up their hamper or ordered a hamper. Clients who agreed to participate either contacted us directly or they provided their email address to the volunteers, who recorded this information on the study's contact list. Each client received a brief recruitment pamphlet, indicating the purpose of the study, researchers' contact information and noting the $35 gift card to a grocery store that would be given in return for participation. In addition, a poster was posted at the CFB during the study period. The poster contained the inclusion criteria, purpose of the study and researchers' contact information (See Appendix 5). A phone call or recruitment email was then sent to all those who agreed to participate, to explain the purpose, the procedure, and the benefits of the study, to screen for eligibility, and to determine a convenient time to conduct the interview.

4.5.3 Procedure

Face-to-face structured interviews were held at the UAlberta in a private office within the Edmonton Clinic Heath Academy (ECHA). Another graduate student or I conducted the interview. The interview took less than one hour to complete. At the beginning of the interview, I provided the participants with *information sheets* that clarified the purpose of the study, its procedures, and the risks and benefits of the study (See Appendix 2). Also, an informed *consent form* was filled out to indicate that the client had read the information sheet and was fully aware of the extent of their participation in the study (See Appendix 2). I reminded the participants that their participation was voluntary and they could withdraw from the study at any time, and they may also choose not to answer any of the questions. All participants received a copy of the survey to follow along during the interview (See Appendix 1). During the interview, I asked participants questions about their socio-demographic and educational characteristics, food security status, general health and well-being, impact of food insecurity on academic experience, CFB and food hampers, and coping strategies they used when they ran out of food or money to buy food. The structured interview responses were recorded on paper. After finishing the survey, participants were giving a laptop to complete an online Dietary Screener Questionnaire (DSQ). Participants were compensated for their time with a $35 gift card to a grocery store upon completion of the interview. In addition, $5 was donated to the CFB as a reward for each client who participated in the study.

Recruitment and data collection took place throughout the summer and academic year (April 2013-April 2014). Data were collected to help answer research questions of interest. The interview process was consistent between the data collectors in order to minimize interviewer

bias. The other interviewer and I read the questions exactly as they were worded in the questionnaire and marked the response that the participant chose. I asked the questions in the order in which they were written to avoid making any changes that could affect the answers between participants (Creswell, 2012). Before ending the interview, I reviewed the entire interview and all forms, to ensure that all questions were asked and completed and that the consent form was signed, to avoid missing data or follow-ups with the participant to get the missing information.

4.5.4 Data collection

To address the objectives of this research, a face-to-face structured interview and an online dietary screener were completed by post-secondary students using the CFB. The face-to-face interview is more useful than a self-completed survey as the interviewer can explain any questions that are not clear to participants, or ask for clarifications to responses. Furthermore, closed-ended questions are useful for asking sensitive questions about issues such as food security status because participants may feel more comfortable responding by selecting from a series of options (Creswell, 2012). One of the main concerns related to closed-ended questions is that not every possible response can be listed. Therefore, the response the person wishes to give may not be present. This circumstance was avoided by identifying the most reasonable responses through cognitive interviews to test the questions prior to launching the study. Furthermore, in case the desired response was still not present for everyone, an extra option, *Other please specify*, was added to each question, which gave the participants the opportunity to say the appropriate answer.

4.5.5 Measurement

Demographic Information

The demographic questions were the first part of the survey. Demographic information consisted of fourteen questions, some of which related to age, marital status, number of children, education level, course load, year of program, international student status, whether parents were born in Canada, household characteristics, living condition, whether participants share the cost of food with people living with them, and primary source of income. This information was essential to identify the socio-demographic characteristics of CFB clients and the relationship between socio-demographic characteristics among post-secondary students and food insecurity.

Self-Rated Health and Well-Being Status for Adults

Six validated questions about self-rated health and well-being status were asked. These questions were obtained from the Canadian Community Health Surveys (CCHS) conducted in 2004 and the 2011. Participants were asked to report on their perceived overall health status, mental health, physical health, stress, and life satisfaction based on their own judgment. In addition, participants were asked to rate their sense of social belonging. This question was adopted from the 2011 CCHS (Health Canada, 2007; Statistics Canada, 2012).

Reliance on the Campus Food bank and hampers

Questions concerning food hampers received by student clients of the CFB were asked. The researchers developed these questions to discover information about how heavily CFB users rely on the CFB for food and if the food the CFB distributes was well-received. Also, these

questions identified their experience of the food they received from the CFB. This information could help the CFB to identify the needs of the clients.

I developed three open-ended questions to discover information about how participants learned about the CFB, and what would they do to get food if the CFB did not exist. I used open-ended questions because it allowed participants to respond using their own words and for us to understand more about the issues. Then I scanned through the responses to the open-ended questions to look for common themes and then listed them in major groups of responses and add a numerical code to each response.

Consequences of Food Insecurity on Academic Performance

Closed-ended questions about the consequences of food insecurity with regards to academic performance were asked to identify if there was a relationship between food insecurity among post-secondary students and academic performance (in-house question). Respondents chose all options that applied to them from seven responses.

Measuring Food Insecurity

The Food Security Survey Module (FSSM) is the most recent, validated, and widely-used tool to assess household food security status. It measures both qualitative and quantitative components of food intake in the household. The FSSM have three different version: a 18-item survey for households with children (ten questions are specific to adults; eight questions are specific to children), a 10-item survey for households without children, and a 6-item short form of the survey (Bickel, Nord, Price, Hamilton, & Cook, 2000; United States Department of Agriculture Economic Research Service (USDA), 2015). All of the aforementioned instruments

were developed and tested in the USA, but have been adopted by researchers in other countries, including Canada.

Surveys that measure food insecurity often include quantifying the number of people who are in households even though not everyone in the household may experience food insecurity. For example, if the household includes one or more persons with food insecurity, the household is considered food insecure (Bickel et al., 2000). This is considered a limitation to this measure as it does not measure the condition of all individuals in the household.

To determine a household's level of food insecurity, information needs to be obtained on a range of conditions, experiences, and behaviours that serve as indicators of the different degrees and severity of food insecurity (Bickel et al., 2000). The FSSM has two characteristics that are needed to ensure a high-quality measurement of food insecurity. First, financial limitations should be included within each item; at the end of each question, phrases such as "…because we couldn't afford food" or "…because there wasn't enough money for food" should be included. Second, each question should include a defined timeframe (*e.g.,* over the past year, or the past 30 days). The FSSM includes these types of contextual statements while measuring a number of important constructs related to food insecurity, including lack of financial resources that causes the experience of uncertainty and food depletion, insufficient quality or quantity of food, and reduced food intake and the feeling of hunger. The FSSM is critical for accurately measuring the prevalence of food insecurity and captures degrees of severity in a population (Bickel et al., 2000).

This study used the validated 10-item USDA Adult Food Security Survey Module (AFSSM), which measures qualitative and quantitative compromises in food intake. The advantages of using the 10-item AFSSM compared to the 18-item HFSSM is that there was less

respondent burden because it includes fewer questions, and, it does not ask questions about the food security of children in the household, which is considered a sensitive topic. Additionally, the accuracy of statistics on children's food insecurity depends on the reliability of interview responses by adults, so there is no guarantee that the 18-item scale would have provided accurate information about child food insecurity in a household (Nord & Hanson, 2012).

Despite the strengths of the AFSSM, there are also some limitations to note (Bickel et al., 2000) including, (1) it measures households as a group rather than the condition of individuals in the household. For example, some post-secondary students may live with others, but would not consider themselves as a part of a household, (2) if the household included more than a single person, the scale does not indicate how many or who experienced the condition, (3) it does not measure food safety, nutritional quality of diet, or social acceptability of food, (4) it does not capture other reasons for household food insecurity apart from financial constraints (*e.g.,* individuals' reduced mobility or illness).

Although the AFSSM is usually used to measure food security over the previous 12 months, the time period can be changed to examine adult food security status over the past 30 days, which has also been found to be appropriate for monitoring food insecurity. For this study, questions examining the temporal dimension of food security on the AFSSM were changed from "how many months" to "how many days" (Bickel et al., 2000). Questions to measure the level of student household food security over the previous 30 days were asked. This change was made to reflect the fact that students probably experience serious financial crises at a particular time of the year, which leads them to visit the CFB. Also, students may not have been food insecure throughout the past year, especially if they were living with their parents for part of the year or went back to their home country to visit their family.

Since I interviewed students who may be living with others but may not consider them as a part of a household, I revised some wording of the AFSSM to fit with their living conditions. Thus, instead of the word "you/your household", the word "you/your household or living group" was used for all AFSSM questions. While the AFSSM can be used to measure household food security status, it is limited insofar as it was not designed to assess the food security status of each member of the household, as mentioned above. This could present a problem, considering that some students who access the CFB might live with other students. It is important to note that if one member of the household is food insecure, this does not mean that the entire household is, especially considering that students may not share food or the income with which to purchase food between them.

The survey has two built-in screeners to assess food security status among participants. If clients respond positively to one of the two questions, I continued the interview and asked all of the food security questions. If the participant answers negatively to the questions, I skipped the food security questions and asked the participant the next questions.

The AFSSM asked question about: (1) anxiety that the food budget or food supply may be insufficient to meet essential needs; (2) the experience of running out of food and not have money to get more; (3) the perception that consumed food was inadequate in quality or quantity; (4) adjustments to normal food use, change usual food with fewer foods; (5) instances of reduced food intake, or consequences of reduced intake (*e.g.,* the physical sensation of hunger or loss of weight).

To describe the food security situation experienced by post-secondary students, I used the Health Canada classification method (Health Canada, 2012). Based on the responses to the 10-item AFSSM, specifically the number of affirmative responses, participants were classified into

one of the following three food security categories using the Health Canada scoring method (Health Canada, 2012).

Table 4.2: Food security status

Affirmative responses	Food security status
0-1	Food secure: No problem or anxiety or one indication of food insecurity.
2-5	Moderate food insecurity: Indication of compromise in quality, variety and or quantity of food intake
≥6	Severe food insecurity: Indication of reduced food intake and disrupted eating patterns

Coping Strategies for Food Insecurity

Questions about coping strategies in relation to food insecurity were asked, as they helped provide descriptive information on how students experience food insecurity and how they cope with food insecurity. Some of the coping strategies cited in the questionnaire were taken from strategies reported previously (Rainville & Brink, 2001; Tarasuk, 2001). Also, I created other possible coping strategies that would be particular to students. The coping strategies included the following: get food from a friend or relative, go to a city food bank or emergency food service such as a soup kitchen, purchase food on credit, give up services such as telephone or TV cable, delay bill payments, delay buying text books or university supplies, borrow money for food from friends and family, delay buying books or university supply, sell or pawn possessions, seek employment or work extra hours, and apply for a loan or bursary.

Dietary Screener Questionnaire (DSQ NCI)

After finishing the structured survey, participants received a laptop to complete a web-based form of diet quality questionnaire, which was easy to administer. The National Cancer Institute's (NCI) online Dietary Screener Questionnaire (DSQ) is composed of 26 questions that ask about the frequency of consumption in the previous 30 days of selected foods and drinks. The advantage of this time frame was that it matched the 30-day time frame on the survey used to assess food security status. The NCI developed scoring algorithms to convert screener responses to seven dietary variables: red meat, and processed meat; added sugar; added sugar from sugar-sweetened beverages; whole grain/fiber; dairy/calcium; and fruit, vegetables (excluding French fries), and legumes. Upon completion of this questionnaire, the data were submitted automatically to an online database managed by the National Cancer Institute. (National Cancer Institute, 2014a). A username and password was used to login to the sight to obtain information on the seven dietary variables that had been computed.

4.5.6 Data analysis

Data collected were analyzed using statistical analysis software SPSS 22 (Chicago, IL, USA). Chi-square analysis or the Fisher's exact test were used to compare categorical variables including, socio-demographic characteristics, academic experiences, coping strategies, and health and well-being and between Canadian and international post-secondary students. The Mann-Whitney U test was used to compare continuous variables including dietary intakes between Canadian and international post-secondary students when the dependent variable was

not normally distributed. For all group comparisons, a p-value <0.05 was considered to be statistically significant. DSQ data was analyzed using algorithms and a SAS program provided by the NCI, then imported into SPSS 22 and analyzed for nutritional adequacy.

I coded all the questions with numerical code before entering them in statistical software programs. All the records were labeled with an identification number. In addition, the questions were organized by topic for ease of analysis. Also I checked the data entered for errors before starting to analyze the data. For open-ended questions, I scanned through the questions and looked for common themes and then listed them in major groups of responses and added a numerical code to each response (Bryman et al., 2012).

4.5.7 Validity

During the research process, validity was considered. Validity refers to the degree to which a test measures what it is supposed to measure and it is an important component to establish the truth and authenticity of the study (Creswell, 2012). On the other hand, reliability refers to consistency of results (Creswell, 2012). Validity is more essential than reliability, which means if a study is not valid, it can hardly be reliable. Validity is needed in the study to be able to answer the research question. Though, is better to conduct a study that is both reliable and valid (Creswell, 2012).

A cross-sectional design produces relatively weak internal validity as it does not measure cause and effect, but since the purpose of this study was not to indicate cause and effect between any two variables, it was an appropriate design (Bryman et al., 2012). All the questions used in the interview answered the research questions and objectives. Some questions that were used come from or are adapted from validated questionnaires including the 10-item AFSSM, CCHS,

and DSQ, and all of these are indicated to be reliable measures (Bickel et al., 2000; National Cancer Institute, 2014b: Raat, Bonsel, Essink-Bot, Landgraf, & Gemke, 2002; Statistics Canada, 2012). These questionnaires have been used in diverse populations and a wide range of settings, attesting to the flexibility.

To ensure study validity, face and content validity were assessed. As the study survey was newly developed, face validity was assessed to ensure it reflected the content of the concept in the questions. By using face validity, we looked at each question to see whether "on its face" it looked like a good measure of the concept. Face validity considers the simple way to try to establish validity. Face validity was assessed by using cognitive interviews and testing the questions with 19 UAlberta students; we received and incorporated their feedback before administering the survey to CFB student clients. In addition, the Executive Director of the CFB reviewed the survey questions for suitability (Research Method Knowledge Base, 2006). Content validity refers to the degree to which a measure takes into account all aspects of a specific situation (Bryman et al., 2012). Content validity of the preliminary survey questions was assessed by an assessment of the survey content by consulting two internationally recognized leaders in food security research, Dr. Valerie Tarasuk of the University of Toronto and Dr. Mark Nord of the United States Department of Agriculture. The experts reviewed the questionnaires and provided feedback on appropriate food security questions to use and the order of the questions.

4.5.8 Cognitive interviews

The cognitive interview is an important method to ensure the quality and accuracy of survey tools. Cognitive interviews can improve instruments by identifying sources of error in surveys. Cognitive interviews help to determine how well participants understand survey

questions, and test any revised survey questions and response options (Collins, 2003). After the survey was designed, cognitive interviews were conducted with 19 undergraduate and graduate students at UAlberta. The reason for using an alternative population for the cognitive interviewing is because food insecurity can be a sensitive topic to discuss. I conducted the cognitive interviews using the same data collection proposed for the research study. This helped to identify any limitations of the interview questions and to make sure that the interview questions were understandable to the participants. The feedback that participants provided helped to ensure that the questions had face validity. In addition, the first six CFB participants that I interviewed were considered as external pilots. Based on feedback from the cognitive interview participants during the pretest, data collection tools were revised to make sure that instructions and questions were understandable to all participants and that responses were provided that effectively answer the study's research questions (Creswell, 2012). After finalizing the questionnaire, these tools were used to collect data from the sample included in the study. Carrying out a cognitive interview also gave the novice researcher some practice in interviewing to enhance confidence and technique (Holloway, 1997).

4.6 Qualitative Studies (Papers 3 and 4)

Since quantitative data only includes *how many?* and *how much?* questions, but does little to understand the *how?* and *why?* questions, a qualitative approach was used to explore "the stories behind the numbers" (Mayan, 2009). A qualitative design allows for in-depth knowledge to be gained regarding how food insecurity affects international students' lives and academic performance; this would be difficult to obtain using a quantitative design.

4.6.1 Design

A qualitative descriptive research design was used to understand the experience of food insecurity and interpret how it impacted international post-secondary students (Sandelowski, 2000). The qualitative descriptive study was chosen because straight descriptions and summaries of phenomena are needed (Sandelowski, 2000). This approach required staying closely "with surface of the words and events" (Sandelowski, 2000).

4.6.2 Sample

In quantitative research the aim is to generalize the result to the larger population therefore a large and random sample is preferred to control bias. On the other hand, qualitative research aims to gain an in-depth understanding of the phenomenon of interest therefore bias is a sampling strength (Mayan, 2009). Participants were chosen purposefully. Purposive sampling involves selecting research participants according to the needs of the study to provide rich data on the topic by focusing on the perspectives of those who experienced food insecurity (Mayan, 2009).

Inclusion criteria: To be included in the study, participants had to: (1) be international students without children in their care, (2) be clients of the CFB, (3) have participated in the quantitative survey (quantitative study 2) of this research, (3) be food insecure based on responses to the AFSSM, and (4) have agreed to be contacted for inclusion in future research.

Exclusion criteria: Food secure students, Canadian students, and students with children were excluded from the study. Students with children were excluded from the study because of their unique food security considerations (McIntyre et al., 2003).

4.6.3 Recruitment

Recruitment and data collection occurred between October 2013 and April 2014. Food insecure international students who agreed to be contacted in the future upon completion of the food security survey (quantitative study 2) were recruited for interviews using the email address they provided. The researcher contacted eligible participants sequentially in order of their participation in the quantitative study. In the recruitment email, the qualitative study was explained, and the information sheet and consent form were included as attachments. When participants agreed to participate in the study, the researcher and participants established a date and time to meet. The recruitment continued until interviews reached a point of saturation, the point at which no new categories emerged from the data and further data collection would add little or no additional information, indicating that the number of interviews was sufficient (Mayan, 2009; Strauss & Corbin, 1990).

4.6.4 Procedure

The interview administration took place in a private office within the ECHA at UAlberta. At the beginning of the interview, I explained the purpose, procedure, and risks and benefits of the study. Participants were provided with the *information sheet* containing details of the study (See Appendix 4). The participants were asked to sign a *consent form* indicating that they had read the information sheet, and that they were fully aware of the extent of participation in the study (See Appendix 4). I asked open-ended questions throughout the session. The interview sessions were recorded and I transcribed all interviews for data analysis.

The interview sessions were digitally recorded with the permission of the participants and transcribed verbatim to assist with data analysis. Recording the interview on digital recorder also

allowed me to give the participant my complete attention. I checked all recording equipment before each interview to ensure they were working correctly.

As the qualitative data collection tool was newly developed, the interview questions were pilot tested using cognitive interviews with four graduate students, which helped to find any limitations of the interview questions and understand how participants interpreted and answered each question (Creswell, 2012). I asked students who participated in the cognitive interviews to pay attention to the wording and clarity of the questions. After we finished the interviews, I reviewed each question and asked participants how they understood each question. Also, I paid attention when participants asked for clarification, and made subsequent edits based on this feedback. Based on feedback from the participants during the pretest, revisions were made so that instructions and questions were understandable to the CFB participants to help them provide responses that effectively answer the study's research questions. After finalizing the interview guide, the tool was used to collect data from the sample. I conducted all the interviews and each took approximately 45 to 60 minutes to complete. A sample food hamper was used during interviews to help participants talk about their experience with the food they received from the CFB. Participants were compensated for their time with a $35 grocery store gift card.

4.6.5 Data collection

Data were collected using two approaches – a short survey and a semi-structured interview. Before the interviews began, participants were asked to complete a short survey asking questions regarding demographics, educational characteristics and food security status. The questions were from the longer survey, which was approved in the quantitative study of the research. Then the interview began using a topic guide tailored to international students without

children. The semi-structured interview consisted of open-ended questions that I developed (See Appendix 3). The use of open-ended questions allowed the participants to talk freely in their own words about their situation. Semi-structured individual interviews also allowed the participants to go into greater depth in terms of their self-expression, which allowed me to gain data from the participants according to their own words, thoughts and experiences (Liamputtong, 2009). Topics that were covered during the interview included (1) reasons for using the CFB services, (2) the experience with the CFB hamper, (3) feelings regarding using the CFB service, (4) the influence of food insecurity on academic experience and achievement, (5) coping strategies students used to deal with food shortages and food insecurity, and (6) challenges and barriers to overcome food insecurity. Probing questions were used if needed to gain more specific or in-depth information such as *Can you please tell me more about that?*

4.6.6 Data analysis

Data analysis began immediately after collecting the data. I transcribed verbatim all digitally recorded interviews. I used Microsoft Word and highlighted the text with the colour function. Simple descriptive statistics were derived from responses to the quantitative survey using the statistical software for the Social Sciences SPSS, version 22 (SPSS Inc., Chicago, IL, USA). In keeping with the qualitative descriptive approach, qualitative content analysis was the selected analysis (Sandelowski, 2000). The data collected on the semi-structured interview were analyzed using content analysis by identifying, coding, and categorizing the main patterns in the data. Specifically, conventional content analysis was used, which means I let the categories emerge from the data itself (Hsieh et al., 2005). After I finished transcribing all interviews, I read these transcripts multiple times to increase my familiarity with the data before I started coding. I

started coding phrases that captured similar ideas that emerged among the data. Words and phrases that captured the emerging categories were highlighted. Then, I searched for categories, reviewed categories, defined and named categories and wrote the results. I created a conceptual framework with all categories and sub-categories that emerged from the data (See Appendix 6). Supporting quotes were provided for each category.

4.6.7 Rigour

Rigour is the means by which the research shows integrity and competence (Liamputtong, 2009). In qualitative research, the strength of the study refers to how trustworthy and rigorous the study is. To ensure the rigour and trustworthiness of the findings, several strategies were used to ascertain credibility, transferability, dependability and confirmability (Lincoln & Guba, 1985).

Credibility: Credibility in qualitative researcher is equivalent to the internal validity of quantitative research. Credibility was obtained using many strategies including peer debriefing and prolonged engagement (Holloway, 1997). To ensure content validity, a topic guide was used to make sure that similar questions were discussed with all participants. Also, the topic guide was pilot tested with four graduate students at UAlberta who did not participate in the study, and the questions were adjusted based on their feedback. In addition, since the short survey was adopted from a piloted survey used in the quantitative study, that also added to the credibility of the data. Peer debriefing was practiced in many ways. First, I had regular meetings with my thesis committee and supervisors to review the data coding and analysis progress and to critically review the data and gather feedback. Second, I discussed the emerging categories and findings

with colleagues who were familiar with qualitative research. Third, I presented the findings at research conferences and to students in a seminar course (AFNS 601) at the UAlberta (Long & Johnson, 2000).

Prolonged engagement was achieved by sitting at the CFB every day during peak hours of usage to recruit participants; this persistent presence helped to build trust between me and CFB users. Also, I listened to the recorded interviews repeatedly to familiarise myself with the data. Recording the interviews also added to the credibility of the data collection.

Transferability: Transferability is comparable to external validity in quantitative research (Holloway, 1997). Transferability allows the reader to understand determined categories and decide whether or not the results are transferable to other situations or participants. According to Lincoln & Guba (1985, p. 316), a researcher's goal is to "provide a database that makes transferability judgment possible." To achieve thick description**,** I provided detailed description of methods, data collection and findings so that peers and readers have a clear picture of what happened. Digitally recording the interview sessions allowed for the creation of thick descriptions of the study findings, which assist in the establishment of the criteria of transferability. Also, by using purposive sampling, rich and specific information was obtained (Holloway, 1997). In addition, the researcher included participants' quotations under each category to enable researchers to make decisions about transferability (Lincoln & Guba, 1985). When I presented the findings to students at the *Canadian Nutrition Society Conference*, many students agreed with the finding and experienced "déjà vu" that indicated that my findings are relevant and transferable.

Dependability: Dependability is comparable to the concept of reliability in quantitative research

which means the results must be consistent and accurate, and similar finding would be obtained if the study was repeated (Holloway, 1997). However, given the nature of qualitative studies, even if the study were to be repeated with the same participants, it would not give the same findings and would become as a new study. Replication came through reaching a point of saturation (Mayan, 2009). To ensure the reliability of the transcripts, another graduate student randomly listened to five interview records and compared each one with the accompanying transcript. Also, recording the interview sessions add to the reliability of the findings.

Confirmability: Confirmability refers to objectivity, which ensures that the findings reflect participants' perceptions as presented in the transcripts and do not reflect the researcher's own perception or bias. I enhanced confirmability by digitally recording the interviews and including participants' quotations under each category as evidence that the findings reflect participants' perceptions.

4.7 Ethical Considerations

A research ethics approval was received for each study from the University Research Ethics Board at UAlberta and the CFB Board of Directors and Executive Director of the CFB at the UAlberta. Participant recruitment began after approval had been gained. Potential ethical issues included confidentiality and human dignity.

Confidentiality of participants' data was ensured because data was only reviewed by the research team. All the documents will be stored on a password-protected computer and in a locked filing cabinet at UAlberta for five years, and then the researchers will destroy all the raw data after the documentation is completed. I ensured confidentiality of participants' personal information by not including any identifying information of participants. Instead, all the records

were labeled with an identification number, and the hard copies of the records were kept in a locked cabinet and a password-protected computer file to protect participants' anonymity and confidentiality.

Respect for autonomy means that the participants must be allowed to make independent and informed choices without coercion. This was achieved through informed consent. The consent forms underlined any benefits or possible risks of the study and emphasized that the participant could withdraw from the study at any stage without detriment. (Panel on Research Ethics, 2010).

4.8 Chapter Summary

This multi-method thesis includes three studies. The first two studies were quantitative studies that aimed to characterize student clients of the CFB and compare them with the general population of university students, and examine the association of food security status to indicators of health and well-being, dietary intake, coping strategies and academic performance among both domestic and international post-secondary students receiving food hampers from the CFB at the UAlberta. The third study was the descriptive qualitative study that aimed to explore and understand the experience of food insecurity among food insecure international post-secondary students using the CFB. Using multi-method allows for a complete picture that helped us to understand the problem of food insecurity among post-secondary students.

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CHAPTER 5: Filling a need: Sociodemographic and educational characteristics among student clients using a University-based campus food bank

This manuscript was accepted for publication as a research brief in the *Journal of Hunger and Environmental Nutrition.* The style of the manuscript is according to journal requirements.

ABSTRACT:

Objectives: To characterize student clients of a campus-based food bank (CFB) and compare student clients with the greater population of university students.

Methods: Cross-sectional data from electronic records of students who accessed CFB at University of Alberta (UAlberta).

Results: Most student clients studied full-time (94.4%), lived alone (67.6%), were Canadian (67.0%), undergraduates (66.1%), and female (58.8%). Many (17.3%) had children. Compared to the total UAlberta population, CFB clients were older and more likely to be international, graduate, and full-time students.

Conclusion: CFB student clients are distinct from the general student population and may be at increased risk of food insufficiency.

Keywords: Food bank; food insecurity; food security; students; universities; hunger; Canada

INTRODUCTION

Food security is a basic human right and an important determinant of health. [1,2] It is achieved when there is access "by all people, at all times, to enough food for an active, healthy life and includes at a minimum: a) the availability of adequate healthy and safe foods, and b) the assured ability to get acceptable foods in acceptable ways without relying on emergency food supplies, scavenging, stealing, or other coping strategies". [3] 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". [3] Food insecurity occurs even in countries with relatively strong economies, and reflects personal and household financial insecurity.[2, 4] In Canada, food insecurity is a consequence of three major factors: income, the cost of food, and the cost of non-food essentials such as housing and transportation. [5] Individuals who are food insecure often put the purchasing of food at the end of their priority list [6], a reality that has been described as the "heat or eat dilemma" whereby households spend less money on food and eat less food during times when financial resources are limited. [7]

Post-secondary students are an understudied group that may be vulnerable for food insecurity due to their limited earning potential, high student loans and tuition costs, and high student debt. [8,9,10] Since the cost of post-secondary education can be expensive, many students rely on summer jobs, student loans, family financial aid, borrowing money and working while studying to fund their education. [11,12] In addition to financial constraints, there are other factors that may impact their food insecurity status such as a lack of shopping and budgeting skills. [13]

In response to food insecurity, food banks (also known as food pantries or food depots) have emerged to offer emergency food supplies. Food banks in Canada were originally intended to respond to short-term food requirements and urgent food needs, but they have become a long-

term food source for many individuals and families. [14] In 1991, the first campus food bank (CFB) for post-secondary students in Canada opened at the University of Alberta (UAlberta) in Edmonton, Alberta [15], although there are now many university-based food banks across Canada and the United States. [16,17,18] CFB at the UAlberta is an independent, non-profit organization run by the Students' Union that provides emergency food hampers to campus members including students, staff, and alumni who are in need of food.[15] Over its first decade, the numbers of requests for food hampers and students relying on CFB at the UAlberta increased two-fold.[19] In 2010 alone, 1,200 food hampers containing non-perishable and perishable (when available) food items were distributed containing enough food to feed over 2500 individuals [15]; numbers that highlight the substantial emergency food needs of some UAlberta students. The number of students using the CFB likely underestimates the problem of food insecurity on campus as many food insecure students on campus probably do not use the services of the campus food bank. In Canada, less than one-quarter of food-insecure households use food banks. [20]

Despite the evidence for food insecurity among post-secondary students, there is limited information about the sociodemographic and educational characteristics of students who access food from campus food banks in Canada. The aims of this study were to (1) describe the sociodemographic and educational characteristics of students requesting food hampers from CFB at the UAlberta and (2) compare and contrast CFB student clients' characteristics with the total population of UAlberta students.

METHODS

We completed a cross-sectional review of electronic data collected from clients who registered with the CFB from September 2010 to July 2013. CFB data prior to September 2010 were not available for analysis. All individuals who registered to receive their first food hamper

were required to provide information regarding their sociodemographic and education background, although proof of food insecurity or limited financial means was not required. Sociodemographic characteristics included gender, household type, primary source(s) of income, date of birth, and the birth dates of all individuals living with a CFB client who required food from the hamper. Educational characteristics included level of study (undergraduate or graduate), student nationality (Canadian or international), course load (full-time or part-time), and relationship to the university (student, staff, alumni or postdoctoral fellow). For the purpose of our research, only client information from undergraduate and graduate students was included in analysis. Identifying data including names, phone numbers, and email addresses were removed from the database prior to analysis. Aggregate data on characteristics of the 38,774 UAlberta students enrolled during the 2011-2012 academic year were abstracted from the university's publically-available website. [21] The study was approved by the Board of Directors and Executive Director of CFB at the UAlberta as well as the UAlberta Health Research Ethics Board.

Descriptive statistics were used to characterize sociodemographic and educational characteristics of the student CFB clients. Differences between CFB clients and the total UAlberta student population were tested using Z-tests for two population proportions.[22] For all group comparisons, a p-value <0.05 was considered to be statistically significant. Data were analyzed using SPSS, version 21.0 (Chicago, IL, USA).

RESULTS

In total, 596 individuals registered with CFB at the UAlberta from September 2010 to July 2013. Of these, 568 (95.3%) were post-secondary students; the remainder were a combination of post-doctoral fellows, alumni, and staff. CFB student clients were on average 27.9 ± 8.0 years

old. Most CFB student clients were between 17-25 years old (n=269; 47.4%) and 26-34 years old (n=198; 34.9%). The majority were female (n=334; 58.8%), of Canadian nationality (n=358; 67%), attended school full-time (n=536; 94.4%), and enrolled in undergraduate studies (n=368; 66.1%). Among the 189 graduate student clients, an equal proportion were enrolled in Master's (n=95, 50.3%) and Doctoral (n=94, 49.7%) programs. CFB student clients relied on employment (27.4%; n=153); a student loan or line of credit (24.6%; n=140); a scholarship, bursary or other government support (20.8%; n=118); support of family or friends (16.5%; n=92); savings (6.3%; n=35); and other sources (3.6%; n=20) as their primary sources of income.

Most (n=384; 67.6%) CFB student clients reported living alone, while 32.4% (n=184) were living with others. The average household size of students living with others was 3.0 ± 1.2 persons. Altogether, 17.3% (n=98) of students had at least one child less than 18 years old living with them. Of the 98 students with children (who were on average 7.0 ± 4.5 years old), 42.9% (n=42) had 1 child, 35.7% (n=35) had 2 children, and 21.4% (n=21) had 3 or more children. Among students with children, 74.5% (n=73) were female, 74.2% (n=69) were Canadian, 68.4% (n=67) were living with another adult, and 58.1% (n=54) were undergraduates. Of the 31.6% (n=31) of students with children who were living alone with them, 93.5% (n=29) were female.

When compared to the total UAlberta student population, CFB student clients were older (27.9 vs 23.9 years old; $p<0.05$), more likely to be international students (33% vs 13.7%, $p<0.05$), to attend university full-time (95.7% vs 90.9%, $p<0.05$), and to be enrolled in a graduate program (33.9% vs 19.3%, $p<0.05$). The proportion of females who registered with the CFB to receive a food hamper (58.8%) was not different from the proportion of females in the general UAlberta population (55%) ($p>0.05$). There was no information regarding parenthood in the UAlberta student population to compare with information obtained from CFB student clients

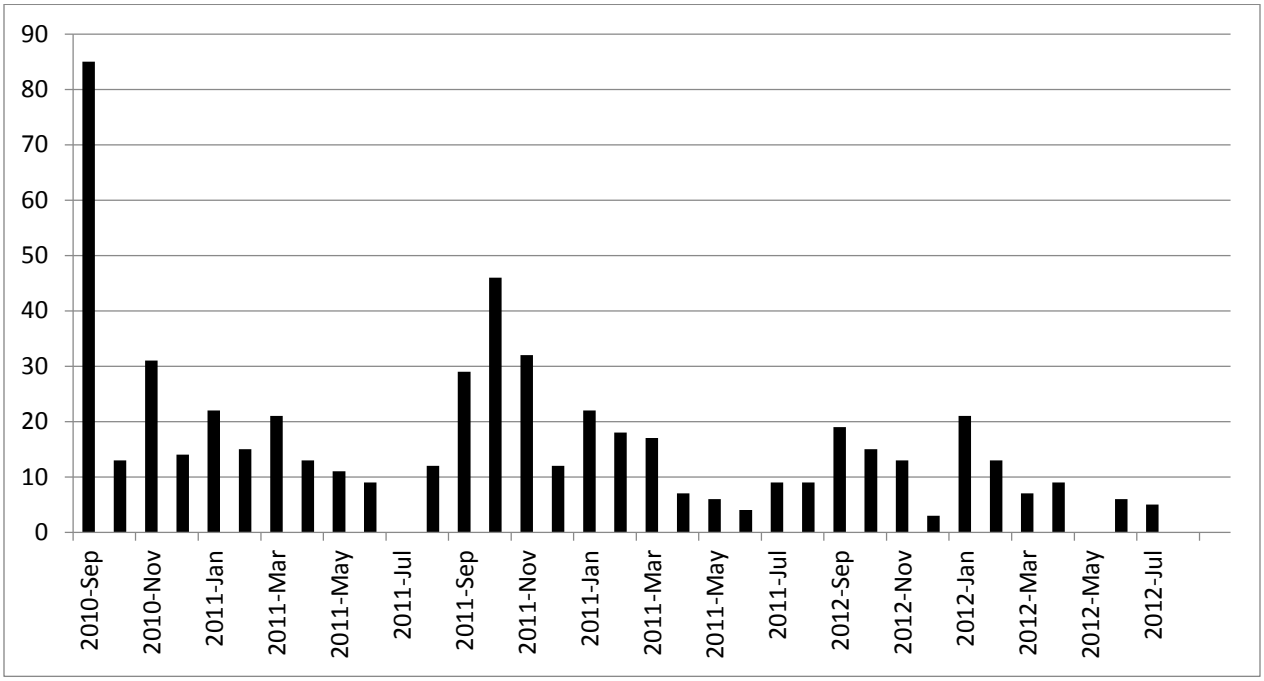
(Table 1).

Table 1: Sociodemographic and educational characteristics of postsecondary student clients of the campus food bank at the University of Alberta compared with the total student population of the University of Alberta

	Campus Food Bank student clients (2010-2013) (n=568)	**Total student population (2011-2012) (n=38,774)**	**P-value**
Age (yr)	27.9	23.9	—
Sex			
Female	58.8%	54.9%	0.06
Male	41.2%	45.1 %	0.06
Citizenship			
Canadian	67%	86.3%	<0.0001
International	33%	13.7%	<0.0001
Level of Study			
Undergraduate Student	66.1%	80.7%	<0.0001
Graduate Student	33.9%	19.3%	<0.0001
Course load			
Full-time	95.7%	90.9%	0.004
Part-time	4.3%	9.1%	0.004

When CFB registration data were viewed based on semester (fall [September to December], winter [January to April], and spring/summer [May to August]), a pattern of need emerged. Most (54.9%, n=312) students registered to receive their first hamper in the fall semester, followed by 32.6% (n=185) in the winter semester, and 12.5% (n=71) in the spring/summer semester. The month with the greatest percentage of new registrants (23.4%) was September (133 of 568 registrations over the three years) (Figure 1).

Figure 1: Number of student clients registering to receive a food hamper from the Campus Food Bank at the University of Alberta (Sep 2010 – Aug 2012)



COMMENT

To our knowledge, this study is the first in Canada or the United States to describe the characteristics of student clients of a food bank located on a post-secondary campus. Our analyses showed that most CFB student clients at UAlberta were female, Canadian, lived alone,

attended school full-time, and were enrolled in undergraduate programs of study. Almost one in five CFB student clients lived with dependent children. Compared to the total UAlberta student population, CFB clients were older and more likely to be an international student, enrolled in a graduate program of study, and attend school full time.

Most CFB students living with children or living alone with children were female. In Canada, single mothers and their children are at higher risk for food insecurity, and its adverse nutritional and health consequences, than households without children or male lone-parent households. [23,24,25] When struggling with limited finances to meet basic needs, food insecure parents are known to protect their children from food deprivation by making compromises to their own food quality or intake. [26,27,28] Thus, students who are also parents or child caregivers may be going hungry to protect their children from hunger or nutritional inadequacy.

In this study we found that the primary sources of income of students using the CFB were employment, student loans or lines of credit, or scholarships and bursaries. The reliance on these income sources by students who are likely food insecure suggests that these sources may have been inadequate to cover monthly expenses. Consistent with this supposition, a study in Oregon indicated that employed students were more likely to experience food insecurity, which suggests that employment does not ensure that students' financial demands of attending university will be met.[12] An earlier study based at UAlberta reported that students dependent on financial aid (*e.g.,* student loans) were unlikely to have adequate money for a healthy and adequate diet.[8] Student income received through government loans or scholarships is often used to pay tuition and other university fees rather than daily expenses.[29]

The majority of CFB student clients at UAlberta were domestic students. In Canada, public funding for post-secondary education has been declining; consequently, tuition increases have

become the pervasive means of funding education, making education unaffordable for many individuals from lower-income families. [30] The finding that CFB students were different from the general student population in several ways implies that specific student groups are vulnerable for food insecurity. International students, in particular, face additional challenges compared to domestic students (e.g., higher tuition costs, cultural differences, lack of familiar food, visa restrictions that limit employment opportunities) [31,32] which can increase the risk of food insecurity. In general, students living away from home who are not receiving family support are more likely to be food insecure [32] and in need of financial support to meet educational and other living expenses. Graduate students were overrepresented among CFB clients compared to the general UAlberta student population. Graduate students may have more risk factors for food insecurity than undergraduate students, including parenthood, accumulated student loan debt, and living independent of their parents.

Most students registered to receive a CFB food hamper in the fall semester, perhaps because students have to pay for tuition, books, and school supplies in addition to paying for rent, food, and other living expenses. Strategies designed to increase awareness of and donations (i.e., food, money, volunteers) to campus food banks may be most useful and valuable if timed to meet the pattern of need among student clients. Food banks however are not the solution to address post-secondary student food insecurity. Rather, policy makers need to establish more effective approaches to reduce its prevalence among students by making appropriate decisions regarding tuition costs, student funding and loan assistance. In addition, universities should offer grocery store tours to students along with sessions on financial management, shopping with a grocery list, and meal planning on a budget.

Limitations

This study has limitations. First, the absence of an objective measure of food security among CFB student clients limits the ability to comment on whether CFB users are really food insecure and in need of food. Second, we did not have control over variables contained in the CFB dataset or the publicly available information on the general UAlberta student population. Useful student information would be income and food security status. Knowing whether UAlberta students have children in their care would allow this subgroup of students who are potentially vulnerable for food insecurity to be identified. Third, the CFB data would benefit from the addition of qualitative data to provide specificity and context.

CONCLUSION

The findings indicate that CFB at the UAlberta serves mainly students, typically a female Canadian who lives on her own and studies at the undergraduate level. Full-time, international and graduate students are overrepresented among users of the CFB. Understanding the characteristics of student clients who use campus food banks may improve the services of food banks and inform service planning and priority setting. Future studies should focus on understanding the food security needs of this highly vulnerable group. Multi-method research is underway at the UAlberta to further understand and contextualize food insecurity among post-secondary students who use the food bank on campus, its causes and related consequences. This body of research will improve our understanding of food insecurity among post-secondary students.

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CHAPTER 6: A descriptive study of food insecurity on a Canadian campus: A comparison between international and domestic postsecondary students

This manuscript was submitted for publication as a short report in the *Canadian Journal of Dietetic Practice and Research* in spring, 2016. The style of the manuscript is according to journal requirements.

Abstract

Purpose: To examine differences in demographics, self-rated mental and physical health, and coping strategies between international and domestic students with food insecurity.

Methods: A cross-sectional study of 58 postsecondary students at a Canadian university, recruited from a convenience sample and with data collected from April 2013 to April 2014 through structured, face-to-face interviews.

Results: Compared to their domestic peers (n=31), international students (n=27) were younger (27.4±5.8 vs. 32.2±9.5 years, p=.03), more likely to pursue graduate studies (73.1% vs. 29.0%; p=.001), and more likely to rate their mental health positively (85.2% vs. 61.3%, p=.04). International students were less likely to ask for food from friends or relatives (48.1% vs. 77.4%, p=.02); or to apply for loans or bursaries (70.4% vs. 90.3%, p=.05) to cope with food insecurity.

Conclusion: Differences between international and domestic students suggest that targeted strategies are needed to mitigate the influence of food insecurity within these two groups.

Key words: food supply, food security, students, university, hunger, health, Canada

INTRODUCTION

Food insecurity, the inadequate or insecure access to food due to financial constraints, may have multiple detrimental effects on postsecondary students' health, nutrition and well-being [1-3]. In Canada, domestic postsecondary students from low- and middle-income households are vulnerable to food insecurity due to high tuition and academic fees [1]. Postsecondary institutions such as universities are seeking to increase enrollment of international students, in part to generate additional revenue through higher international tuition fees. The potential for food insecurity might be even greater among international students studying in Canada because, in relation to their domestic counterparts, international students pay higher tuition fees and have fewer employment opportunities due to restrictions on their student visas that limit employment [4,5]. International students are also ineligible to receive many Canadian federal and provincial scholarships and bursaries to support their education. Similar to refugees and immigrants in Canada, international students also have limited social support and financial resources [4,6] which may limit their ability to cope with food insecurity.

Domestic and international students studying at postsecondary institutions may access emergency food hampers from a food bank located on their campus as one option to cope with food insecurity. In 1991, the first Canadian campus food bank opened at the University of Alberta (UAlberta) in Edmonton. Today, most universities and colleges across Canada have food banks, possibly due to increased financial pressures faced by postsecondary students. The concern regarding food insecurity among international postsecondary students has yet to be well-characterized or understood. With this in mind, the purpose of this brief report was to compare the demographic characteristics, self-rated mental and physical health, diet and food insecurity coping strategies between international and domestic students receiving charitable food

donations from the Campus Food Bank (CFB) at the UAlberta.

METHODS

This cross-sectional study included a convenience sample of postsecondary student clients of the CFB. Participants completed a validated face-to-face survey from April 2013 to April 2014 [7]. It assessed demographic characteristics, food security status using the 10-item USDA Adult Food Security Survey Module, self-reported health and well-being, coping strategies, academic consequences of food insecurity, and diet quality. Chi-square, Fisher's exact test, and Mann-Whitney U test were used to compare differences in responses between domestic and international students. A p-value <0.05 was considered to be statistically significant. Data were analyzed using SPSS, version 22.0 (Chicago, IL, USA). This study received approvals from the UAlberta Research Ethics Board and the CFB Board of Directors and Executive Director.

RESULTS

Fifty-eight students (n=27, 46.6% international; n=31, 53.4% domestic) participated in the study, representing 24.9% of all CFB clients in 2014 (n=233). Among those clients, 37% were international and 63% were domestic students. The prevalence of moderate or severe food insecurity among study participants was 81.4% and 96.8% for international and domestic students, respectively (χ^2=.315, p = .58). Compared to domestic students, international students were younger (27.4±5.8 vs. 32.2±9.5, p=.03) and more likely to be graduate students (73.1% vs. 29%, χ^2= 10.98**,** p=.001) and to report positive self-rated mental health (85.2% vs. 61.3%, χ^2= 4.125**,** p=.04). International students were less likely than their domestic peers to: (*i)* report receiving food from friends or relatives; or *(ii)* apply for a loan or bursary when they did not

have food or money for food (Table 1). While groups did not differ in the academic consequences of food insecurity, more than half of study participants (~55%) reported that insufficient food or money for food prevented them from concentrating in class or during an exam. We did not observe any other differences between the two groups in relation to diet quality, demographic characteristics, self-rated health, or food insecurity coping strategies.

Table 1: Coping strategies used by international and domestic postsecondary student clients of the Campus Food Bank (CFB) at UAlberta when they did not have food or money for food

Coping strategies §	International No. (%) (n=27)	Canadian No. (%) (n=31)	$\chi 2$	p-value
Got food from friends or relatives	13 (48.1)	24 (77.4)	5.35	.02*
Applied for a loan or bursary	19 (70.4)	28 (90.3)	3.74	.05*
Got food from a food bank or emergency food service other than the CFB	5 (18.5)	11(35.5)	2.08	.15*
Purchased food using a credit card	19 (70.4)	26 (83.9)	1.51	.22*
Delayed bill payments	15 (55.6)	20 (64.5)	.48	.49*
Sought employment or worked more hours	23 (85.2)	25 (80.6)	-	.74†
Borrowed money for food from a friend or relative	15 (55.6)	16 (51.6)	.09	.76*
Delayed buying university supplies or not	20 (74.1)	24 (77.4)	.09	.77*

buying them				
Gave up services such as telephone or TV	13 (48.1)	16 (51.6)	.07	.79*
Sold or pawned possessions	11 (40.7)	13 (41.9)	.01	.93*

§ Total percentages exceeds 100% because participants chose as many options as applied to them

*p-value based on $\chi 2$

†p-value based on Fisher's exact test

DISCUSSION

Our results showed that most study participants who sought charitable food donations from a food bank on a Canadian campus were moderately or severely food insecure, regardless of whether they were international or domestic students. A majority of students in both groups perceived that food insecurity had a negative influence on their academic performance. Individuals living in food insecure households are prone to a variety of health conditions, including emotional distress and depression [3]. International students were more likely to self-report positive mental health compared to their Canadian peers despite being as food insecure as their domestic counterparts. Approximately 15% of international students and 39% of domestic students considered their mental health as less than positive. International students might not have recognized that they had a mental health problem; might have been better protected from poor mental health for reasons that have yet to be determined; or might have chosen not to report their perceptions of their negative mental health. Some cultures have negative attitudes regarding symptoms of psychopathology and stigmatize mental health problems, thereby preventing their disclosure [8].

Consistent with limited existing evidence [9], our findings corroborate that postsecondary

students apply various coping strategies to deal with inadequate food or money for food. To our knowledge, we are the first to document differences in coping strategies between international and domestic students living with food insecurity. We showed that international students were less likely to request food from friends or relatives to alleviate their food insecurity, which might be due, at least in part, to the geographical distance between students and their home family and social networks [6]. Canadian government loans and bursaries are available only to domestic citizens or permanent residents [10], so international students were limited in their potential sources of supplemental income.

Limitations of the study include the cross-sectional design, which precludes making causal inferences about study findings. In addition, some characteristics of the sample differed from the general population of UAlberta CFB users, as participants were more likely to be graduate and international students than the general CFB student clientele [7]. A better representation of the general population of CFB users could have been achieved with a larger sample size; however, it was a challenge to recruit more participants, likely due to the stigma surrounding food insecurity.

CONCLUSIONS

The differences in demographic characteristics and coping strategies between international and domestic students suggest that targeted approaches are needed to address food insecurity within each group. As limited data are available on how best to address food insecurity in postsecondary students, there is value in conducting community-based participatory research with relevant stakeholders (*e.g.,* students, community leaders, food bank staff, university administrators) to develop, implement, and evaluate approaches designed to reduce food

insecurity. Future research should investigate the reasons behind positive self-rated mental health reported by international postsecondary students compared to domestic postsecondary students. Lastly, longitudinal research is needed to examine temporal trends in food insecurity and determine whether the impact of food insecurity has short- and/or long-term effects on health and academic outcomes in postsecondary students.

COMPLIANCE WITH ETHICAL STANDARDS

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

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CHAPTER 7: Exploring the reasons for using a campus food bank service and the coping strategies used by food insecure international post-secondary students

Abstract

Semi-structured interviews were conducted with eleven international (non-domestic) students studying at a Canadian university, who were food insecure, to understand their experiences with food insecurity, the campus food bank they accessed, and food insecurity coping strategies. Reasons for food insecurity were high fixed and non-fixed expenses, including tuition fees and food costs, along with credit debt, and inadequate bursaries/scholarships. Negative feelings about accessing the food bank included embarrassment, hesitancy, and fear. For some students, the food they received from the campus food bank was culturally inappropriate. To help cope with food insecurity, students used income, food management strategies and social and community support. Some coping strategies likely compromised students' nutritional status and exacerbated food insecurity. Limited financial resources played a dominant role in international students' motivations to access the food bank. Increased financial assistance and/or reduced education-related expenses are required to mitigate food insecurity in this student group.

Keywords

Coping and adaptation; nutrition / malnutrition; poverty; stigma; young adults

Food insecurity, the inadequate or insecure access to food because of financial constraints, is associated with multiple detrimental effects on health and well-being (Tarasuk, Mitchell, & Dachner, 2014). In Canada, domestic students from low- and middle-income households are increasingly vulnerable to food insecurity because of their limited earning potential, high student loans, tuition fees, and student debt (Canadian Federation of Students, 2013; Willows, 2006; Shaker & Macdonald, 2014). International students, namely, foreign students who hold a permit to study in Canada, might also be at risk for food insecurity because of high international tuition fees combined with student visa restrictions that limit employment opportunities (Baruch, Budhwar, & Khatri, 2007; Davis, 2010). Although tuition fees for international students are lower in Canada compared to the UK, Australia, New Zealand and the USA, the cost of a post-secondary education in Canada is approximately three times higher for international students than for domestic students (Education au/in Canada, 2013).

Food insecure individuals use various coping strategies to reduce the impact of food insecurity and to acquire food when they do not have enough food or money to buy food (Maxwell & Caldwell, 2008; Tarasuk, 2001). One approach to cope with food insecurity that international students studying in Canada might use is to access support from a food bank. Charitable agencies such as food banks that distribute free emergency food relief to individuals and families in need (Tarasuk, Dachner, Hamelin, et al., 2014) have become increasingly common on postsecondary campuses in Canada and the United States for reasons that are not fully understood (Cunningham, & Johnson, 2011; College and university food bank alliance, n.d.; Ferguson, 2004). Food banks have limited potential to resolve student food insecurity because they do not address the major underlying problem, student poverty (Tarasuk, et al., 2014).

Few Canadian studies have been conducted to examine the issue of food insecurity among international students. The food security concerns of international postsecondary students in Canada need exploration considering that in 2014 the International Education Strategy of the Federal Government of Canada announced a plan to attract more international students (Hamdullahpur, 2014). International students are perhaps more likely than domestic students to seek food aid. For example, the proportion of international student clients accessing the food bank at the University of Alberta in Canada is high compared to their presence in the general student population at this campus. Indeed, 33% of food bank clients are international students compared to 13.7% of the overall student body at the University of Alberta (Hanbazaza, in press). In a sample of international student clients with documented food insecurity studying at a Canadian university, we qualitatively investigated the reasons for accessing the food bank located on the campus, experiences and perceptions of food bank services, and strategies for coping with food insecurity.

Methods

Campus Food Bank Society

The food bank located at the university is a charitable organization operated by the Students' Union. It accepts donations of food, cash and toiletries and provides free emergency food hampers to students, staff, and alumni in need of food; however, users can request a food hamper no more than once every two weeks. Hampers include a combination of non-perishable and perishable foods sufficient to last about 4 days, based on the available food inventory.

Study Design

We conducted a descriptive qualitative study to provide a description of the phenomenon of food

insecurity among international students requesting food hampers from the food bank on the Canadian campus where they were studying (Sandelowski, 2000). The Board of Directors and Executive Director of the food bank as well as the University's Health Research Ethics Board approved the study.

Participants

Recruitment and data collection occurred from October 2013 to April 2014. Purposive sampling was used to focus on the perspectives of those with rich data on the topic (Mayan, 2009). To be included in the study, participants had to be (1) international students without children in their care, (2) clients of the campus food bank, and (3) from a food insecure household based on responses to the validated Adult Food Security Survey Module (United States Department of Agriculture, n.d.). Students with children were excluded because of their unique food security considerations (McIntyre et al., 2003). During a preceding phase of this research, students indicated their willingness to participate in an in-depth interview about food security. The first author (HM) contacted eligible participants using their email address. Informed written consent was obtained prior to data collection and participants were compensated for their time with a $35 (Canadian dollars) gift card to a local grocery store.

Data Collection

A semi-structured interview guide consisting of open-ended questions was developed to query participants on a range of topics, including (1) reasons for using the campus food bank services, (2) feelings about using the campus food bank, (3) experiences with the food hamper they received from the campus food bank, (4) coping strategies students used to deal with food insecurity, (5) influence of food insecurity on academic experience and achievement, and (6)

challenges and barriers to overcome food insecurity. Data collected from six questions covering topics 1 – 4 are reported herein. The interview guide was pilot tested using cognitive interviews (n=4) with graduate-level trainees, to refine questions for content and clarity.

HM conducted the interviews in a private setting, which included collecting demographic and educational data from participants for descriptive purposes. Interviews lasted 45-60 minutes and were recorded digitally. A sample of non-perishable foods typically found in food hampers was present during interviews to help participants talk about the hampers. Participants were recruited until data saturation was reached, i.e., the point at which no new categories emerged from the data and additional data collection would add little or no additional information, indicating that the number of interviews was sufficient (Creswell, 2012; Walker, 2012).

Data Analysis

MH transcribed all interviews verbatim. To ensure reliability of transcription, a second researcher compared a subset of transcripts (n=5) to the original recordings. MH used conventional content analysis to allow the categories to emerge from the data (Hsieh & Shannon, 2005). To enhance validity, a second researcher reviewed the coded transcripts and the categories. Final categories were developed and confirmed after discussions among team members.

Results

Participant Characteristics

In total, 11 international students, 8 females and 3 males, with an average age of 24.5 years (range 18 to 33 years) participated in the interviews. All students were studying full-time. The primary sources of income for the majority of participants were student assistantships (36.4%)

and family funds (36.4%). Participants were predominantly enrolled in graduate studies (54.5%), single (not married or co-habiting with a partner) (81.8%), and lived with others (63.6%). Among those living with others, (71.4%) lived with someone other than a family member or relative, and (57.1%) shared the cost of food or meals with household members.

Categories

Categories that emerged from responses to the six questions used to explore the four topics of interest are described below. Questions, categories and quotes exemplifying each category are shown in Table 1.

Table 1: Categories and Exemplar Quotes of Food Insecure International Postsecondary Students' (n=11) Regarding Perceptions and Experiences Related to Food Insecurity and Using a Food Bank Located on the Campus in Canada Where They Were Studying

Question asked of participant	Category	Sample Quotes
Q1. Think of the first time that you went to the campus food bank, what happened in your life that made you decide to ask for food from the campus food bank?	Reaction to a current financial crisis	*"The money that we got from the university it is not enough to cover everything. I think the rent is expensive so the money was not enough to cover everything like rent, food…"*
	Buffering against a future financial crisis	*"I thought as an important or additional source of food regarding a lot of stuff that we*

		received you don't have to buy these stuff at the supermarket."
Q2. Can you describe your feelings about getting food from the campus food bank?	Positive feelings	*"I feel totally fine and I am so thankful to all these people who found it this food bank because its real help for anybody struggling like me."*
	Negative feelings	*"I was kind of shy, embarrassed and afraid because in my country usually only you can ask for food when you are really poor..."*
Q3. How did the food hamper you received help you to get enough food to eat? Q4. If the hamper did not provide enough to eat, please tell me why not? Q5. Do you feel that the food in the hamper is culturally appropriate for you? Please explain why or why not?	Food quality	*"I like their vegetables and fruits. Usually they are fresh but sometimes they expire really fast like you got them see today and by Monday they are expired which is about two to three days."*
	Food quantity	*"The hamper provide less fresh food with green stuff or vegetables…"*
	Cultural appropriateness	*"It not necessarily it kind of*

		foods I am used to eating, it is different…"
Q6. Apart from using the campus food bank, what do you do if you run out of food or money to buy food?	Non-food income management strategies	*"Just trying to make everything fitting to your budget"*
	Food income management strategies	*"I was in a strict budget. like I would say ok I am spending $30 per week for food"*
	Food management behaviours	*"I used to skip the breakfast sometime because I did not have like anything to eat for the morning"*
	Social support	*"When I go to my friends house they have giving me the noodles and pasta"*
	Community support	*"Sometime, I would go to the church"*

Topic - Reasons for using the campus food bank services

(1) Reactions to a financial crisis. Almost all (n=10) respondents indicated that they used the food bank for the first time in response to a serious financial crisis that left them with insufficient money to buy enough food. A wide range of circumstances caused the financial crisis including lack of funding to support their education, lack of financial support from family, high fixed (e.g., tuition fees) and non-fixed (e.g., food) expenses, high financial debt, and other expenses (e.g.,

credit card debt). Students discussed how a financial crisis coupled with limited earning potential prevented them from covering their daily expenses.

A student explained that she had substantial credit card debt and the teaching assistantship she received was not enough to cover high international student tuition fees, rent and food. She explained how living away from her family was difficult, as she needed to depend on herself for everything.

> I am on a really tight budget this year. Basically, I have a really big credit debt and I have to pay my rent and my teaching assistantship is not enough to cover all my expenses. . . . Being international students you are more insecure about the money. You are more tight in the budget and you are by yourself and you don't have family here most of the time and when you are an international student as I said you want to eat this and you want to buy this food but just simply you cannot afford it. When like you do teaching assistantship you get so little money or because you have to pay tuitions fees and for international students I mean we pay a lot more than Canadian students so basically the main problem is that funding it's not enough to cover all these expenses, you have all this bills to pay and what do you have left? (Participant # 5)

(2) Buffering against a future financial crisis. Two students used the food bank services to buffer against a potential future financial crisis that would leave them without money to buy food. For these students, the food provided by the food bank was used as a cost-saving strategy to reduce their grocery bills. For example, a participant stated: "My family financial support is not that much, so I decided to spend less on my living expense so I started using the campus food bank." (Participant #9)

Topic – Feelings about using the campus food bank

(1) Positive feelings. Six participants had positive feelings about receiving food hampers. They considered the food bank to be "a life saver" and they felt "relief", "thankful", "not worried" and "happy" at having received hampers considering that they would have been hungry without them. The feelings of one student were representative of several others:

> Relief. I can say that for sure. Because again they are making me feel better or helping me in a way that one of my biggest concern here food is no longer concern. So I feel really relief when I heard about that then I could take advantage of that. I went to the campus food bank and I got really happy like they really change my life in a way. (Participant #4)

(2) Negative feelings. Using the food bank was a difficult decision for five participants who had negative feelings about receiving charity. Participants reported feeling "embarrassed", "shy", "hesitant", and "afraid." Students described the embarrassment they had to overcome in having others see them with food hampers, which indicated that they were poor. For example, a participant stated:

> Sometimes I feel a little bit embarrassing but it's not that bad. Sometimes when there is a lot of people in [the location of the food bank on the campus is not identified to maintain anonymity of location] when you bring lot of foods to go through the lobby and people were realize you are getting food from the food bank. You probably you are the poor person or poor students. (Participant #9)

Of the five students who were initially embarrassed about using the food bank, two indicated that once they overcame their initial reluctance to ask for food, they felt "*fine*" with getting it:

". . . but when I am bringing the food back home, is kind of I think is happy, so it is like I have food enough for two weeks so I don't have to worry about that (laughing)." (Participant #11) and "but then I found a lot of actually students do this and it is completely normal." (Participant #10)

Topic – Experiences with the food hamper

(1) Food quality. Participants had different opinions regarding the perceived nutritional quality of food hampers. Five participants mentioned that the food bank on campus did not provide meat and dairy products, which students thought were important to provide. Four participants thought that they received a variety of perishable food that they enjoyed eating, whereas five participants thought that the quality of the perishable food was low, many items "expire really fast" or "usually last few days because they are really close to the expiration date." For non-perishable foods, five participants mentioned that the food had a long expiration date and "it lasts for long time", whereas three participants mentioned it contained "a lot of preservatives", was "limited in variety", "does not contain lots of vitamins" and "it's not healthy."

(2) Food quantity. Participants had differing opinions regarding whether the quantity of food in the hampers was sufficient. Eight participants mentioned that the hampers did not contain enough food and that they needed to supplement the hampers with groceries. Two participants mentioned that the perishable food was not enough, whereas one participant thought that the non-perishable food was not enough. For example, a participant stated:

> The food bank provides with enough food so you can go twice per month which I think it is fine they also give cans that last more and also perishable. They usually last few days because they are really close to the expiration date but ya if you use the cans as well they last definitely for two weeks. Usually you have to buy but not everything. It covers like good

proportion but you have to buy as well. (Participant #3)

(3) Cultural appropriateness. Three participants mentioned that the foods they received in hampers were similar to the foods they consumed in their own country, so they perceived them to be appropriate and acceptable. Four participants mentioned that the food was different than the food they consumed back home, did not taste good, and they did not know how to prepare it. Four students mentioned that perishable food was culturally appropriate and "it's pretty much what they used to eat", but the nonperishable food was culturally inappropriate. For instance:

> Well I don't really eat a lot of tin food back home . . . but I think it is pretty much the same in terms of the ingredient so it is acceptable . . . you are not accustomed to them. The taste and also not knowing how to prepare it also. (Participant #1)

Unfamiliar foods were eaten, given back, or thrown in the trash, as demonstrated in the following quote:

> I think not (not appropriate), because for example the tomato sauce the cans tomato sauce is really different the taste is totally different from the tomato sauce that we often use in my country. Because the tomato sauce here is kind of sweet but also sour which it is weird. So honestly I cannot use the tomato sauce that is provided by the campus food bank. . . . Sometime I have a problem with cheese some type of cheese here so fat. Is so fat that I cannot eat it and it has weird smell [referring to packaged macaroni and cheese]. (Participant #11)

Topic - Strategies to cope with insufficient food or money to purchase food

(1) Non-food income management strategies. Ten participants used non-food management strategies to economize so that their money lasted longer, including budgeting, paying for

expenses with credit cards, working extra hours, and applying for bursaries. Eight students mentioned budgeting as a way to cope with food insecurity. One student described their experience: "It has been really tough for me to deal with the situation and I have to budget a lot. I have cut out a lot of things or cut down on many essential things just to make both ends meet." (Participant #5) Another student reported using a credit card as a way to cope with food insecurity: "I have credit card so I use credit card. Actually first four years I just lived on credit card because I did not have money." (Participant #10) Another student reported working extra hours to cope with food insecurity: "I have started working more this semester. Like last year I just had one job, now I have two, but it is really hard to juggle but I mean you gonna do what you gonna do." (Participant #7) A student reported applying for bursaries at the university as a coping strategy: "For me as international students I am applying for bursary and I have to provide some proof that I am out of money." (Participant #6)

(2) Food income management strategies. Ten participants used food management strategies to ensure they had enough food to eat including buying food on sale, buying only essential food items, buying more canned food, buying cheaper food, buying in bulk, and shopping at discount supermarkets. A student mentioned:

> What I have done before is go shopping with stuff in sale to buy as much as possible. To buy tons of the same kind of food, which is easy to save, so I will keep it for a long time. . . . We often choose the cheaper food rather than the healthier food. (Participant #9)

Another student mentioned shopping at a discount grocery store:

> I always do my grocery things in Superstore. . . . So usually when I buy meat I go to Superstore and I have like the meat on deal so they have like 30% off and usually I go for

those one and when they don't have any then I just I get something else." (Participant #4)

(3) Food management behaviours. Ten participants reported changing their eating patterns when they did not have enough to eat by compromising either food quantity or quality. Strategies included eating more canned food, lowering their intake of nutritious foods, skipping meals, eating less preferred foods, reducing perishable food intake, and reducing the amounts of food they consumed. One student explained:

> For food, I skip my meals and then I see what I could do . . . even like when I get old bread I eat those sometimes; I would say because this is the cheap once. . . . I skip my milk sometime a month or two months because I don't have money. (Participant #6)

Another student mentioned restricting food intake:

> I am eating a lot less than I used to, a lot less and don't know I really need to have breakfast, like I am sort of person who cannot leave her house without breakfast but this semester there not been happening. . . . Just to cut short I guess to save enough for next time . . . it just like now instead of having a proper lunch, I just eat like two or three pieces of fruits and like with yogurt or something instead of lunch. I just skip lunch and eat fruits and whatever. Is just filling instead of like having full meal. So that way like save on food. (Participant #7)

(4) Social support. Five participants reported asking for money or food to manage their financial crisis from their social network, which included family "Sometimes I used to call my husband before he came" or "I would call my dad to send me some cash", or friends "I just try to go for a friend house" or "some of my friends with parents they send me some food."

(5) Community support. Other than using the food bank on campus, to ameliorate food insecurity four participants sought help from places of worship, charitable organizations in the community such as the municipal food bank in the city where the university was located, or ate free food at events around campus. For example, one student stated:

> Sometimes even I used [name of city where university is located] food bank. So whatever I get from there I take it. Of course I am always looking for free food options like someone given around campus or someone in the church because some people they give food and stuff. (Participant #6)

Discussion

To our knowledge, this Canadian study is unique in exploring food insecurity among international postsecondary students using a food bank located on a university campus. Our research among international student clients of a food bank located on a Canadian campus highlights the reasons that led international students to request food hampers, their experiences and perceptions of the food bank and food hampers, and the strategies that they used to cope with food insecurity. Among our participants, insufficient income to meet the high costs of obtaining an education outside their country of origin was the predominant reason for their food insecurity. The financial hardship that international students experienced had many causes including not receiving financial support from the foreign institution where they were studying, paying high international tuition fees and living expenses, credit card debt, and family funding or graduate student assistantships which were inadequate to cover the costs of their education.

International students studying in Canada have limited opportunities for employment to meet education costs. They are allowed to work full-time during breaks in the school schedule, but are

restricted to working no more than 20 hours per week during a regular academic session (Justice Laws Website, n.d.), a limitation that can exacerbate financial pressures and might only be offset partially by supplemental sources of income (e.g., scholarships, bursaries). Although Canadian universities are keen to raise international student enrolment on campus (Hamdullahpur, 2014), few organizations offer financial support to international students on arrival (Puxley, 2010). The high tuition fees paid by international students can make them feel as if they are being used as "cash cows" to provide for university infrastructure (Laucius & Barber, 2009) potentially leading to disillusionment about why they are being recruited.

One strategy that students in Canada and the United States use to cope with food insecurity is to access the services of a food bank located on the campus where they are studying. Food banks are unable to address both domestic and international student food insecurity for multiple reasons. The donor-driven nature of food banks determines the quantity and nutritional quality of food available for distribution (Irwin, Ng, Rush, Nguyen, & He, 2007; Tarasuk et al., 2014). Food banks accept food donations that cannot be sold by retailers (*e.g.,* expired food) and which clients might consider unacceptable (Teron & Tarasuk, 1999). A study found that one of the reasons that food insecure individuals might not use municipal food banks is that the food they receive is not suitable and does not meet their dietary requirements (Loopstra & Tarasuk, 2012). In our study, some participants reported on the low perceived variety, quality and quantity of food they received in food hampers. For some participants in our study, preparing culturally-familiar dishes was a challenge given the food they received. It is unlikely that food hampers can be customized to meet the food preferences of a multicultural student clientele that requires religious or ethnic foods.

The campus food bank where international student participants of the present study received

their food hampers has limited food availability. Despite efforts by the food bank to ensure that hampers adhere to minimum nutrition standards based on recommendations from Eating Well with Canada's Food Guide for healthy eating, the nature of food donations means that hampers obtained from food banks might not meet students' nutritional needs (Jessri, Abedi, Wong, & Eslamian, 2014; Willows, 2006). This raises a concern regarding the dietary intakes of students reliant on food banks. A recent study suggested that Registered Dietitians have a role to play in training staff at food banks in planning healthier hamper menus (Jessri, 2014). Given the inconsistent nature of donated food, this training might not result in much improvement in the nutritional quality of hampers.

In Canada, there is a stigma associated with food bank usage (Tarasuk & MacLean,1990) which might explain why almost a quarter (24%) of food hampers that had been requested in 2014 by student clients of one food bank located on a Canadian campus were not picked up (Campus Food Bank: Hunger for knowledge, not food, 2014). The negative feelings associated with food bank use among international students in the present study such as embarrassment are similar to the negative feelings of food bank clients elsewhere (Parry, Williams, Sefton, & Haddad, 2014). Our findings indicate that there is a perceived social stigma among international students surrounding food bank use.

Coping strategies other than accessing the food bank that international students with food insecurity in our study used ranged in severity. Some students indicated that they skipped meals and reduced their intake of more expensive perishable foods which could compromise students' health and well-being (Kirkpatrick & Tarasuk, 2008). Other strategies used by students such as buying food with credit cards could make food insecurity more severe. The multiple strategies used by students to cope with food insecurity in addition to requesting food hampers highlights

the ineffectiveness of food banks to resolve food insecurity, and the need for programs and services other than food banks to alleviate students' food insecurity.

Our study was not without limitations. For example, although our participants varied in age and nationality, more research is required to explore international postsecondary students' experiences with food insecurity, especially with respect to gender differences and variability within and between ethnicities and cultures. Participants self-selected to participate, so their experiences might have differed from their peers who declined to participate in the study perhaps because of the stigma and shame they might have felt about using the food bank on the campus where they were studying.

Implications for Community Health

Financial hardship was the key underlying reason for why international postsecondary students in our study requested food hampers from the food bank on the campus where they were studying. Our findings raise doubts about the capacity of campus food banks to respond to the needs of international students who seek their services as the result of food insecurity considering that the food provided is limited in both quantity and quality and might be culturally inappropriate. Furthermore, food charity has the potential to undermine a students' dignity and does not address the underlying causes of food insecurity. In addition, if the number of international students with food insecurity continues to increase because of enhanced recruitment programs, the demand for food charity will likely exceed what can be supplied. Thus, any actions to expand food bank activity at postsecondary institutions needs to be accompanied by measures to evaluate the impact of these agencies on the problem of student food insecurity that they are intended to address.

Supplemental funding and nutrition education programs are required to ensure the food

security of international students, and to prevent international students from feeling disappointed, unfulfilled and exploited by universities and colleges that do not address their unique financial needs (Sherry, Thomas, & Chui, 2010). The results of this study offer insights into ways policy makers on- and off-campuses might support international postsecondary students to be food secure. Universities could consider regulating international student fees, increasing financial resources and teaching assistantships for international students, and lowering rental costs for international student housing. Professors and faculties could consider covering the partial cost of tuition fees for international students. It is important that universities design nutrition education interventions to help students to develop and increase skills to use their financial and food resources effectively to lower the burden of food insecurity. Interventions could include grocery stores tours and meal planning lessons about budgeting, comparing prices, using saving coupons, and shopping with a grocery list, many of which have been proven effective in decreasing food insecurity among low income families (Dollahite, Olson, & Scott-Pierce, 2003). Although it would be of value to educate clients on how to consume a healthful diet with a limited budget, it would be more useful to ensure students have an adequate income.

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CHAPTER 8: "I am always thinking about food": Understanding the consequences of food insecurity and barriers to food security among international students using a campus food bank

This manuscript was submitted as a research article to the *Journal of Immigrant & Refugee Studies*. The style of the manuscript is according to journal requirements.

Abstract

Students who move from their home country to pursue higher education in a foreign country may endure food insecurity. Semi-structured interviews with eleven international postsecondary students studying in Canada explored students' perceived outcomes of food insecurity, and barriers to achieving food security. Transcripts were analyzed using conventional content analysis. Food insecurity created hunger and anxiety in students, which negatively influenced students' academic performance and well-being. Barriers to food security included time constraints and a lack of family financial support, employment, awareness of services/resources, and culturally appropriate foods. Students studying abroad need assured access to sufficient quantities of culturally appropriate food.

Key words: Universities; Students; Food Insecurity; Health; Hunger; Canada; Qualitative Research

Introduction

Attending university or college is a period of life when food insecurity may become an issue for young adults who are experiencing financial stress as a result of education costs (*e.g.,* tuition and compulsory fees) and living expenses (*e.g.,* rent and food) (Davis, 2010; Hughes, Serebryanikova, Donaldson, & Leveritt, 2011). Compared to domestic students, the potential for food insecurity may be greater among international (that is, non-domestic) postsecondary students who have moved from their home country to pursue higher education abroad. The numerous additional challenges to achieving financial food security that they face include having difficulty finding affordably priced food, adjusting to a new culture, experiencing a lack of familiarity with public services, and facing visa restrictions that limit employment opportunities (Booth & Smith, 2001; Chaparro, Zaghloul, Holck, & Dobbs, 2009; Davis, 2010; Gallegos, Ramsey, & Ong, 2014; Kim, 2001). Unlike refugees or immigrants, many international students plan to go back to their home countries after they have finished their education. However, during their temporary stay in the foreign country where they are studying, international students need services that will ensure their optimal health and academic performance such as reducing barriers to food security.

Postsecondary students in Canada and the United States attending university or college can access free emergency food relief from charitable agencies such as food banks (pantries) to cope with food insecurity (Cunningham, & Johnson, 2011; Ferguson, 2004). Unfortunately, food banks have limited potential to resolve student food insecurity since they do not address poverty, the underlying issue that leads to food insecurity (Tarasuk et al., 2014). To date, limited research has been conducted to understand food insecurity among postsecondary students in general and international students in particular. Our research group has conducted studies in Canada to

understand the issue of food insecurity among postsecondary students (Farahbakhsh, Ball, Farmer, Maximova, Hanbazaza, & Willows, 2015a). The research verifies that food insecurity has the potential to negatively affect academic outcomes (Hughes et al., 2011; Maroto, Snelling, & Link, 2015). Recently, using a cross-sectional survey of students using a campus food bank to obtain emergency food hampers, we found that issues related to coping with food insecurity among international students differed from domestic students as international students have fewer strategies to cope with food insecurity (Hanbazaza, Ball, Farmer, Maximova, & Willows, 2015). The present qualitative study contributes to our previous work to explore food insecurity in international postsecondary students. Specifically, we aimed to achieve a better understanding of *(i)* the perceptions of the consequences of food insecurity on students' academic performance and well-being, and *(ii)* the non-financial barriers and challenges international postsecondary students face to overcoming food insecurity.

Methods

Study Design

This study focused on international students seeking emergency food hampers from the Campus Food Bank Society (CFB) at the University of Alberta (UAlberta) in Edmonton, Alberta, Canada. To achieve our objectives, we conducted a descriptive qualitative study to provide a straightforward, literal description of the phenomenon of food insecurity among international students using the CFB (Sandelowski, 2000). Our study was approved by the Board of Directors and Executive Director of the CFB as well as the UAlberta Health Research Ethics Board.

Participants

Purposive sampling was used to provide data on the perspectives of international students

who experienced food insecurity (Creswell, 2012). Within an existing quantitative study (Farahbakhsh, Ball, Farmer, Maximova, Hanbazaza, & Willows, 2015b), a subset of international students indicated their willingness to participate in in-depth interviews about their experiences with food insecurity. To be included in the study, participants had to (*i*) be international students without children in their care, (*ii*) have requested and received emergency food relief from the CFB, and (*iii*) have been confirmed as food insecure using the USDA 10-item Adult Food Security Survey Module (United States Department of Agriculture, 2015). Potential participants were contacted by email. Students with children in their care were excluded because of the unique food security considerations experienced by families with children (McIntyre et al., 2003).

Data Collection

Between October 2013 and April 2014, one researcher (MH) met all participants individually in a private setting on UAlberta campus. Informed written consent was obtained from each study participant. A semi-structured interview guide consisting of open-ended questions was developed to allow participants to describe their experiences with food insecurity in their own words. At the beginning of the individual interview, demographic and educational data were collected for descriptive purposes. Qualitative interview questions were created based on a review of the literature and consultation with individuals with expertise in food insecurity. Consistent with recommendations (Creswell, 2012), the interview guide was pilot tested using cognitive interviews with four graduate students; with subsequent minor wording edits and refinements to optimize clarity and understanding.

The interview guide consisted of questions on topics related to *(i)* reasons for using the CFB services, *(ii)* feelings about using the CFB, *(iii)* experiences with the food hamper, *(iv)*

coping strategies students used to deal with food insecurity, *(v)* the consequences of food insecurity on academic experiences and achievement, and *(vi)* non-financial challenges and barriers to overcoming food insecurity. Herein, we report a subset of data related to food insecurity among international postsecondary students derived from the following questions:

- *Describe to me how a lack of food, or money to buy food, has influenced the quality of your university experience, including your ability to study?*
- *As an international student, what are some of the challenges you face regarding obtaining adequate food?*
- *What are some of the challenges you face regarding obtaining culturally appropriate food?*
- *What is your biggest barrier to eating the types of foods that you want?*

Probing questions and prompts were used when necessary to encourage participants to provide more in-depth responses to the questions. Interviews lasted 45-60 minutes and were digitally recorded. Participants were compensated for their time with a CAD $35 gift card to a local grocery store. Participants were recruited until data saturation was reached; data were analyzed until the point at which no new categories were emerging from the data and further data collection would add little or no additional information, indicating that the number of interviews was sufficient (Creswell, 2012).

Data Analysis

Descriptive statistics were calculated from responses to educational and demographic questions. MH transcribed all interviews verbatim. To ensure reliability of transcription, a second researcher compared a subset of transcripts (n=5) to the original recordings. Conventional content analysis was used by MH to analyze the data, which meant letting the categories emerge

from the data itself (Hsieh & Shannon, 2005). Words and phrases that captured the emerging categories were highlighted. To enhance validity, a second researcher reviewed the coded transcripts and the categories. Final categories were developed and confirmed after discussions among team members. Supporting quotes were provided for each category and sub-category.

Results

In total, 11 international students (8 females and 3 males) with an average age of 24.5 years (range: 18 to 33 years) participated in the study. Participants were full-time students from Asian (n=6) and non-Asian (n=5) countries. Participants were predominantly enrolled in graduate studies (n=6), single (not married or co-habiting with a partner; n=9), and living with others (n=7). Among those living with others, most (n=5) lived with someone other than a family member or relative, and (n=4) shared the cost of food or meals. The primary sources of income for participants were student assistantships (n=4) or family funds (n=4).

Table 1 shows the categories and sub-categories that emerged from questions related to the consequences of and barriers related to overcoming food insecurity. In terms of consequences of food insecurity, two sub-categories emerged: *(i)* perceived academic performance and *(ii)* negative well-being. In terms of barriers to overcoming food insecurity, two sub-categories emerged: *(i)* non-financial barriers and *(ii)* barriers to sourcing culturally appropriate food.

Table 1. Categories, sub-categories, and sample quotes from international postsecondary students' with food insecurity (n=11) about the consequences of and barriers to overcoming food insecurity

Categories	**Sub-Categories**	**Sample Quotes**
Consequence: Perceived Academic Performance	No impact on academic performance	*"So far just being over a month I have not really faced such a great challenge, not knowing if it won't be happened down the road so far. It had not really affected my whole university study and stuff in a negative way."(#1)*
	Negative impact on academic performance	*"When I don't have enough money to buy food or the food are all fresh not to bring to school or eat it as a snack, I feel while I get hungry I cannot concentrate to study I also get very impatient sometimes a little bit angry while I am in class and that distract me a lot . . . When I get hungry sometimes in class I feel like I want to get out of the class but not happen during exam because I will be worry enough. So I have to eat a lot to concentrate and study."(#9)*
Consequence: Perceived Negative Well-being	Mental well-being	*"I am always thinking about food that you know, I have foods for the week or for tomorrow or for breakfast what I am gonna do for breakfast?. . . and you know its extra stress for you to deal with." (#5)*
	Physical well-being	*". . . as you are not eating prober food so you don't feel energy you don't feel to work." (#6)*
	Social well-being	*"You don't feel to go and socialize with people because you don't have energy. . ."(#6)*
Barrier: Non-financial Factors	Lack of time	*"Sometime less of time, because you are studying as well to cook because for my country to cook some food it takes also time. For example, to cook appropriate soup as borscht you have to spend like two hours. Once you are studying it is too much time because you are studying 24 hours a day."(#10)*

	Lack of family support	*"Challenges as international student, I would say you don't really have much relatives and friends when you run out you could go to. The lack of family support." (#1)*
	Limited information about services, resources, and food	*"I was doing some grocery shopping in Lucky Seven in Chinatown and it is not cheap at all. But then I heard one student talking with the other about Superstore. So I was ok where the hell is Superstore? I Google it and I search. . . how to get the pressure cook, what is the price. . . and after I got money and would know where to buy? Again it was a challenges because I had to learn how to get there."(#4)*
	Un/under-employment	*"I would have to work more to make more money. With that it is even harder because you need work permit to work off campus."(#8)*
Barrier: Sourcing Culturally Appropriate Foods	Affordability	*"The food in here is more expensive than in my country. The culturally appropriate food and the seafood is more expensive than in my country." (#11)*
	Availability	*"I can't find [cultural] food or proper meal or food that I used to have it from where I belong in* [*country of origin*]. [*Country of origin*] *is like different city, have different culture. So where I used to belong we have different culture different food which is totally different even from the [cultural] food they call it here. So like there is no single restaurant have the kind of my food."(#6)*
	Accessibility	*"Just distance of travel to get the food I want. It is really far away. Like usually I have to go to Mill Woods or somewhere to get culturally appropriate food and that really take time. It takes the whole day, you have to change two buses and go there and come*

		back change two buses."(#7)
	Acceptability	*"Like the food does not taste like the food back home. Even though they are fresh, the perishables they are fresh but it does not have that natural taste like home. And like in terms of the meat products if you do purchase them here they don't really taste like how they taste back home." (#2)*
	No barriers	*"It's pretty much the same food that I used to have in my country so there is nothing that bother me with the food in Canada." (#3)*

Consequence of Food Insecurity: Perceived Academic Performance

Negative Impact on Perceived Academic Performance: Nine students mentioned that lack of food or money to purchase food had a negative influence on their ability to concentrate on their schoolwork, write assignments, attend class, and attend midterm exams, sometimes because of extreme food deprivation. A student stated: *"Like I would say my university experience not going so good. . . . I don't know, I have withdrawn from a course I don't know how indirectly or directly affected like the food or something like affected. Yes, I had stress and stuff, I did not go to my midterm [exam] time and then a final [exam] was coming in and at that time I had withdraw from the course because I was aware that I will fail that course. I used to starving for food sometimes and I cannot concentrate. . . . and as you are not eating proper food . . . so you don't feel to study." (#6)*

No Impact on Perceived Academic Performance: Only two students mentioned that lack of food or money to purchase food had not influenced their academic performance or prevented them from studying. For these students, the food that they received from the CFB prevented their

academic performance from being negatively impacted by hunger, or by anxiety about not having enough food. A student stated: *"Thanks goodness I got the food bank things pretty early in my university life so food was an issue for first month worst case scenario, and then I heard about the food bank and then it became back normal. So they help me to not go through this situation which is pretty good." (#4)*

Consequences of Food Insecurity: Negative Well-being

Mental Well-being: Seven participants reported that not having enough food or money to purchase food had negative psychological impacts such as "*angry*", "*stress*", "*worry*", "*impatience*" and "*anxiety*". Feeling hungry contributed to stress. One student reported: *". . . I also have to worry tomorrow what I am going to eat and what time I am going to cook and I have to plan everything and the thing is getting worse when I don't have any food. . . . I keep worrying oh what I am going to eat for tomorrow, like for 2 weeks what I am going to eat like I am starving."(#11)*

Physical Well-being: Two participants reported that severe food deprivation negatively affected their physical well-being. Being hungry was associated with physical symptoms such as feeling really weak, cold and lacking energy. One participant put it this way: *"If I am gonna go hungry, if I have small portion of food for lunch or dinner at that moment I might feel ok. It is not a big deal. In one hour I am gonna start feel hungry, I am gonna start feel cold. Sometimes usually my feet my foot gets cold so that basically sign of losing temperature because there is not enough sugar in your blood." (#8)*

Social Well-being: One student indicated that food insecurity prevented her from engaging in

daily social activities including interactions with her friends. *"You don't feel to go and socialize with people because you don't have energy . . ." (#6)*

Barriers to Overcoming Food Insecurity: Non-financial

Participants reported numerous non-financial barriers and challenges to becoming food secure. In order of frequency of responses, these were a lack of time; lack of family support; not familiar with public services, resources and food; and lack of employment.

Lack of Time: Time limitations were a barrier to food security for nine participants. University life changed students' eating behavior. Students spent most of their time at the university attending classes and studying and they juggled their time between these activities and cooking. Participants mentioned that because they were enrolled fulltime at university they often found it difficult to have the time to prepare healthy meals or cultural meals. Participants reported that when time is a barrier, they reduced the quality of foods they consumed. As stated by a student: *"For me it was difficult at the beginning because my school was really busy and there was not enough time even to cook so usually cook something really fast or make a sandwich and take it for lunch."(#3)*

Lack of Family Support: Six participants reported challenges related to living away from their family, being away from familiar routines and home comforts, not having parents nearby to assist them financially, and trying to be financially independent. Students described challenges related to independently managing decisions about how much time to spend on studying, grocery shopping and cooking. Here are two different examples: *"There is no one here for us like no parents, no family members so we cannot expect like you know prepared food coming from home or something. You know how to make it do it, if you don't have time don't make it, we just by*

ourselves."(#6). "I used to live with my parents and I did not have any income back then as a student but now that I live alone, I am worry." (#3)

Limited Information about Services, Resources, and Food: Three participants reported that they were unaware of numerous services and resources available to support them. A student stated: *"I would say as international student I would say not aware of other sources that may be offered to resident [Canadian citizen] so it may also not be able to access those because we are not resident so as also another factor."(#1)*. Participants reported a lack of awareness of food availability and where to get ethnic food in the city. One participant mentioned that unfamiliarity with diverse foods in Canada and their ingredients prevented her from buying them and eating them: *"I guess also some like the name on the box or cover we don't even know what that is and we are afraid of buying it and get home and realized I could not eat them at all."(#9)*

Un-/Under-employment: Two students mentioned that finding a job was a barrier to achieving food security. They faced challenges in finding a job in Canada related to being an international student. Their student visa restrictions limited where and how much they could work, and jobs prioritized Canadian citizenship. For example: *"Most of the time I was trying to find some opportunity to get some money like to work somewhere but unfortunately as an international student, it is very hard to find some job even as a waitress it is hard. . . .I have been looking this year but again as international student, it is very hard to find something because first they accept [Canadian] citizenship and primary resident."(#10)*

Barriers to Overcoming Food Insecurity: Sourcing Culturally Appropriate Foods

Most students (n=9) reported various barriers that prevented them from acquiring cultural food on a regular basis including lack of availability, affordability, accessibility, and acceptability. Finding cultural food in Edmonton was more of a challenge for students from non-European countries. Some students who mentioned that they were willing to try new foods had more flexibility regarding the type of food they would purchase.

Affordability: Nine participants reported that even if they found culturally acceptable and preferred food, they could not afford them. They found the price of cultural foods to be more expensive than in their home country. A student mentioned: *"Because of scarcity then it also affects the price so you find it more expensive than say the normal food on sale so. I would say it is a challenge to get access to the food that you are accustom to at the price that is affordable."(#1)*

Some specialty food items such as halal food appropriate for Muslims were considered expensive. One participant mentioned that their religious dietary practices influenced the foods that they ate and that the price of halal food was a barrier to their consumption. *"Definitely getting the food of my culture like it is hard because groceries are really expensive to get the kind of food I need. . . .if I want I don't know like a special kind of vegetables which comes in from my home country, it's really expensive but if I buy the same thing cans here like from a grocery store here its much cheaper but it is not as healthy because it has all these preservative in there and ya. So it is more expensive for sure. . . . and like even halal chicken for let say halal chicken so much more expensive than regular chicken and I like to stick to that so ya that like cost more money, consume more money."(#7)*

Availability: Eight participants found it challenging to find the culturally appropriate foods that they are accustomed to in regular grocery stores. A student stated: *"I could not find the food that I am accustomed to even in the farmer market, even there it is not available, you may find some of the stuff at the Chinese market, you find some of the stuff there but it's not widely available in the local supermarket. . . . For example say fish and chicken foot what else they have there and green banana and a lot of stuff that has the taste that I am accustom to you more find it in Chinese store than say in American supermarket."(#1)*

Accessibility: Two participants considered the cold weather in winter as a barrier that prevented them from purchasing food whenever they needed it. Physical inaccessibility to grocery stores and restaurants with cultural food was a barrier for many participants because of the distance and time required to get to them. Eight participants found it difficult to easily access cultural food at ethnic grocery stores which were far from participants' residences and therefore inaccessible without a car or using public transit. A graduate student stated: *"Accessibility is not really easy, you have to go all the way train, buses to go south Edmonton or West Edmonton Mall [*one of the world's largest shopping and entertainment complexes, approximately 10 km from UAlberta by car or 30 minutes by public transit] *or all the way to Clareview [*major transit centre, approximately 25 minutes by Light Rail Transit from UAlberta*] so it's not easy accessible."(#1)*

Acceptability: Five participants reported that quality, taste, and smell of foods available in Edmonton are different from food in their home countries. Taste was an important factor that influenced student's food choices and led some of them to reject local foods. Two examples included: *"Ah, well coming from the* [country of origin]*, I would say the foods right here is not, I*

mean . . . I miss some of the food that I am accustom to back home not necessary food but the way it has been prepared, the spices, and other sauces but here you don't really find you don't get the same taste . . . that the main challenge is just the taste of the food. Depending on how some food taste, you may not want to eat it and that would affect the amount that you eat." (#1)

"I think the Canadian eat a lot cheese and butter and some sauce I never heard of it and I feel very disgusting sometime. And they are already include it in the food I bought, it has the flavour and spices so I have to eat the food because its already there. . . . Even they have the Asian food like rice or noodle or spices sauce is not Asian spice or Asian rice is just not right when you buy them its really expensive, and when you buy them expect the taste is the same as back home but is just different even they want benefit us but when I bought it taste really different." (#9)

No Barriers: Five participants reported no barriers to finding culturally acceptable food. For example: *"What I can find in* [country of origin] *I can also find it here and maybe because it's more not like its exotic, it's more like we have kind of European food so ya basically its available here. May some others products you cannot find it here but other than that there is no problem to find or to make* [country of origin] *food with the ingredients available." (#5)*

One student had expanded their food preferences and tastes to include western foods, so did not miss eating cultural foods. *"I am not really restricted to the culture. I have adopted a really multicultural as a result of living in different country. As well as in Canada itself. So ya I don't face any kind of problems regarding finding cultural food. There is no cultural food. I enjoy eating everything. ... I don't know it is not a big challenge no."(#8)*

Discussion

In our study, we found that food insecurity had a negative influence on perceptions of academic performance and well-being in international postsecondary students studying at a Canadian university who were food insecure and required the services of a food bank located on campus. We also found that barriers, including non-financial issues and difficulties in sourcing culturally appropriate foods, affected students' ability to be food secure. Our results demonstrated the impact of food insecurity on the lives of international postsecondary students studying in Canada and the imperative to help them achieve food security while studying abroad.

Food insecurity has been shown to compromise students' academic performance and experience. For instance, in school aged children, food insecurity is associated with behavioural and attention problems, school absences and lateness, low math and reading scores, grade repetition, and school suspension (Jyoti, Frongillo, & Jones, 2005). College students with food insecurity are more likely to have lower grades than their food secure peers (Maroto et al., 2015). A previous report from our group (Farahbakhsh et al., 2015a) showed that postsecondary students with severe food insecurity at UAlberta reported an inability to concentrate in class and study for exams; they also reported challenges regarding failing or withdrawing from courses. Among food insecure international students in the present study, insufficient income for food also negatively affected their academic performance and achievement. Students reported an inability to concentrate on their schoolwork, write assignments, or attend class lectures or exams because of hunger or anxiety about their lack of food. Conceivably, this diminished academic experience may lead to reduced international student retention rates.

Postsecondary students with severe food insecurity are more likely to report sub-optimal overall health, and mental health in particular, than food secure students (Farahbakhsh et al., 2015a; Patton-López, López-Cevallos, Cancel-Tirado, & Vazquez, 2014). Our study indicated that food insecurity had negative physical and psychosocial impacts on the lives of international students. Students reported that a lack of financial resources created psychological suffering in the form of stress and anxiety, potentially exacerbating anxiety about their studies. In the present study, students additionally reported weariness and diminished body temperature because of hunger as well as anger arising from feelings of starvation. Studies in low income households have also found evidence that food insecurity is associated with stress, depression, anxiety and weakness (Whitaker, Phillips, & Orzol, 2006; Willows, Veugelers, Raine, & Kuhle, 2011). Our findings highlight the reality that food insecurity is not only about food, but is also about the negative physical and psychological consequences that result from striving to achieve food security.

Food insecurity led to social isolation within our sample of international students. Feelings of of hunger and lassitude prevented students from socially engaging with others, and promoted their social exclusion. Similarly, in Canada, Aboriginal adults in food insecure households were more likely to have a very weak sense of community belonging compared with their counterparts in food-secure households (Willows et al., 2011). There is a positive association between social networks and health outcomes (Berkman, Glass, Brissette, & Seeman, 2000) suggesting that the social isolation brought about by food insecurity might be detrimental to the health of international students.

We identified non-financial barriers to food security among international students, which included a lack of time for food preparation, an observation that others have reported. For

instance, a previous study of university and college students found that a lack of time for grocery shopping and food preparation was an important factor that negatively affected students' eating practices, and that students would rather spend time on other activities than cooking (Deliens, Clarys, De Bourdeaudhuij, & Deforche, 2014). Living away from home, family, and friends was a barrier to food security among participants in the present study. This reality required them to become fully responsible for their food choices, which led many of them to change their eating habits. Others have reported that university students living away from home consumed fewer home cooked meals, more convenience foods, and less fruit and vegetables compared to students living at home (Papadaki, Hondros, Scott, & Kapsokefalou, 2007). Also, students living with parents, relatives or a spouse tend to spend less on accommodation, which can increase the proportion of their income that is spent on food (Chaparro et al., 2009), suggesting that living independently away from family is linked with food insecurity among international students.

Other barriers to food security mentioned by participants were visa restrictions on employment and difficulty finding a job. In Canada, visa regulations stipulate that only full-time international students with a study permit can work. Such students can work full-time during school breaks, but are restricted to working no more than 20 hours per week during a regular academic session without the need to apply for a separate work permit (ICEF Monitor, 2014). From a practical perspective, our interviews suggest that loosening employment restrictions on student visas might help some international students to achieve food security by permitting them to work more hours while attending university.

Lack of awareness of support programs and food resources is an established barrier to accessing food among recent immigrants to Canada (Vahabi & Damba, 2013), and our results further corroborate this. One of the strategies used by postsecondary schools to help international

students adapt to a new environment includes creating local networks and services. For instance, at UAberta, international students have access to programs to learn about Canadian food culture, receive information about internationalization opportunities, and to provide financial, intercultural and interpersonal support that might help to enable food security. Based on our interviews, it appeared that many students were unaware of these services at our institution, so it is likely that additional efforts are needed to promote and advertise such resources.

An important aspect of food security is securing preferences for religious, cultural and ethnic foods (Pinstrup-Andersen, 2009). Many factors influenced students' decisions to preserve familiar diets including time, budget, convenience and taste preferences, which are shaped by cultural and religious identities (Horacek & Betts, 1998). International students in the present study mentioned these factors in relation to culturally appropriate foods as a barrier to achieving food security; however, students of European origin had less trouble accessing culturally familiar foods than students from other geographic location. Students adapted to eating commonly available foods, some with better success, or travelled long distances to obtain cultural foods. To address food insecurity among international students, it is therefore not only important to reduce hunger, but also to reduce hunger in a way that people can consume the foods they prefer, instead of being limited to eating less preferred foods due to a lack of choice (Pinstrup-Andersen, 2009; Power, & Dietitians of Canada, 2005).

The study was not without limitations. While our semi-structured interviews provided rich information about participants' lived experiences with food insecurity, the small number of participants does not allow us to generalize our findings beyond the study sample. Also, our participants varied in age and nationality, and more research is required to explore gender

differences, and variability within and between ethnicities and cultures in relation to food insecurity among international postsecondary students.

Conclusion

The findings of our study generate the first evidence about the experience of food insecurity among international students studying at a Canadian university. Along with the negative consequences of food insecurity on academic studies and well-being, international students faced a variety of non-financial barriers to achieving food security. Some of these barriers appear feasible to address. Locally, UAlberta provides support services for international students; however, these services were either not known, accessed or viewed as useful to international students in our study. Universities should consider focusing on the needs and concerns of international students and carefully plan to help them adapt to new environments. In addition, it is incumbent upon institutions to raise students' awareness regarding available services. These endeavours can help to reduce international students' stress and prevent them from experiencing food insecurity. Additional research on how food insecurity influences objective indicators of academic performance and health in international students is needed to inform policy decisions.

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CHAPTER 9: SUMMARY

9.1 Overview of Findings

Conducted from 2012 to 2015, my dissertation research included three complementary studies that examined and explored food insecurity among post-secondary students at UAlberta. In **Study 1**, I analyzed cross-sectional data to describe the characteristics of 568 clients who received food hampers from the CFB between 2010 and 2013. The results showed that the majority of CFB clients were full-time undergraduate students, of Canadian nationality, female, and living alone. About 20% of CFB student clients during this time period lived with dependent children. The primary sources of income for student clients of the CFB were employment, student loans or lines of credit, or scholarships and bursaries; however, the fact that students had accessed the CFB suggested that these sources were inadequate to cover daily expenses. The greatest need for food hampers was during the fall semester, which coincided with a time of major academic expenses including tuition, books and non-instructional fees. Graduate and international students were overrepresented in the population of clients compared to the general population of UAlberta students, highlighting the need for the CFB within these sub-groups.

Next, in **Study 2**, I conducted a cross-sectional, quantitative survey of post-secondary students using the services of the CFB in 2013– 2014 to determine their food security status as well as to compare and contrast issues related to food insecurity between international and Canadian students. In total, 58 students participated in this study (n=27 international; n=31 Canadian), which represented ~20% of the population of student clients served annually by the CFB. Most international and Canadian students were either moderately or severely food insecure. Compared to Canadians, international students were younger and a greater proportion was studying at the graduate level. International students were more likely to rate their mental

health positively than Canadian students. Compared to Canadian students, international students applied fewer strategies to cope with food insecurity; they were less likely to ask for food from friends or relatives or to apply for loans or bursaries. These data revealed a number of differences between international and Canadian students regarding food insecurity; in particular, their experiences with food insecurity and how they tried to manage living with a lack of financial resources differed in several ways.

Subsequent to study 2, I developed and completed (from 2013 – 2014) **Study 3**, a qualitative study of international post-secondary students with food insecurity. I conducted semi-structured qualitative interviews with 11 international post-secondary students with food insecurity who participated in Study 2. Participants reported that their financial hardship was the result of a lack of financial support from UAlberta, the high cost of tuition and living expenses, credit card debt, and funding from their family or graduate student assistantships that failed to cover the costs of their education. Apart from financial challenges, students described many barriers and challenges that affected their food security status, including a lack of time, lack of employment, cultural barriers, lack of family support, and being unaware of available services and resources to help address food insecurity. Finding local sources of cultural foods was a challenge for many students, the result of a lack of availability, affordability, and accessibility of these foods. In addition, there was a lack of acceptability of common local foods.

Students reported different feelings regarding the use of the CFB; some students reported positive feelings regarding its use, but others reported negative feelings, which likely reflected, at least in part, the social stigma associated with food bank use. Participants reported that the food they received from the CFB was limited in variety and low in quality, although the CFB aspired to meet dietary recommendations from Eating Well with Canada's Food Guide. Also, the food

hampers were not culturally appropriate for some students. It is unlikely that food hampers can be customized to meet the food preferences of a multicultural student clientele who require religious or ethnic foods.

Several students reported that food insecurity had a negative impact on their academic performance, physical health, mental health, and well-being. The few students who reported no impact of food insecurity on their academic performance had learned about the CFB services before their situation worsened, and the food they received from the CFB prevented their academic performance from being negatively impacted by hunger, or by anxiety about not having enough food. Participants reported that not having enough food or money to purchase food had psychological (*e.g.,* stress, anxiety) and physical (*e.g.,* weakness) consequences. Feelings of hunger and lassitude prevented students from socially engaging with others.

Besides using the CFB services, participants reported a number of coping strategies to deal with insufficient money to buy food or insufficient food, including non-food income management strategies, food income management strategies, food management behaviours, social support, and community support. Strategies ranged in severity. For instance, skipping meals and not eating perishable foods could compromise students' health and well-being, whereas budgeting, using credit cards to buy food, buying less expensive food, or receiving help from family or friends would not have as detrimental an effect on health. Considering that credit card debt was a cause of food insecurity, using credit cards to purchase food likely increased the severity of food insecurity for students who used this coping strategy, or prevented them from being able to achieve food security.

9.2 Significance of Findings

This thesis is novel because it begins to fill a knowledge gap about food insecurity among post-secondary students which has not been fully understood until recently. Until now, no studies have examined food insecurity among post-secondary students using food banks in Canada. Therefore, the findings of the three studies that comprised my dissertation provided foundational information and insights into food insecurity, a relevant issue that is increasingly influencing the health, well-being, and academic achievement of post-secondary students. The findings could help researchers understand why some students have experienced food insecurity. In addition, they can serve as baseline data for future interventions to help prevent food insecurity among post-secondary students.

Food insecurity among post-secondary students appears to be increasing based on the rise in food bank use; therefore, finding a solution to improve food security among post-secondary students should be a priority among policy makers and post-secondary institutions. This research offers policy makers and post-secondary institutions knowledge of the experiences of food insecurity among post-secondary students; it is my hope that these data will raise awareness of the impact of food insecurity on campus and enable effective solutions that can be informed by subsequent research. Also, these findings should be useful to the CFB, as they can help this organization to better meet the food needs of its student clients.

The qualitative research will help UAlberta administrators to understand the challenges that international post-secondary students face to being food secure, and the barriers that they face to overcoming food insecurity when they are studying in Canada. It may also help UAlberta administrators to understand the types of information that they should provide and make more available to international students to ensure their financial security. This research could be used

by UAlberta administrators to develop policies to increase accessibility and availability of cultural food on campus.

9.3 Research Strengths and Limitations

As with any dissertation, there were a number of strengths and limitations to this body of research that are worth noting. As for strengths, the first positive attribute included the multi-method approach. The quantitative survey provided valuable information about the prevalence of food insecurity and the association between food insecurity, self-reported health and well-being, diet, coping strategies and academic performance among students who used the CFB. The additional qualitative aspect provided valuable insight into understanding the problem of food insecurity among international post-secondary students. The information gained from the semi-structured individual qualitative interview could not be gained from quantitative studies. Therefore, using multiple-methods provided a better picture of food insecurity than could be achieved using a single method (Creswell, 2012). Second, this study is the first in Canada to describe the characteristics of student clients of a food bank located on a campus, and to examine the prevalence and the consequences of food insecurity among these post-secondary student clients. Third, to our knowledge, this research is one of the first to compare the sociodemographic characteristics of food insecure domestic and international students, as well as to compare the outcomes of food insecurity between these two groups.

As for the limitations of my research, there are a number to acknowledge. First, all quantitative data collected were cross-sectional, which means that causal relationships among variables could not be established. Second, the use of a self-selected convenience sampling made it difficult to generalize our findings to all post-secondary student clients of the CFB as students

who did not participate may have had different experiences or characteristics. The majority of participants were female, which also limited generalizability. Third, data were self-reported, which increases response bias. This is a concern because the findings are subject to recall and may result in the reporting of inaccurate results. In addition, we did not collect information on annual income and place of residence, which are considered important factors related to food insecurity because insufficient income is a key determinant of food insecurity and place of residence is associated with food insecurity in the general population (Che & Chen, 2001; Chaparro et al., 2009; Gonzales & Gould, 2013; Health Canada, 2007). Lastly, given issues related to stigma and shame associated with being food insecure and using the CFB, CFB clients might not have been comfortable participating in a study about food insecurity or talking about their experiences with it, which contributed to the small sample size and insufficient power to detect statistical differences in study 2. Despite these limitations, this research highlights the need for future studies and represents a first step toward better understanding food insecurity among post-secondary students.

9.4 Recommendations

Interventions and programs to help reduce food insecurity among post-secondary students are needed. There are a number of recommendations that can be made based on this research.

Recommendations for policy makers

Reducing the cost of tuition and compulsory fees

Government and post-secondary institutions should find solutions to the issues of high tuition and compulsory fees. These need to be lowered so that students from low- and middle-income families do not have to financially struggle to obtain a post-secondary education. Post-

secondary institutions should consider regulating increases in tuition fees for both domestic and international students. The rise in average tuition fees over recent years in Canada is due to substantial changes in the funding of post-secondary education; students are required to pay more for their education while the government pays less (Schwartz & Finnie, 2002). More specifically, between 1989 and 2009, the average tuition fees for both universities and colleges more than doubled from 10% to 21%, whereas government funding for post-secondary education decreased over this same timeframe from 72% to 55% (Luong, 2010). In Canada, the average annual tuition fee increased from $1,464 in 1990-1991 to $6,348 in 2012-2013. If current trends persist, tuition is expected to increase to an average of $7,437/year by 2016-2017 (Habib, 2013). Increasing tuition fees have likely led to an increasing number of students requiring student loans, a reality that has implications for food insecurity. Therefore, freezing tuition and other compulsory fees for students could help post-secondary students who are struggling between paying tuition and buying food. This year, UAlberta begins a two-year tuition and mandatory non-instructional fees freeze. These freezes will last for the 2015-16 and 2016-17 school years. Such decisions bring much needed relief to post-secondary students. Students mentioned that "Every penny counts" and they are pleased that the government is considering their needs and making university more affordable (Government of Alberta, 2015).

Another strategy implemented this year (2015-2016) to help post-secondary students in Alberta was the 2% increase in base funding offered by the provincial government to post-secondary institutions. This increase will make a positive contribution to students' lives and may reduce food insecurity among students (Government of Alberta, 2015).

Reducing the cost of student housing

Studying while living away from home or studying abroad requires that students find a place to live. Housing stability is an important aspect that allows students to pursue a postsecondary education (Broton & Goldrick-Rab, 2013). Housing insecurity is often related to food insecurity, and is considered a barrier to student academic success (U.S. Department of Housing and Urban Development, 2015). For students, the cost of housing represents a large proportion of their university expenses (U.S. Department of Housing and Urban Development, 2015). A report by Health Canada indicated that, "when rents take 30 to 50% or more of one's income, there is little money left for food, recreation, transportation and the other necessities of life." This means that unaffordable housing puts low-income households at higher risk of food insecurity. Affordable housing has been shown to reduce food insecurity as it likely leaves adequate income for other necessities (Friendly, 2008; Kirkpatrick & Tarasuk, 2011). Affordable housing should be considered a solution to food insecurity for all Canadians including post-secondary students.

Many universities offer accommodations on campus, and the rent for these accommodations may or may not include a meal plan and / or utilities. There are multiple student residences at the UAlberta campus. The main residence facility for first year undergraduate students is located in Lister Hall. Eight-month room rates (excluding the mandatory meal plan) vary from $3235 to $5805 for 2016/2017. Room rates include wireless internet, heat, water and power. Rent to live in this residence and other student residences could be subsidized for those students without adequate income to cover the cost of both education and living expenses.

Students have the option to live off campus if they want to avoid university-supplied student housing and buying a mandatory expensive meal plan. Post-secondary students are at

increased risk for housing insecurity if they choose this option as they don't have a rental history, a guarantor, or the money for a security deposit (Broton & Goldrick-Rab, 2013). While the rent costs may be lower off-campus than on campus, students still have to cover additional costs such as furnishings, hydro, and electricity (Education au/in Canada, 2013). They will also need to purchase food. Subsidized housing is one previously suggested strategy to address the growing problem of poverty in Canada. UAlberta offers a list of places where students can purchase low cost furniture and clothing, and options to obtain subsidized and affordable housing (University of Alberta, 2015a). The housing list does not include the student residences at UAlberta.

Ensuring the availability of economic and cultural foods

Students living away from their family become responsible for the first time for their food choices and hence they may change their eating habits (Papadaki, Hondros, A Scott, & Kapsokefalou, 2007). One study found that students who moved away from home to go to University had developed more negative eating habits including consuming fewer home-cooked meals, fewer fresh fruits, raw and cooked vegetables, and more convenience food and take away meals compared to students who lived at home while attending university (Papadaki et al., 2007). Universities could try to ensure that students facing financial challenges have nutritious and economic meals available to them on campus to prevent the quality of their diet from deteriorating. There is precedence for this. Some colleges in the USA established agreements with the school cafeteria to help students who did not have money to buy food or to get food on campus by using food vouchers (Broton, Frank, & Goldrick-Rab, 2014).

At UAlberta, the meal plan is mandatory for all first year students living in residence at Lister Centre; therefore, there are a limited number of microwaves, refrigerators and stoves in

community kitchens on each floor for preparing the meals or snacks (University of Alberta, 2015b). The meal plan is similar to ones offered at many other universities across North America. The costs of the three meal plans for the 2015/16 academic year vary from $3227 to $4379. None of the plans are intended to cover all of a student's food and eating costs for the academic year, meaning that additional food costs will be incurred by students with a meal plan. The cost for food over eight months for students living in residence is therefore substantial. UAlberta rates for the meal plans could be subsidized for low income students so that they could both afford the meal plan and additional nutritious meals to supplement the plan.

Participants in the research that I conducted suggested that universities should design nutrition education interventions to help them to develop and apply skills to use their financial and food resources as effectively as possible in order to improve food security. Interventions could include grocery store tours and meal planning lessons about budgeting, comparing prices, using coupons, shopping with a grocery list, and preparing inexpensive healthy meals. These types of nutrition education interventions have been proven effective in decreasing food insecurity among low income families (Dollahite, Olson, Scott-Pierce, 2003). In addition, universities should provide new students with information regarding food assistance programs and grocery stores available around campus. Providing new students, especially international students with this information may prevent food insecurity among post-secondary students.

International students who participated in my study experienced dietary changes in both food intake and food preparation when they moved to Canada to study. These dietary changes resulted from several factors including low availability, affordability, and accessibility of cultural foods. A study conducted among a similar group, recent immigrants to Canada, found that limited information about community food resources and services available was a barrier to food

security (Vahabi & Damba, 2013). Universities should consider focusing on the needs and concerns of international students in first year orientation programs and carefully plan to help international students adapt to their new food environment. For example, international students in my study suggested that it would be important to inform them about existing cultural food stores and food services around campus and in the city, and provide guidance on how to prepare healthy and cultural food by selecting from the food available in Canada. Doing these things will help reduce international students' stress and will help them to adapt more quickly to their new environment.

Several options are available to Universities to increase international students' access to cultural and religious foods. For example, leases could be offered to food outlets that sell halal or kosher foods on campus. Leases could also be offered to establishments that have extensive vegetarian options that could be consumed by individuals with religious food restrictions against eating meat, or against eating meat from animals which were not ritually slaughtered. The Muslim Students ' Association at UAlberta provides students with the names of restaurants and grocery stores with halal foods. None of these food establishments are near to the campus. Vegetarian, halal and vegan options are offered at UAlberta in Lister Centre (University of Alberta InsideOut, 2013); efforts could be made to offer the same choices to students purchasing food in the Students' Union Building and HUB mall.

Increasing the amount and availability of funding, bursaries and scholarships

In order to alleviate food insecurity among post-secondary students, policies must be established to ensure that funding, bursaries and scholarships are enough to meet the cost of tuition, compulsory fees, food, and accommodations. Many post-secondary institutions in the USA have created policies to help students who are struggling. For example, the financial aid services at

one university put into action a short-term loan without interest to students who expected to receive financial aid, but had a late payment, to help them pay for tuition, buy university supplies, or even pay for rent (Broton, Frank, & Goldrick-Rab, 2014). Similarly, at UAlberta, the collaborative service of University Bursaries and Emergency Funding and the Student Financial Aid Information Centre administer a number of emergency aid programs to assist full-time undergraduate and graduate students to complete their academic programs (University of Alberta, 2015c). It is not clear how many students in need are able to access these emergency funds.

Financial management and budgeting skills

Most young adults in university have just started living independently of their family for the first time and they likely don't have the financial skills to spend their money properly. Research has indicated that post-secondary students need better budgeting and financial management skills because of their limited funds (Davis, 2010; Meldrum & Willows, 2006). Without these skills, students who are responsible for managing multiple expenses such as accommodation and utility expenses may experience financial stress and begin to purchase unhealthy food (Booth & Smith 2001; Chaparro et al., 2009). Many universities offer workshops or advice to students about budgeting. For example, McGill University provides students with a detailed Excel spreadsheet to track spending as part of a frugal scholar toolkit (McGill University, 2015). Similarly, the UAlberta offers workshops to students so that they can learn how to prepare a simple budget, and to provide advice on staying within a budget to meet financial goals (University of Alberta, 2015c). It is unclear how many students take advantage of these workshops, or if attending these workshops reduces student food insecurity.

Recommendations for the CFB

Food banks are not the solution to the growing problem of food insecurity, but since the demand for the campus food banks continues to rise, the CFB and Students' Union at UAlberta should consider gathering more information about their clients including their income and food security status, which could help them to provide more targeted or tailored support to clients. Also, more attention should be paid to the types of food provided at the CFB. Food banks should provide more choices and culturally appropriate foods. Even though food banks do not have control over what they receive, and donors determine the quantity and nutritional quality of food, food banks should consider increasing the quality and quantity of food hampers by increasing donors' awareness of food insecurity problems and the importance of their donation. Government can provide funding for food banks and other community programs and tax credits for donors - such strategies may help to increase the quantity and nutritional quality of food donated to the food banks (Howard & Edge, 2013). In order for the CFB to receive more perishable food donations, they will need to increase the storage facilities for perishable foods to improve the quality of the food hampers.

The CFB serves a multicultural student clientele that requires religious or ethnic foods. In order to provide food of greater quality and culturally appropriateness to clients, food banks should encourage donors to increase ethnic food and cash donation. Cash could be used more effectively by food bank to purchase perishable food and more appropriate food for its clientele than could be provided by donors. Cash allows food banks to buy exactly what their clients need (*e.g.,* vegetarian food or halal food) in large quantities. For example, in North Toronto, food banks in areas helping ethnic communities request donations of culturally appropriate and nutritious foods in order to give clients food items that are familiar to them (Kalinauskas, 2014).

Andy Morris, the director of the Los Angeles Regional Food Bank, indicated that if people went to the grocery store and bought $5 worth of food to donate to a food bank, the food they bought might be enough for around five meals. However, if people donated that $5 to a food bank; that $5 could be turned into 20 nutritious meals because of the food bank's relationships with retailers, wholesalers, farms, and other donors (The Kitchen, 2015).

The CFB at MacEwan University provides their student clients each month with non-perishable food in addition to a $15 Safeway gift card to buy perishables food such as milk, vegetables and fruit (Students' Association of MacEwan University [SAMU], 2015). The grocery store gift card allows students to choose the type of foods and the quality of the food they want. Before this option is adopted by food banks everywhere, tracking of gift card reimbursement should take place. In Canada, according to a 2015 Ipsos survey for Ugo Mobile Solutions, one-third of gift card recipients, including 47% of young adults, have unspent money on their gift cards (Ipsos, 2015). Gift cards often go unused because they are misplaced, lost, forgotten, or not used to their full amount. Unspent grocery store gift cards would be a waste of precious food bank resources.

Campus food banks should make students aware of their services through more activities and advertisement as many students do not know about this service (Hughes, 2011; Loopstra & Tarasuk, 2012). However, it is conceivable that campus food banks would not be able to meet the needs of all the students requiring their services if utilization were to increase as a result of increased student awareness.

Recommendations for food retailers

Many companies offer student discounts on purchases with evidence of valid enrollment at a Canadian University. For example, the Student Price Card is available for purchase for $10

at various locations on the UAlberta campus. This card gives discounts on many services, including from participating food retailers (*e.g.,* 15% off food at Boston Pizza). The International Student Identity Card provides discounts on many items and services, including establishments that sell food in Canada and elsewhere (University of Alberta InsideOut, 2014). In Ontario, Superstore offers a 10% discount every Tuesday to all students with valid identification (Complaints Board, n.d.). In Alberta, the first Tuesday of each month is 10% off day at both Sobeys and Safeway grocery stores with a minimum purchase for all consumers (Simply Frugal, 2015).

More food retailers should be encouraged to consider providing discounts to all students who have valid student identification. These discounts might make a considerable difference to students' budgets and could help students to save money and eat a healthy diet. Also, students may feel less stigmatized to buy food from a grocery store than to receive food from a food bank. Also, government, food sector and businesses should collaborate to reduce the cost of food by providing food vouchers and coupons for low income household including post-secondary student households (Howard & Edge, 2013). Food vouchers and coupons may allow members of low-income households to buy healthy food reduce their reliance on food banks. In addition, food retailers around campus should consider making culturally appropriate food available at affordable prices. This will help reduce the challenges faced by international students regarding availability, accessibility and affordability of ethnic food.

9.5 Future Research

Several studies insisted that further work is needed to determine how food insecurity affects post-secondary students' academic achievements, and to examine the coping strategies

that post-secondary students employ when they experience food insecurity (Chaparro et al., 2009; Gaines et al., 2012; Hughes et al., 2011). The research conducted in this dissertation adds to the existing limited research available and improved our understanding of the problem of food insecurity among post-secondary students and its impact on their education achievement, health and well-being; however, this research represents only a first step – additional study is needed.

Because of the limitations of this research, as highlighted above, there are a number of lines of research that represent logical extensions of the work to date. First, a follow-up longitudinal study with a larger and more representative sample size should be conducted to provide long-term outcomes of food insecurity on post-secondary students' health, dietary intake and academic performance. For example, researchers could interview students in their first academic year, and then every year subsequently. This type of study would provide a stronger understanding of the issues of food insecurity and will also show changes in food security status over time. Second, future research should investigate the reasons behind the positive self-rated mental health reported by international postsecondary students compared to domestic postsecondary students. Third, researchers should examine the association between food insecurity status and place of residence and annual income among post-secondary students. Fourth, future qualitative work is also needed to understand and explore the experience of food insecurity among specific genders, religious or cultural groups of international students in the general UAlberta population. Future studies should include more participants and be designed for a long period in order to generate evidence. Finally, it will be important to identify degrees of food insecurity among international students and determine if gender and ethnicity play a role in relation to food security status.

9.6 Conclusions

This dissertation has contributed to the limited literature by improving our understanding of food insecurity among post-secondary students in Canada, and the associations between limited income and food insecurity. This research also was novel in shedding light on the unique experiences of food insecurity among international post-secondary students. This research found that the majority of CFB clients were students, and graduate and international students were overrepresented compared to the overall CFB clientele. In addition, the research improved our understanding of the experience of food insecurity among international students. The strategies used by both Canadian and international post-secondary students to cope with food insecurity could also be worsening this condition. However, international students applied fewer strategies available to them to cope with not having food or money for food. Long-term chronic food insecurity coupled with the use of severe coping strategies might lead to health complications in the food insecure student population, which may impact their well-being and academic performance. The consistency of findings between the three studies and with previous research suggests that the issues of food insecurity among post-secondary students are present and related to financial constraints. Although many Canadian post-secondary students experiencing food insecurity face the same barriers as international students, my findings suggested that international students face unique challenges and different experiences than their Canadian peers.

Findings from this multi-method research revealed that consideration needs to be given to a better understanding of advocacy actions to reduce food insecurity among post-secondary students. Although food insecurity among post-secondary students has been understudied and requires further research in order to understand the full scale of food insecurity among post-secondary students, it is clear that it is an issue that requires attention. Food insecurity among

post-secondary students is a complicated and not easy to solve problem. It is a part of a larger problem in the community that must be addressed in order to assure that everyone has nutritious and affordable food. Creating a university environment that addresses food security to support students can contribute to optimal health and diet, and thereby enabling students to achieve academic success.

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APPENDICES

10.1 Appendix 1: Quantitative Study 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 year 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 primary 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 <u>often</u>, <u>sometimes</u>,

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 #20)
c Don't know (skip #20)

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.

10.2 Appendix 2: Quantitative Study Information Sheet and Consent Form

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, 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'

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?	☐	☐
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): _____

10.3 Appendix 3: Qualitative Study Interview Topic Guide

Topic Guide for Qualitative Interviews – International students

Icebreaker questions

- How long have you been studying at the University of Alberta?

Reasons for using the Campus Food Bank and the impact of the Food Bank on the student's life

- Think of the first time that you went to the food bank. What happened in your life that made you decide to ask for food from the food bank?
- How did the food hamper you received help you to get enough food to eat?
- If the hamper didn't provide enough to eat, please tell me why not?
- Do you feel that the food in the hampers is culturally appropriate for you? Please explain why or why not.
- Can you describe your feelings about getting food from the Campus Food Bank?
    - Probe: How does it make you feel to ask for food?
    - Probe: Do you feel OK to get food this way?

The impact of food insecurity on student's education

- Please describe to me how a lack of food or money for food has influenced the quality of your university experience, including your ability to study.

Coping strategies

- Apart from using the Campus Food Bank, what do you do if you run out of food or money to buy food?
- What would you do if the Campus Food Bank did not exist?

Food related behaviours

- Thinking about your eating habits since you came to Canada, what kind of challenges do you face as an international student that affects your eating habits?
- Could you describe how your diet has changed since you came to Canada to be a student?
- How would you change what you eat if you could?
- What is your biggest barrier to eating the types of foods that you want?

Challenges to achieving food security

- As an international student, what are some of the challenges you face regarding obtaining adequate food?
- What are some of the challenges you face regarding obtaining culturally appropriate food?
- What could be done to overcome these challenges?
- Describe your food situation prior to come to Canada?
    - Probe: did you ever worry about having enough food or money for food?

Wrap up Questions

- Is there anything you want to add or that we haven't covered in this discussion that you would like to talk about?
- Is there anything else you think is important for me to know?

10.4 Appendix 4: Qualitative Study Information Sheets and Consent Form

Information Sheet

Project Title: Hunger on Campus –Understanding food insecurity among students

Investigators
Dr. Noreen Willows, Associate Professor* — Principal Investigator
Dr. Geoff Ball, Associate Professor[§] — Co-Investigator
Dr. Anna Farmer, Associate Professor[*+] — Co-Investigator
Mahitab Hanbazaza * — Graduate Student

* Department of Agricultural, Food and Nutritional Science
[§] Department of Pediatrics
+ Centre for Health Promotion Studies

Purpose of Research

Some students at the University of Alberta are food insecure. When students are food insecure, they may be worried that they are unable to acquire nutritionally adequate and safe foods, or they may not have the ability to acquire acceptable foods in socially acceptable ways. Some food insecure students contact the Campus Food Bank at the University of Alberta to receive food hampers.

This research study aims to better understand food insecurity among international students without children who request food hampers from the Campus Food Bank. Knowing more about the reasons for food insecurity among these students will enable policymakers to make more appropriate decisions regarding post-secondary student funding. Knowing more about its clientele will help the Campus Food Bank improve the services it provides to students. The Campus Food Bank would also like to know the impact it has on students.

In a previous study about the Campus Food Bank, you completed a food security survey and agreed to be contacted about future research. We invite you to take part in an interview about your experiences with food insecurity and the services of the Campus Food Bank. The objectives of the study are to:

1. Explore the reasons for using the services of the Campus Food Bank.
2. Understand the challenges to achieving food security among international university students.
3. Describe the impact of the Campus Food Bank on the quality of your life.
4. Understand coping strategies used to deal with food insecurity.
5. Describe the impact of food insecurity on your academic studies and food related behaviours.

Study Procedure

You will meet with a researcher in private. The researcher is a graduate student, Ms. Mahitab Hanbazaza, at the University of Alberta who is doing her PhD in Human Nutrition. Mahitab will ask you questions about the reasons for using the Campus Food Bank, coping strategies when you do not have enough food to eat, challenges to achieving food security, and the impact of the Campus Food Bank on your quality of life, food related behaviours and academic performance. The interview will take about 1 hour to complete. The interview will be recorded for later analysis. Before the interview begins, you will be asked some demographic and food security questions.

As a token of our appreciation, you will receive a $35 gift card from a local grocery store for participating in this study.

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 at the University of Alberta. The findings may also enable policymakers to make better decisions regarding post-secondary funding, loan assistance and tuition costs for U of A students.

Confidentiality

The interview will be digitally recorded. Ms. Hanbazaza will type what is said into a document, or a professional transcriptionist might be hired to do this. Your name will be removed from the typed transcripts of the interview. Names and identifying information of you or anyone that you mention will not be included on the written reports from the research, and you will be anonymous in any written and verbal reports of the research. The only people who will have access to the transcripts are the researchers affiliated with the study. A graduate student researcher who is also interviewing students about food security will assist Ms. Hanbazaza with data analysis of transcripts once all names are removed. All transcripts 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 and only researchers affiliated with this project will have access to data collected as part of this study.

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 are required to sign the 'Consent Form'. Even if you consent to the study, you can choose at any time to not answer the interview questions. After you complete the interview, if you choose to withdraw from the study all information you provide will be destroyed. Once the information

from your transcript 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 interview study will appear in a graduate student thesis, reports for the Campus Food Bank, publications, and conference presentations. Neither the thesis nor any of the reports, publications, or presentations about this study 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.

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

Name	Email	Phone
Dr. Noreen Willows	noreen.willows@ualberta.ca	780-492-3989
Dr. Geoff Ball	geoffball@med.ualberta.ca	780-342-8465
Dr. Anna Farmer	anna.farmer@ualberta.ca	780-492-2693
Ms. Mahitab Hanbazaza	hanbazaza@ualberta.ca	780-492-8837

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.'

Consent Form

Project Title: Hunger on Campus – Understanding food insecurity among students

Investigators

Dr. Noreen Willows, Associate Professor*	Principal Investigator
Dr. Geoff Ball, Associate Professor[§]	Co-Investigator
Dr. Anna Farmer, Associate Professor[*+]	Co-Investigator
Ms. Mahitab Hanbazaza*	Graduate Student

* Department of Agricultural, Food and Nutritional Science
[§] Department of Pediatrics
+ Centre for Health Promotion Studies

Purpose of Research:
The purpose of this research is to explore how food insecurity affects the academic performance, food related behaviours, and coping strategies of international students who do not have children. The study will be conducted in partnership with 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 withdraw from the study or refuse to answer any question without having to give a reason and without affecting your present or future use of the Campus Food Bank?		
Are you aware that what you say will be kept confidential and in the secure possession of the researchers?		

Do you agree to anonymous publication of quotations or extracts from your interview?		
Has the issue of been explained confidentiality to you?		
Do you agree to have this interview audio-recorded?		
Do you understand that only the research team will have access to the data?		
Do you agree to have information from the questionnaire you previously completed used for descriptive purposes in the present study?		
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 (please circle your response).	Yes No
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: _____

Confirmation of Compensation Receipt

By signing below, I acknowledge that I have received $35 as a token of appreciation for participating in the above study.

Participant's Signature:
_____

Date (mm/dd/yyyy): _____

10.5 Appendix 5: Recruitment poster

Hunger on Campus – Food insecurity among students

VOLUNTEERS NEEDED FOR RESEARCH!

Are you...

- a University of Alberta student
  AND
- a client of the Campus Food Bank who has received a food hamper?

Then, we invite you to participate in a study to understand the impact of the Campus Food Bank on you, and whether lack of money for food has influenced the quality of your university experience and your health, nutrition and well-being. The study involves two surveys which will take less than one hour of your time to complete. You will receive a $35 grocery store gift card for your time.
To learn more, please email Mahitab (hanbazaz@ualberta.ca) or Jasmine (farahbak@ualberta.ca), or call them at 492-8837.

10.6 Appendix 6: Qualitative Framework

Categories and sub-categories that emerged from the content analysis of international post-secondary students' perspectives on food insecurity.