Can Food Banks Sustain Nutrient Requirements?

A Case Study in Southwestern Ontario

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ABSTRACT

Background: Concerns about adequate food supply is a mounting problem in Canada, making food bank visits a necessity for over 820,000 Canadians.[1] Given this reliance, the purpose of this study was to compare contents of food hampers with Canadian guidelines, at a large urban food bank in Southwestern Ontario that intends to provide 3 days worth of food per person.

Method: Thirty hampers of each available size (for 1-6 people) were sampled (N = 180). Food items were recorded and analyzed for caloric value, food group, and macro- and micro-nutrient values. Results were compared to Dietary Reference Intakes (DRI) and Canada's Food Guide to Healthy Eating.

Results: 99% of hampers did not provide 3 days worth of nutrients. Grains and cereals met the lower range of Canada's Food Guide recommendations, and fruits and vegetables, meats and alternatives, and dairy products were below recommended levels, as were numerous vitamins and minerals, including vitamins A, D, B12, C, riboflavin, niacin, calcium, magnesium and zinc. Carbohydrates were slightly above recommended DRI, and energy from fat and protein scarcely met the minimums recommended. Hampers contained 1.6 days worth of energy per person.

Discussion: The energy available per person was below recommendations for most Canadians. Nutrients missing from the hampers can come from fresh fruits, vegetables, dairy products, and meats and alternatives. However, many low-income families have limited finances to purchase these foods which are relatively more expensive than processed foods. Encouraging more perishable food donations and storage facilities to maximize the nutritional intake for clients is imperative.

MeSH terms: Food supply; nutrition; social welfare

La traduction du résumé se trouve à la fin de l'article.

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Approximately 3.7 million Canadians worry about having adequate amounts of food, do not eat suitable quality or selections of foods, and/or have inadequate amounts of food.[2] These Canadians live in food-insecure households. Food insecurity is associated with a threefold increase in anxiety, when compared to residents in food-secure homes.[3] Physically, food insecurity is associated with anemia, chronic illness, depression, obesity, and poor overall health.[3-5] With increasing rates of food insecurity, food banks, which were originally intended to provide infrequent assistance to people in need, are now a stable fixture in the lives of many Canadians.[6] In 2005, approximately 60% of Canadian food banks allowed clients to use their service once each month, although allowable food bank use ranged from every 7 days to every 14 weeks.[1] The food offered at the 650 food banks in Canada has become an integral part of the nutritional intake of over 820,600 Canadians each month and approximately 40% of food bank users are children. Ninety-four percent of all food bank users experience food insecurity.[1,7]

The unpredictable nature of food donated to and therefore distributed through food banks makes it challenging to meet recipients' nutritional needs,[8] and nearly 40% of food banks report challenges with meeting the public's demand.[1] The Canadian Association of Food Banks[1] reported that 28% of food banks aim to provide between 1-3 days worth of food, about 34% between 3-5 days worth of food, and the remaining 38% more than 5 days worth of food. With a portion of food donations coming from the corporate sector's unsaleable products and because the demand is greater than the available supply, the amount and types of food distributed through the food banks are often inadequate to meet recipients' nutritional needs, and therefore provide respite from severe hunger but little else.[6,9,10] In addition to the quantity, the quality of some of the food given out to food bank users has also been questioned.[8,11,12] For example, in Teron and Tarasuk's[8] study, the vast majority of food hampers contained at least one unsafe item (i.e., damaged or past due date). Furthermore, even if the food quality and quantity are below suitable standards, the taxing responsibility of managing and distributing the donated

food items falls to (mostly) volunteers who have stressed that providing *something* for those in need is preferable to nothing at all.[10]

With Ontario being the province that provides for the greatest share of Canadian food bank recipients,[1] it was of interest to assess the extent to which a food bank in the province is able to adequately provide for its users. In the large urban food bank in Southwestern Ontario where the current study took place (hereafter referred to as the food bank), users are allowed to use the service once per month. The food bank's website cited that more than 2,000 families use the food bank each month and 40% of the food bank's recipients are children. The food supplied at each visit is intended to last three days. The purpose of this study was to analyze the amount and the nutritional content of the food hampers compared to Dietary Reference Intakes (DRIs)[13] and Canada's Food Guide to Healthy Eating.[14]

METHODS

The food bank has 6 different hamper sizes for families of one to six people. In the months between January and May of 2005, 30 hampers from each of the hamper sizes were randomly selected (N = 180 hampers). The food items were recorded and the nutrient content analyzed (i.e., energy, food group inclusion, and macro- and micro-nutrient values) by the Esha Food Processor system (version 7.21, copyright 1998 Esha Research Group) with the Canada Nutrient File (CNF) Food Composition database. When reporting the contents of foods in comparison to the DRIs,[13] the most conservative guidelines were used. All macro- and micro-nutrients were compared with recommendations for adult males aged 18-50, while iron was compared with recommendations for adult females aged 18-30. All data were analyzed using SPSS version 13. One-way Analysis of Variance (ANOVA) was performed to compare nutrient contents of food hampers for different family size. The level of significance for statistical tests was set at 0.05.

No human subjects were contacted in this study and therefore, permission to conduct this study was granted by the Board of Directors at the participating food bank.

TABLE I

Nutrient Content as Percent DRI per Person per Day per Food Bank Hamper (n = 180)

Food Groups/Nutrients	Food Hamper Content (mean ± SD)	Food Guide Recommendations/ DRIs	% of DRI* Available in Food Hamper (mean ± SD)
Food Group (servings/person/day)			
Milk & dairy	0.1 ±0.0	2-4 (adults)	
Meat & alternatives	0.8±0.0	2-3	
Fruits & vegetables	2.0 ±0.08	5-10	
Grain products	6.1±0.3	5-12	
Total kilocalories (kcal)	1634.7 ± 179.7	3067	53 ± 5.9
Macronutrient			
Carbohydrates (g)	1130.4 ± 129.3	45-65†	67 – 69‡
Fats (g)	341.1 ± 15.8	20-30†	19.9 – 21.8‡
Proteins (g)	174 ± 4.7	10-35†	9.9 – 11.3‡
Micronutrient			
Vitamin B12 (µg)	3.5 ± .4	2.4	145 ± 15.1
Thiamin (mg)	1.9 ± .1	1.2	160 ± 6.1
Riboflavin (mg)	1.6 ± .1	1.3	123 ± 5.8
Niacin (mg)	18.9 ± .8	16	118 ± 4.7
Vitamin A (ug RE)	809.0 ±409.0	900 for males/700 for females	89.9 ± 4.5
Vitamin D (ug)	2.3 ±8.0	5	45.5 ± 16.1
Vitamin C (mg)	31.7 ± 21.9	90 for males/75 for females	35.2 ± 24.3
Calcium (mg)	272.9 ± 12.5	1000	27 ± 1.2
Magnesium (mg)	151.3 ± 9.1	420	36 ± 2.2
Iron (mg)	22.7 ± .7	18	126 ± 4.0
Zinc (mg)	4.5 ± .4	11	41 ± 3.2

* DRI refers to Dietary Reference Intakes[13]
† Recommended Macronutrient Distribution Ranges
‡ Percent kilocalories

TABLE II

Estimated Number Days of Food Group Provision per Food Hamper (n = 180)

Food Group (CFG's recommended servings per day)‡	Number of Days Available Using Lower Recommended Values* (mean ±SD)	Number of Days Available Using Upper Recommended Values† (mean ±SD)
Milk and dairy	0.09 ± 0.16	0.05 ± 0.08
(2-4)	(0.00 – 0.95)	(0.00 – 0.47)
Meat and alternatives	1.14 ± 0.63	0.76 ± 0.42
(2-3)	(0.06 – 4.13)	(0.04 – 2.76)
Fruits and vegetables	1.20 ± 0.47	0.60 ± 0.23
(5-10)	(0.00 – 2.54)	(0.00 – 1.27)
Grain products	3.63 ± 1.58	1.51 ± 0.66
(5-12)	(0.62 – 8.87)	(0.26 – 3.70)

* divided by lower recommended daily serving size (i.e., 2, 2, 5, and 5)
† divided by Canada's Food Guide to Healthy Eating (CFG) upper recommended daily serving size (i.e., 4, 3, 10, and 12)
‡ Canada's Food Guide to Healthy Eating[14]

RESULTS

When analyzed per person, no nutrient, energy, or food group differences were found among hampers intended for 1, 2, 3, 4, 5, or 6 people and therefore, all values are presented per person regardless of hamper size. With regard to the recommendations from Canada's Food Guide to Healthy Eating,[14] all food groups, with the exception of grain products (which provided up to 6.36 daily servings), were inadequate when compared to the recommended number of daily servings (Table I). As presented in Table I, carbohydrates were slightly above the DRI upper-most macronutrient distribution range, and both percent energy from fat and protein scarcely met the minimum cut-offs for appropriate ranges. The micro-nutrient content of the food hampers, per person per day, varied widely and sufficient DRIs were available for only 36% of the micro-nutrients analyzed. While approximately one third of the required amount of vitamin C was provided for in the hampers, more than one and a half times the amount of thiamin was available. Table II presents the estimated number of days that would include sufficient servings of food groups, when compared to Canada's Food Guide to Healthy Eating's lower and upper recommendations for daily servings. The rationale for comparing both the lower and upper recommendations is based on a conservation consideration that some food bank users may need more nutrients than others (e.g., people with a bigger body

TABLE III

Estimated Number of Days that the Kilocalories and Micronutrient Content Provided by Hampers Can Sustain a Person, and Number of Hampers Meeting the 3-Day Goal (n = 180)

Nutrients	Mean ± SD (days)	% of Hampers with <3 Days Supply (n)
Total kilocalories	1.60 ± 1.76	99.4 (179)
Vitamin A	2.70 ± 1.36	66.7 (120)
Vitamin D	1.36 ± 4.82	96.1 (173)
Vitamin C	1.06 ± 0.73	98.9 (178)
Folate	2.51 ± 1.89	75.6 (136)
Vitamin B12	4.35 ± 4.52	46.7 (84)
Thiamin	4.79 ± 1.84	12.2 (22)
Riboflavin	3.70 ± 1.73	33.9 (61)
Niacin	3.54 ± 1.41	40.0 (72)
Calcium	0.82 ± 0.37	100.0 (180)
Magnesium	1.08 ± 0.65	98.9 (178)
Iron	3.79 ± 1.20	23.3 (42)
Zinc	1.24 ± 0.97	93.9 (169)

frame and a higher physical activity level need more energy, thus their servings of grains and meat may approach the upper end of the recommendations). When using the lower number of recommended servings, food hampers did not provide sufficient servings for three days worth of milk and dairy, meat and alternatives, and fruits and vegetables. Sufficient servings of grain products were available for the lower recommended daily servings. None of the food groups were adequately provided for when compared to the upper number of recommended daily servings. As shown in Table III, the majority of hampers provided energy and amounts of most micronutrients per person in amounts below the recommended daily intakes. Approximately 88% of the hampers provided sufficient daily amounts of thiamin and 77% of the hampers provided sufficient iron. On the other end of the spectrum, nearly all hampers provided insufficient amounts of magnesium, calcium, vitamins C and D, and overall caloric content.

DISCUSSION

In general, the food hampers did not provide sufficient macro- or micro-nutrients, food group servings, or energy per person for the intended three days. Inadequate nutritional content of food bank hampers was also identified by Teron and Tarasuk's study of a large urban food bank in Toronto, Ontario.[8] In particular, Teron and Tarasuk found calcium and vitamin D to be lacking in the food hampers.[8] They also found vitamin A to be in limited supply, although the current study found that nearly 90% of DRI of vitamin A was contained within the hampers. It is possible that the nutritional provisions contained within the food hampers were actually less, in some cases, than is reported here. Teron and Tarasuk found that approximately half of food bank users in their study received food they deemed unsafe to eat, and therefore did not consume the products.[8] When removing potentially unsafe items from the food bank hampers, the potential nutritional and caloric content of those items would also be removed from the individual's overall intake. Food quality in terms of perceived safety was not studied in the current investigation and may have reduced further the nutritional provisions available to clients. Conversely, in some cases, the nutritional content may have been more favourable than is reported here. The food bank does give out fresh foods such as milk, bread and vegetables as they become available from donations. These are known as "extras" and the nature of these vary greatly from day to day. Due to the lack of consistency of being able to provide them, these extras were not included in the analysis. At the time of the study, some of the hampers would have included extras and, therefore, provided additional nutritional provisions than are reflected here. Furthermore, the most conservative guidelines were used as benchmarks, and therefore nutrient content may have been adequate for some food bank recipients depending on their sex, age, height, weight, and activity levels. The overall energy available per person was insufficient for most Canadians.

The nutrients missing from the food hampers can come from nutrient-rich fresh fruits, vegetables, dairy products, and meats and alternatives. Often these nutrient-rich foods are relatively more expensive than processed foods and many low-income families have limited finances to purchase these much-needed foods.[15] In families with financial limitations, it seems reasonable to assume that existing funds would be spent on purchasing less expensive and larger quantities of food to ensure that all members of the family receive something to eat. Unfortunately, these foods typically are grains and cereals which are often high in sugars and low in many nutrients. Therefore, encouraging food bank donations from individuals and corporations in the form of fresh or even canned fruits, vegetables, dairy, and meat and alternatives *and* the much-needed storage facilities to ensure safety and space for perishable food would be valuable for food bank users and may be an effective recommendation for food banks.

With 15% of Canadians experiencing food insecurity, food banks have become a very important source of nutrition for low-income and highly vulnerable subpopulations in Canada.[2] The use of food banks has grown dramatically since the 1980s and has become an integral source of nutrition for many families.[7] Recently, Tarasuk and Eakin pointed to a societal belief that food banks are adequately able to meet the needs of the underprivileged.[9] As additional research focuses on the quality and quantity of food available at food banks, it is clear that there must be a change in society's perception that foods banks are able to provide sufficiently for people in need. This study found inadequate amounts of energy, macro- and micro-nutrients available in food bank hampers and adds support to the growing body of evidence with regard to the monumental problem of hunger and inappropriate nutrition among a substantial number of Canadians. This situation requires meaningful and immediate attention.

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RÉSUMÉ

Contexte : Les problèmes de disponibilité alimentaire sont de plus en plus préoccupants au Canada, et la fréquentation des banques d'alimentation est devenue une nécessité pour plus de 820 000 Canadiens[1]. Comme ces banques jouent un rôle essentiel, nous avons voulu comparer aux directives canadiennes le contenu des paniers alimentaires distribués dans une grande banque d'alimentation d'une ville du sud-ouest de l'Ontario, censés nourrir une personne pendant trois jours.

Méthode : Nous avons étudié un échantillon de 30 paniers de chaque taille disponible (pour 1 à 6 personnes) (n=180). Les articles alimentaires ont été notés, et nous en avons analysé le nombre de calories, le groupe d'aliments et la valeur en macro- et en micronutriments. Les résultats ont été comparés aux Apports nutritionnels de référence (ANREF) et au Guide alimentaire canadien pour manger sainement.

Résultats : 99 % des paniers ne contenaient pas l'équivalent de trois jours d'éléments nutritifs. Les produits céréaliers correspondaient au nombre minimum de portions recommandées dans le Guide alimentaire canadien, et les légumes et fruits, les viandes et substituts et les produits laitiers étaient en deçà des niveaux recommandés, tout comme bon nombre de vitamines et de minéraux, dont les vitamines A, D, B12 et C, la riboflavine, la niacine, le calcium, le magnésium et le zinc. Les glucides étaient légèrement au-dessus des ANREF recommandés, et les apports énergétiques provenant des matières grasses et des protéines atteignaient à peine les minimums recommandés. Les paniers contenaient un apport énergétique de 1,6 jour par personne.

Discussion : L'apport énergétique disponible par personne était inférieur aux recommandations qui valent pour la plupart des Canadiens. Les nutriments manquants dans les paniers se trouvent dans les fruits frais, les légumes, les produits laitiers et les viandes et substituts. Cependant, beaucoup de familles à faible revenu n'ont pas les moyens d'acheter ces aliments, qui sont relativement plus chers que les aliments transformés. Il faut absolument encourager davantage les dons d'aliments périssables et les installations de stockage connexes, afin de maximiser les apports nutritionnels des clients des banques alimentaires.