Calcium Nutrition perceptions among Food Bank Users: A Canadian Case Study

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Abstract

The present study examined the differences in the food bank users' perceptions related to calcium nutrition across sex and employment status using a cross-sectional, prospective design at a large food bank in Canada. A total of 197 individuals participated for a response rate of 97%. A structured survey was developed and pilot tested before it was administered. Gender and employment status were the independent variables and calcium nutrition perceptions was the primary dependent variable. Chi-square analyses were conducted. Over 75% of participants perceived calcium to be important, but 47% believed they have insufficient intakes and over 15% admitted to being uncertain of their actual calcium needs. Food costs and not knowing food sources of calcium were indicated as the main determinant for choosing calcium rich foods. While the men surveyed were more likely to be "unsure of sources" of calcium, women were more concerned about the cost of calcium rich foods. Based on the results, it was recommended that nutrition education initiatives should inform food bank users of their calcium needs and economical ways to obtain an adequate calcium intake.

Key Words: *Calcium, Nutrition, Food bank, Low Income, Food Insecurity.*

Introduction

Poverty and low-income prevents many Canadians from attaining a reasonable quality of life[1] and these are well recognized as important determinants of health around the world.[2-4] In addition, low-income is known to compromise the ability of individuals to meet their basic needs of life such as food.[1,5] In order to help economically marginalized population meet the basic food needs, several governmental and non-governmental organizations and programs offer emergency and short-term assistance such as food hampers provided by food banks. According to *HungerCount 2009*, released by the Canadian Association of Food Banks, close to eight million Canadians turned to food banks for emergency food assistance in March 2009.[5] This represents an 18% increase from the same time in 2008. In addition, the majority of food bank users and those who experience poverty are women and working poor who are unable to make ends meet.[5]

The increase in those accessing food banks with the higher proportion of women and the working poor highlights the growing food insecurity in Canada and warrants further research examining the needs of the low-income populations. Specifically, given the large numbers of people are turning to community-run food assistance for their meals, it is important to examine the nutritional quality and adequacy of the food provisions.[6-10] The food that is supplied to individuals by the food bank is subject to supply constraints.[11] The majority of these food banks are limited to what is donated by the community and local businesses, since few food banks have the financial resources to supplement their donations with purchased food. [5] The donations to food banks mostly include non-perishable food products such as canned fruits and vegetables, pasta and other food products which are often low in calcium. However, recently, food banks are beginning to provide fluid milk to its clientele as a way of providing calcium rich food, albeit contingent on the availability of donor dollars, and realizing the importance of calcium for health and wellbeing of the vulnerable population especially women, who are the primary food bank clientele.[5,11] While the provision of milk is promising, the average availability of calcium and dairy products in food hampers remains less than the Canadian requirements.[12,13]

Furthermore, there are limits to how often one may access the food bank; once every three weeks or once a month are common limitations.[5] The quantity of groceries supplied to the individual as well as the quality of food donated to the food bank are inconsistent that change with the season and economic climate.[5] This volatility in food provision and food insecurity observe in low-income earners result in wide variation in the composition of food hampers distributed,[14] 99% of these food hampers do not provide sufficient amount of nutrients per person,[12] and compromised health status.[15-19] Specifically, calcium continues to remain a nutrient of concern for low-income populations and underserved individuals.[6,7,14,20]

Calcium carries out many important physiological roles in the body; it facilitates muscle contraction and relaxation, nerve transmission, bone formation and homeostasis, enzyme activation, and blood coagulation.[21-24] Research has repeatedly shown that the calcium status of low-income persons and food bank clients is influenced by numerous factors.[14, 19, 25] In addition to the financial constraints, health psychology literature suggests that the adoption of any health behavior is influenced by many psychosocial factors. As a result, many theories of behavioral change have been constructed in an effort to explain human health-related behaviors, to determine targets for change, and the best methods for implementing these changes.[26] In many of the theoretical models including the health belief model, which is one of the most widely used conceptual frameworks in health behavior, individual's perceptions, including their judgment of the benefits and barriers associated with health behaviors, are fundamental to behavioral change. It is important to examine these factors to understand the role of food banks as an avenue for nutrition education and behavioral change.[27]

While previous studies have examined the nutritional composition of food hampers[12], there has not been any research on the opinions of the food bank users on their perceptions of the importance of calcium for their health, sources of calcium, or the barriers associated with making dietary choices rich in this nutrient. Further research in the calcium nutrition perceptions will be relevant to food bank users to supplement the food bank provision of calcium through economical sources as well as for health professional and social service providers who may offer health promotion and food bank services to low-income populations. Data shows that women and working poor (employed) are increasingly using food banks and these two variables are emerging as important considerations in the study of food bank users.[5] As such, the purpose of the present study is to examine the calcium nutrition perceptions of food

bank users and to determine differences among food bank users based on gender and employment status.

Health education students were like other Americans who wanted to act on their concerns about the unreasonable costs, the unjust access, and the unsatisfactory outcomes of the American health care system—they needed to learn about a complex system and how to participate in the reform of that system. Young adults including undergraduates in health education were increasingly going online to both learn and participate in their society. Using an online simulation of health care reform helped students learn about health care and learn about how to go online to participate in health care reform. A process evaluation of this simulation offered ways to enhance student engagement and learning and thereby hasten their eventual participation in local, state, or national discourse about health and health care reform.

Methods

Participants

Clients (n=197) of the Calgary Interfaith Food Bank participated in the study. All of those met the inclusion criteria of being a minimum of 18 years old and at the food bank to obtain an emergency food parcel were invited to participate. The clients who met the inclusion criteria were then informed of their rights as participants, asked to read and sign a consent form, and complete the survey while they were waiting for their food parcels. In total, 203 agreed to participate and 197 completed the survey, resulting in a 97% of completion rate. The study protocol was approved by the Research Ethics Board at the investigators' institution.

Measurements

A survey with 26 questions was developed by the investigators and pilot tested prior to the use in the study. The survey included two sections, a series of questions to elicit background characteristics and calcium perceptions of the participants. Background characteristics included age, sex, education, employment and financial status, social assistance received, and perceived health status. Calcium perception section assessed factors affecting food selection in general, importance of calcium to health, knowledge of the sources of calcium, self-perceived calcium intake, and barriers to calcium consumption. In the calcium knowledge question, a list of eight foods including good and poor sources of calcium was provided and participants were asked to select those which they believed to be good sources of calcium. Different response scales were used. For example, for the perceived importance of calcium for health and well-being, a 3-point scale ranging from not at all important, somewhat important to very important was used. For the sources of calcium, a list of sources was provided where the participants checked either yes or no.

Data Analysis

The survey information was numerically coded and entered into the Statistical Package for the Social Sciences (SPSS Version 11.0 for Windows) program. Background and health characteristics of the participants were ascertained via mean and frequency analyses. Mann-Whitney tests were run to highlight variables in which significant differences might be observed. Subsequent Chi-square analyses were conducted to test for significant gender (male versus female) and employment status (employed versus not employed) differences. Significance was set at $p \leq 0.05$ for all tests.

Results

Approximately two-thirds of participants were female (n=128). The mean age was 34.2 years (± 9.9), and the majority of respondents were Caucasian (67.7%). Mean household size was 3.2 individuals (± 1.8), with a mean of 1.3 (± 1.4) children. Close to 60% of the participants had a high school education (57.4), and employment statistics revealed that almost half of the sample was not employed (45.1%) at the time of data collection. Financial situation and social assistance questions revealed that 72.1% (142) of respondents were unable to meet their needs. Government income supplements were received by 46% of the participants. The most common form of supplemental income was the child tax benefit (40.6%), followed by social assistance (24.9%), and disability income (11.2%). It was determined that clients had used the food bank an average of 2.5 times in the past year (SD±2.0). Background characteristics of the sample are provided in Table 1.

Table 2 shows the results of the health profile and dietary perceptions of the participants. Of the 197 individuals, 31% considered their health to be fair or poor while a majority (69%) reported it to be good or very good. In terms of general food selection, a majority of respondents selected cost (71.1%) as the main factor influencing food selection, followed by

nutritional value (29.9%), taste (20.8%), availability (17.8%), and convenience (11.7%). Nearly half of the sample (48.7%) reported that their food intake did not meet their nutritional needs, while 20.3% were unsure of their nutritional needs.

The majority of participants (75.1%) considered calcium to be very important to their health. In the calcium knowledge question, a list of eight foods was provided and participants were asked to select those which they believed to be good sources of calcium. The item with the largest proportion of correct responses was cheese (82.7%), followed by low fat yogurt (67.0%), and skim milk (61.4%). Over half (53.3%) of those questioned believed that eggs were a source of calcium. Many users (47.2%) felt their calcium intake was not adequate to meet their nutritional needs, and 31 respondents (15.7%) were unsure of their calcium needs. Cost (53.3%) and uncertainty regarding sources (21.3%) were most commonly cited as barriers to calcium consumption.

Comparisons of the aforementioned characteristics on the basis of gender and employment status are presented in Table 3. More women than men were concerned with the price of foods in food selection, and a lower proportion of women were concerned with the convenience and availability of food ($p = .025$, and $p = .021$). More females indicated that calcium was "very important" to their health and well being, whereas a higher proportion of males selected calcium as "somewhat important" or "not important" ($p = .053$). Men were more likely to be "unsure of sources" of calcium ($p = .022$) than women, and women were more concerned about the cost of calcium rich foods ($p = .009$).

A larger proportion of men were employed (45%) compared to women (30%) and this gender difference was statistically significant ($p = .024$). More employed persons rated their health as "good" or "very good" compared to unemployed individuals, whereas the unemployed individuals were more likely to describe their health as "poor" ($p = .038$). No differences have emerged between employed and unemployed individuals with respect to calcium perceptions.

Discussion

While some research has been conducted among food bank populations particularly examining the nutritional status and intake,[8,12] none of these studies have examined the food bank clients' nutritional perceptions with specific emphasis on calcium. Given the high proportion of women[5] and employed individuals accessing food banks,[9, 10] the present study examined the differences in calcium perception based on gender and employment status. Both of these variables have been well established as a determinant of health and health practices.[2,4,15]

This study has offered insight into the relatively unexplored area of nutrition research involving the perceptions held by food bank users with regards to calcium. The five key findings emerged from the present study included: 1) cost is the most important factor affecting food selection with a statistically significant gender difference, 2) many, especially women, identify calcium as being important to health yet they perceive their intake to be inadequate, 3) cost and poor nutritional knowledge were identified as barriers to calcium consumption with gender difference, 4) most identify only milk and milk products as source of calcium with no gender difference and 5) no difference in calcium perception was observed based on the employment status of the participants.

Income has been well documented as a determinant of health.[1] It is not surprising that cost was identified as an important factor affecting food selection among the food bank users in the present study involving economically vulnerable individuals especially women. Previous studies on the affordability of nutritious foods have clearly indicated that economically vulnerable individuals do not have adequate income to meet basic needs including a nutritious diet.[28,29] The observed gender difference in cost as a barrier might reflect the food procurement and preparation practices which are primarily carried out by women in our society.[9, 16] As such, women are perhaps more aware of the cost constraints in the purchase of food for the family. Initiatives to supply milk-vouchers or a similar cost-independent method should be implemented to ensure those needy individuals, especially those with children, receive adequate calcium intake. While food stamp programs are available for low-income populations in the United States, no such program is available for this vulnerable group in Canada. Most of those in poverty needing emergency food assistance seek food banks as the source of food provision on the short-term. However, with growing number of food bank users, the provision of food and the variability in what is provided in the food hampers vary considerably based on donor dollars and other factors.[5]

The second key finding is the perception that calcium is important for health especially among a majority of

women.[21-24] Calcium has been promoted as a nutrient necessary for growth and development in younger individuals and prevention of osteoporosis among older individuals, especially women. Studies examining the osteoporosis health beliefs suggest that it is perceived as a women's condition.[30] As such, women might perceive calcium as being important for health more than men. While calcium might be perceived as important, studies involving food bank users have shown intakes of calcium well below the recommended levels.[7, 8,12] Jacobs Starkey and Kuhnlein[23] ascertained that, across gender and age groups, only 21% of Montreal food bank clients obtained the recommended minimum servings of dairy products each day, compared to the 32.5% of the general population in Quebec. Consistent with the less than optimal intake documented in other studies,[6, 7, 12] a majority of the participants in the present study perceived that they do not consume enough calcium to meet their needs. This raises the question of why individuals do not consume enough nutrients when they do recognize its importance to their health.[26, 30] This finding also highlights the need to consider various barriers such as cost of food in accessing nutritious foods and addressing food insecurity.

As indicated earlier, perceived cost along with poor nutritional knowledge are barriers for the selection and consumption of calcium rich foods. In the present study, only milk and mil products were identified as sources of calcium along with a general confusion and lack of knowledge about calcium and nutrition for a significant proportion of the food bank client population. Calcium is a macro nutrient available through many dietary sources.[22] While milk and milk products are high in calcium,[25] there are several other non-dairy sources of calcium (e.g., sardines, broccoli, kale, almonds, beans) and fortified food sources (e.g., calcium fortified orange juice, breakfast cereals, soy milk). Taking this finding into account, the food banks and other organizations in which individuals needing emergency food assistance would be well advised to provide educational materials on economical sources of calcium, and the most convenient and easy ways in which such foods might be integrated into the diet.[27] Also, little formal research has been conducted on the calcium and nutritional knowledge of food bank users. Therefore, the results from this study offer initial insight into these areas and could suggest further research in this area. The information from this study will be useful for health professional and social service providers who may offer health promotion and food bank services to low-income populations to enable the food bank users to supplement the food bank provision of calcium through economical sources as well as to increase awareness of donors/food bank workers for the need for calcium-rich foods provided in the food hampers.

While gender difference was evident in the calcium perceptions, no difference was observed based on employment status. HungerCount[5] reported that individuals who are employed in jobs paying low and minimum wages are increasingly using the food banks in Canada along with those who are unemployed. In addition, recent studies show that low income earners and unemployed individuals receiving social assistance from the government are not able to afford to meet their basic needs of life including a nutritious diet.[28,29] The closeness of the lack of affordability and possibly lower educational levels among these two groups might have contributed to the lack of significant difference. This emphasises the need for nutrition education for all individuals, irrespective of their employment status. Further research should examine the mediating role of education in the health perceptions of economically vulnerable individuals.

The results of the present study should be taken into account in planning nutritional education programs for food bank users.[26] For example, the provision of information pamphlets about economical calcium-rich food sources to male food bank users could be undertaken in response to their expression of uncertainty regarding food sources of the mineral. Such evidence-based, gender-specific, and tailored interventions could prove more efficient in that only the groups most in need of the specific information or programme are addressed, thereby saving time and money.

The results of this study offer insight into the food bank users' perceptions related to calcium nutrition; however, certain limitations must also be acknowledged. The convenience sampling procedure limited the extent to which the sample represents the larger population, given that certain respondents may have been motivated by other factors, such as interest in the topic being surveyed. The choice of cross-sectional research design limits the generalizability of the results and causal relationship of the variables studied; however, it is apparent that nutritional education initiatives are needed based on the findings of the present study and those reported in the literature. Efforts should be undertaken to inform food bank users of not only the importance of nutrition and calcium in the diet, but of economically viable dietary sources. A large proportion of study participants were concerned with their own diet

quality and appropriate health promotion is needed to enable these individuals to make affordable diet modification(s) to improve their quality of life. Furthermore, this study was designed to identify differences between groups (e.g. between employed and not employed individuals) to ease the implementation of education initiatives. Gender demonstrates the area of most potential for these intervention programmes because of the discernable differences between men and women that emerged in regards to the factors affecting food selection and barriers to calcium consumption. Additionally, by targeting intervention efforts at either men or women, intervention may be undertaken relatively targeted without having to ask more sensitive questions to assess employment status, financial situation, and age.

Further research into the diet and food habits of food bank clients is needed. Suitable dietary assessment of regular calcium consumption would be useful in gaining a quantitative perspective of intakes, as would be an in-depth analysis of food bank hampers. Another opportunity for calcium-related research in food banks would be a cross-sectional study of the calcium content in food hampers across the provinces, or within certain regions (e.g. comparing urban versus rural or small or large food bank). This data could be related to other factors such as location, community support for the food bank, facility size, client base, and food storage limitations such as access to refrigeration units. Research targeting specific ages, ethnicities, or genders within the population of food bank users might also be pursued in order to assess the specific needs of high-risk individuals, most notably children, ethnic minorities, and women.

Relevance to Practice

It is estimated that close to eight million people access Canadian food banks each month for emergency food supplies. In addition to food, these organizations provide information on the various social programs available to individuals in need. The present study suggests that, although some food bank users are aware of the importance of calcium rich foods and proper nutrition to their health and well-being, there is still confusion regarding calcium sources and perceived cost barriers to purchasing such foods. The results also showed significant gender differences in calcium perceptions. Thus, the need for nutrition education regarding economically viable ways to obtain proper nutrition for food bank users and their families is apparent. Nutritionists and other public health professionals should utilize food banks as an avenue through which to communicate nutritional information to economically vulnerable individuals and targeting specific gender groups. Existing counselling services in food banks might be expanded to include more nutrition information, specifically, information on the benefits of calcium consumption, cost efficient ways to obtain calcium, and creative methods of integrating calcium into the diet. Both dairy and non-dairy sources of calcium should be promoted. A number of economical choices of calcium rich foods are available and these include various dairy products, non-dairy foods such as beans, sardines, and collard greens along with calcium fortified foods such as fortified orange juice and soy milk. Furthermore, nutrition professionals and food bank staff could encourage those food banks without refrigeration units or a specified milk allocation to provide milk vouchers to their clients, especially those with children, in addition to the recommended educational services.

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Table 1. Sample Background Characteristics

Characteristics	Participants
Gender (%, n)	
Male	35.0 (69)
Female	65.0 (128)
Age in Years (mean ± SD)	34.2 ± 9.9
Education Level (%, n)	
Elementary or less	14.8 (29)
High School	57.4 (113)
University/College	27.9 (55)
Employment (%, n)	
Unemployed	45.1 (88)
Employed full time	19.0 (37)
Employed part time	14.9 (29)
Retired or Semi-retired	4.2 (8)
Other	16.9 (33)
Financial Situation (%, n)	
Easily meets needs	2.0 (4)
Just meets needs	25.9 (51)
Does not meet needs	72.1 (142)
Social Assistance (%, n)	
Child tax benefit	40.6 (80)
Welfare	24.9 (49)
Disability	11.2 (22)
Unemployment Insurance	10.2 (20)
Retirement Income/Pension	2.0 (4)

Table 2. Health Profile and Dietary Perceptions of the Participants

Characteristics	**Participants %, (n)**
Current Health Status	
Good to Very Good	69.1 (136)
Fair to Poor	31.0 (61)
Factors Affecting Food Selection (%"yes", n)	
Cost	71.1 (140)
Nutritional Value	29.9 (59)
Taste	20.8 (41)
Availability	17.8 (35)
Convenience	11.7 (23)
Importance of Calcium to Health (%, n)	
Very Important	75.1 (148)
Somewhat Important	22.3 (44)
Not Important	2.5 (5)
Source of Calcium (% yes, n)	
Cheese	82.7 (163)
Low Fat Yogurt	67.0 (132)
Skim Milk	61.4 (121)
Eggs	53.3 (105)
Orange	30.8 (60)
White Bread	28.2 (55)
Peanuts	20.5 (40)
Ham	13.8 (27)
Self-Perceived Calcium Intake (%, n)	
Not Enough to Meet Needs	47.2 (93)
Just Enough to Meet Needs	32.0 (63)
Not Sure of Calcium Needs	15.7 (31)
More than Needed	5.1 (10)
Barriers to Calcium Consumption (% yes, n)	
Cost	53.3 (105)
Unsure of Sources	21.3 (42)
Dislike Taste	11.2 (22)

Table 3. Calcium Perceptions by Gender and Employment Status

Groups	Variable	χ^2	p-value
Gender	Description of Current Health Status	8.4	.04
	Factors Affecting Food Selection		
	Cost	10.9	.00
	Availability	5.0	.03
	Convenience	5.3	.02
	Importance of Calcium to Health	5.9	.05
	Barriers to Calcium Consumption		
	Unsure of Sources	5.3	.02
	Cost	6.9	.01
	Difficult to Prepare	4.3	.04
Employment Status	Description of Current Health Status	8.4	.04
	Factors Affecting Food Selection		
	Taste	3.5	.06
	Availability	3.0	.08
	Importance of Calcium to Health	5.3	.07
	Barriers to Calcium Consumption		
	Difficult to Prepare	4.0	.05