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Prevalence and sociodemographic risk factors related to household food security in Aboriginal peoples in Canada

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Abstract

Objective: Canada's Aboriginal population is vulnerable to food insecurity and increasingly lives off-reserve. The Canadian Community Health Survey, Cycle 2.2 Nutrition, was used to compare the prevalence and sociodemographic correlates of food insecurity between non-Aboriginal and off-reserve Aboriginal households.
Design: Food insecurity status was based on Health Canada's revised interpretation of responses to the US Household Food Security Survey Module. Logistic regression was used to assess if Aboriginal households were at higher risk for food insecurity than non-Aboriginal households, adjusting for household sociodemographic factors.
Setting: Canada.
Subjects: Households (*n* 35,107), 1528 Aboriginal and 33 579 non-Aboriginal.
Results: Thirty-three per cent of Aboriginal households were food insecure as compared with 9 % of non-Aboriginal households (univariate OR 5·2, 95 % CI 4·2, 6·3). Whereas 14 % of Aboriginal households had severe food insecurity, 3 % of non-Aboriginal households did. The prevalence of sociodemographic risk factors for household food insecurity was higher for Aboriginal households. Aboriginal households were more likely to have three or more children (14 % *v.* 5 %), be lone-parent households (21 % *v.* 5 %), not have home ownership (52 % *v.* 31 %), have educational attainment of secondary school or less (43 % *v.* 26 %), have income from sources other than wages or salaries (38 % *v.* 29 %), and be in the lowest income adequacy category (33 % *v.* 12 %). Adjusted for these sociodemographic factors, Aboriginal households retained a higher risk for food insecurity than non-Aboriginal households (OR 2·6, 95 % CI 2·1, 3·2).
Conclusions: Off-reserve Aboriginal households in Canada merit special attention for income security and poverty alleviation initiatives.

Keywords
American Indians
Canada
Low-income populations
Health survey
Nutrition

In a wealthy country such as Canada elevated rates of poverty persist among economically vulnerable groups, including Aboriginal (First Nations, Métis, Inuit)† groups[1]. Food insecurity, the limited or uncertain availability of nutritionally adequate and safe foods, or the limited or uncertain ability to acquire acceptable foods in socially acceptable ways[2], is widespread in Aboriginal households in Canada[3–7]. High levels of poverty, multi-child households, low levels of education achievement and labour force participation, reliance on social assistance and welfare, and female lone-parent families are associated with food insecurity in Aboriginal households[3–8]. Canada's Aboriginal population has surpassed the one million mark, is experiencing upward growth, and 54 % of enumerated Aboriginals live off-reserve‡[9]. The off-reserve Aboriginal population has less often been included in health and nutrition surveys than the on-reserve population, in part because the federal government historically took the position that its specific responsibilities for Aboriginal Peoples were limited to Status Indians living on-reserve and Inuit[10]. Aboriginals aged 19–50 years living off-reserve were intentionally over-sampled in the Canadian Community Health Survey, Cycle 2.2 Nutrition (CCHS 2.2), which allowed for separate analysis of household food insecurity in this subpopulation[11,12].

The CCHS 2.2 was a cross-sectional survey of Canadians households. Excluded from the survey were persons living on Indian reserves or Crown lands, persons living in institutions, full-time members of the Canadian Forces and residents of some remote regions[11,12]. Treasury Board

† In Canada, First Nations is the preferred term for American Indians. Inuit traditionally inhabited Arctic Canada. Métis have mixed First Nations and European ancestry.

‡ A reserve is a tract of Crown land (not privately owned) set aside for the use and benefit of an Indian band (community).

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funding did not provide for data collection in the Northwest Territories, Yukon Territory or Nunavut. However, the target population covered by the survey represents approximately 98% of the population of the ten provinces and is thus considered a national survey[13]. The CCHS 2.2 is the only Canada-wide survey to include a multiple-indicator measure to derive household food security status using the US Household Food Security Survey Module (HFSSM)[12], which is an internationally recognized 18-question measure of food insecurity resulting from financial resource constraint over the previous 12 months, ranging in severity from worrying about running out of food to children not eating for a whole day. Each question addresses either an issue pertaining to a lack of money or an inability to afford food as the reason for the condition or behaviour[14]. Given the array of sociodemographic variables that were collected, the intentional over-sampling of the off-reserve Aboriginal population and the use of the HFSSM to measure food insecurity, the CCHS 2.2 provided an important opportunity to better understand the household-level factors associated with the food security situation of Aboriginal households[12].

We report herein the prevalence of food insecurity for Aboriginal and non-Aboriginal households included in the CCHS 2.2 using a method developed by Health Canada to interpret responses to the HFSSM[12]. The sociodemographic risk factors for food insecurity of Aboriginal and non-Aboriginal households were compared. It was intended that the results could inform about the need for income security strategies and poverty alleviation initiatives for the off-reserve Aboriginal population, in addition to providing a baseline measurement of household food insecurity prevalence to be monitored using the HFSSM in subsequent Canadian Community Health Surveys[12].

Methods

Survey design and composition

A complex multistage sampling strategy was used to select participating households and respondents in the CCHS 2.2. A single member of 35 107 Canadian households was surveyed between January 2004 and January 2005, of whom 1528 respondents were identified as Aboriginal (59·1% North American Indian, 37·0% Métis and 3·1% Inuit; does not add up to 100% due to rounding). Of Aboriginal respondents, 405 had mixed Aboriginal and non-Aboriginal origin and 1123 had sole Aboriginal identity (i.e. no other cultural/racial group chosen). The overall survey response rate was 76·5%. Detailed descriptions of the CCHS 2.2 design, sample and interview procedures are available elsewhere[11,12].

Data access

Research was conducted under the Research Data Centre (RDC) Program which provided researchers access, in a secure university setting, to the CCHS 2.2 Master File that included data collected from every respondent[15].

Variables

Household food insecurity status was the outcome variable. Food security status was based on a revised interpretation of the responses to the HFSSM developed by Health Canada's Office of Nutrition Policy and Promotion in consultation with leading experts in nutrition and food security[12]. Two levels of food insecurity were defined. Adults and/or children in households with moderate food insecurity reported multiple indicators of problems of food access such as inadequacy in household food supplies or adjustments to the quality of food consumed. In addition to these indicators, households with severe food insecurity also reported disrupted eating patterns and reduced food intake among adults and/or children[12]. Due to small numbers, child food insecurity was not considered separately from adult food insecurity. Household food security status information was missing for <1% of respondents.

Respondents with sole or mixed Aboriginal identity were considered Aboriginal. All other respondents were considered non-Aboriginal. On the basis of respondent identity, households were categorized as Aboriginal or non-Aboriginal. Information on ethnic status was missing for <1% of respondents.

Household-level sociodemographic variables collected by questionnaire were used as covariates in regression analysis (percentage of missing values in parentheses): highest level of education achieved by any member of the household (2·0%), home ownership (<1·0%), household income adequacy based on the number of people in the household and total household income from all sources in the 12 months before the interview (10·0%), main source of household income (3·0%). Due to small numbers of observations and the risk of disclosure, the categories for almost all variables had to be more aggregated than the derived variables in the CCHS 2.2. Information on original survey variables is reported elsewhere[16].

Statistical analysis and data handling

Prevalence estimates were derived for total household food insecurity and for each of moderate and severe household food insecurity. As not all people in food-insecure households are necessarily food insecure, it was not possible to estimate the individual number of Canadians experiencing food insecurity[12]. All estimates were calculated using sampling weights provided by Statistics Canada to account for design effect and non-response bias. Household weights were used to estimate the number of households experiencing food insecurity. Owing to the small number of respondents, rounding of the prevalence estimates was required so as to avoid disclosure[16].

Associations between household overall food insecurity status (moderate and severe food insecurity combined)

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and sociodemographic factors were examined using univariate and multiple logistic regression models. To assess potential differences in the associations of sociodemographic factors with household food insecurity, analyses were initially stratified by Aboriginal and non-Aboriginal household status. Univariate odds ratios for household food insecurity for each sociodemographic variable were calculated, as were odds ratios adjusted for all sociodemographic variables. Hosmer and Lemeshow's purposeful selection procedure was used to build the multiple regression model[17]. Standard errors were estimated using a bootstrapping procedure[18,19]. According to Statistics Canada's policy, data with a moderate CV (16·5–33·3 %) were interpreted with caution and data with a CV > 33·3 % or a respondent count of <30 were suppressed due to extreme sampling variability[16]. The STATA statistical software package version 9 (Stata Corp., College Station, TX, USA) was used to perform the statistical analyses.

Ethics approval for the study was obtained from the Human Research Ethics Board of the Faculty of Agriculture, Forestry and Home Economics, University of Alberta.

Results

There were an estimated 12 000 000 non-Aboriginal and 196 000 off-reserve Aboriginal households in Canada in 2004. Overall, 33 % of Aboriginal households surveyed were food insecure as compared with 9 % of non-Aboriginal households. The univariate odds ratio for food insecurity for Aboriginal *v.* non-Aboriginal households was 5·2 (95 % CI 4·2, 6·3). Of Aboriginal households, 19 % had moderate food insecurity and 14 % had severe food insecurity; whereas of non-Aboriginal households, 6 % had moderate food insecurity and 3 % had severe food insecurity.

Table 1 provides the distribution of categories of sociodemographic variables in Aboriginal and non-Aboriginal households, the prevalence of food insecurity for each variable, and univariate and adjusted odds ratios for food insecurity. Aboriginal households had a higher prevalence of risk factors for food insecurity than non-Aboriginal households and experienced a greater prevalence of food insecurity than non-Aboriginal households with similar risk factors. Overall, 17·9 % of Aboriginal households received social assistance as compared with 3·5 % of non-Aboriginal households. Of Aboriginal households having a main source of income other than wages and salaries, 47 % received social assistance and 51 % were food insecure. By comparison, of non-Aboriginal in this category, 12 % received social assistance and 13 % were food insecure. The percentage of households headed by females was high for both Aboriginal (91 %) and non-Aboriginal (85 %) lone-parent households. Half (51 %) of Aboriginal households with three or more children were food insecure as compared with 13 % of non-Aboriginal households with this many children. After adjusting for sociodemographic factors, Aboriginal but not non-Aboriginal households with three or more children had higher odds for food insecurity than households without children.

Table 2 shows the odds ratios for household food insecurity for each sociodemographic variable adjusted for Aboriginal ethnicity, as well as the final multiple regression model adjusted for Aboriginal ethnicity and all sociodemographic factors. Aboriginal households had higher odds for food insecurity compared with non-Aboriginal households (adjusted OR 2·6, 95 % CI 2·1, 3·2). There were no statistically significant first-order interactions between any covariate and ethnic status.

Discussion

The CCHS 2.2 offered the first opportunity to derive population estimates of the household food insecurity status of the off-reserve Aboriginal population in the context of financial resource constraint[12]. Aboriginal households were more likely than non-Aboriginal households participating in the CCHS 2.2 to have overall (33 % *v.* 9 %), moderate (19 % *v.* 6 %) and severe (14 % *v.* 3 %) food insecurity. Even after controlling for differences in household sociodemographic risk factors, Aboriginal households had 2·6 times greater odds for food insecurity than non-Aboriginal households.

A greater proportion of Aboriginal households was in the lowest income adequacy category and relied on social assistance for income. A previous study reported that 59·7 % of all Canadian households relying on social assistance in the CCHS 2.2 were food insecure, and that 66·7 % of Aboriginal households that received social assistance were food insecure[12]. In Canada, social assistance funds fall below Statistics Canada's Low Income Cut-Offs (unofficial poverty lines), and fail to provide sufficient income for an adequate material standard of living and economic security[1,20]. Consequently, in households receiving social assistance, often funds meant for food are spent on other essentials such as shelter and utilities[1]. Therefore, the likely explanation for the higher prevalence of food insecurity in Aboriginal households is a greater depth of poverty. The Canadian federal government has established targeted, strategic initiatives to address the interrelated causes of poverty and inequality in Aboriginal Canadians; however, only recently has the off-reserve Aboriginal population been considered in initiatives to eradicate poverty[21]. The findings from the CCHS 2.2 indicate that to alleviate food insecurity in the off-reserve Aboriginal population, government initiatives must address poverty by increasing income and social assistance funding for families receiving welfare.

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Table 1 Distribution of sociodemographic factors within households, prevalence of food insecurity by category of sociodemographic variable, and the unadjusted and adjusted odds ratios and 95 % confidence intervals for household food insecurity: Canadian Community Health Survey, Cycle 2.2 Nutrition, 2004

	Aboriginal households						Non-Aboriginal households					
			Univariate analysis		Adjusted analysis*				Univariate analysis		Adjusted analysis*	
Sociodemographic variable	Distribution of category (%)	Food insecurity (%)	OR	95 % CI	OR	95 % CI	Distribution of category (%)	Food insecurity (%)	OR	95 % CI	OR	95 % CI
Children <18 years												
None	50	28	1·00	ref	1·00	ref	68	8	1·00	ref	1·00	ref
1 or 2	36	33	1·29	0·84, 1·96	1·93	0·63, 5·96	27	9	1·11	0·97, 1·28	1·38	0·81, 2·37
3+	14	51	2·77	1·69, 4·55	3·43	1·01, 11·72	5	13	1·70	1·39, 2·07	1·52	0·86, 2·71
Home ownership												
Owns	48	16	1·00	ref	1·00	ref	69	4	1·00	ref	1·00	ref
Does not own	52	48	4·88	3·28, 7·26	2·02	1·27, 3·21	31	19	5·95	5·19, 6·81	3·06	2·60, 3·61
Household education†												
Secondary or less	43	43	1·00	ref	1·00	ref	26	12	1·00	ref	1·00	ref
Some post-secondary	45	29	0·53	0·35, 0·80	0·91	0·59, 5·47	43	10	0·77	0·67, 0·90	1·25	1·03, 1·52
Post-secondary	12	14	0·21	0·10, 0·44	0·74	0·35, 1·55	31	4 (E)	0·32	0·26, 0·40	0·68	0·54, 0·88
Main income source												
Wages and salaries‡	62	21	1·00	ref	1·00	ref	71	7	1·00	ref	1·00	ref
Other§	38	51	3·92	2·65, 5·81	1·11	0·67, 1·83	29	13	1·97	1·71, 2·25	0·76	0·63, 0·92
Income adequacy‖												
Lowest	33	66	18·10	10·40, 31·32	9·03	3·90, 20·92	12	33	9·32	7·68, 11·31	7·34	5·90, 9·14
Lower middle	25	31	4·14	2·30, 7·47	2·72	1·45, 5·09	22	13	2·80	2·32, 3·38	2·40	1·96, 2·93
Upper middle	26	10 (E)	1·00	ref	1·00	ref	35	5	1·00	ref	1·00	ref
Highest	15	(F)	0·60	0·23, 1·57	0·75	0·24, 2·38	31	1	0·25	0·18, 0·34	0·35	0·26, 0·48
Household type												
Couple with children	27	27	1·00	ref	1·00	ref	26	7	1·00	ref	1·00	ref
Couple, no children¶	19	12 (E)	0·37	0·16, 0·87	0·96	0·23, 4·10	33	3	0·44	0·36, 0·54	0·74	0·41, 1·35
Lone parent**	21	52	2·9	1·75, 4·86	1·22	0·62, 2·38	5	20	3·26	2·71, 3·91	1·13	0·89, 1·43
Other††	33	38	1·62	1·00, 2·61	1·80	0·59, 5·47	36	13	1·87	1·60, 2·19	1·11	0·64, 1·91

(E), high sampling variability, CV = 16·6–33·3 %, interpret result with caution; (F), results suppressed, CV > 33·3 %; ref, referent category.
*Adjusted for all sociodemographic factors.
†This variable reflects the highest level of education achieved by any member of the household.
‡Includes income from self-employment.
§Includes social assistance, worker's compensation/employment insurance, pensions/seniors' benefits and other income (alimony, child support, child tax benefits, dividends and interest, and other).
‖Based on the number of people in the household and the total household income from all sources in the 12 months before the interview.
¶Includes couples living alone, or with children 18 years and older, or with 'others'.
**Includes lone parents living with at least one child less than 18 years old; may also be living with 'others'.
††Includes unattached individuals and 'other' households.

Table 2 Aboriginal status adjusted and multivariable adjusted odds ratios and 95 % confidence intervals for living in a household with food insecurity: Canadian Community Health Survey, Cycle 2.2 Nutrition, 2004

	Aboriginal status adjusted		Multivariable adjusted*	
	OR	95 % CI	OR	95 % CI
Aboriginal status				
No	n/a		1·00	ref
Yes	n/a		2·61	2·10, 3·24
Number of children				
None	1·00	ref	1·00	ref
1 or 2	1·12	0·98, 1·28	1·43	0·85, 2·39
3+	1·76	1·47, 2·12	1·63	0·94, 2·83
Household type				
Couple with children	1·00	ref	1·00	ref
Couple, no children	0·44	0·36, 0·54	0·76	0·44, 1·34
Lone parent	3·24	2·72, 3·86	1·14	0·91, 1·42
Other	1·86	1·59, 2·17	1·15	0·68, 1·92
Home ownership				
Owns	1·00	ref	1·00	ref
Does not own	5·90	5·18, 6·73	3·02	2·59, 3·53
Highest level of education in household				
Secondary or less	1·00	ref	1·00	ref
Some post-secondary	0·76	0·66, 0·87	1·24	1·04, 1·48
Post-secondary graduate	0·32	0·26, 0·39	0·68	0·54, 0·87
Main source of household income				
Wages and salaries	1·00	ref	1·00	ref
Other	2·02	1·78, 2·31	0·77	0·64, 0·93
Household income adequacy				
Lowest	9·52	7·89, 11·50	7·36	5·91, 9·16
Lower middle	2·83	2·35, 3·40	2·39	1·96, 2·91
Upper middle	1·00	ref	1·00	ref
Highest	0·25	0·19, 0·34	0·36	0·26, 0·49

n/a, not applicable; ref, referent category.
*Adjusted for Aboriginal status and for sociodemographic factors.

Aboriginal households with three or more children and lone-parent Aboriginal households participating in the CCHS 2.2 experienced a greater prevalence of food insecurity than non-Aboriginal households under these conditions. The majority of lone-parent households were headed by women. In these types of households mothers tend to sacrifice their own diet so that children will not be hungry[22]. It is critical that lone-parent Aboriginal mothers and Aboriginal households with multiple children be provided with sufficient financial resources to ensure that parents and their children do not go hungry or experience anxiety about not having sufficient food to eat. The National Child Benefit (NCB) is a federal government initiative to reduce child poverty; however, some provinces reduce the amount of social assistance a family receives by the amount of the NCB[1]. Policy initiatives such as increasing the amount of the NCB for each additional child, and eliminating the claw back of the NCB from families receiving social assistance, have the potential to improve the economic conditions of many Aboriginal families at risk for food insecurity[1].

Unexplored or unmeasured factors may be responsible for the higher prevalence of food insecurity in Aboriginal households. If the material, behavioural and psychological circumstances associated with the vulnerability to food insecurity vary between Aboriginal and non-Aboriginal households, then the lived experience of food insecurity would be distinct between the two groups. There is little knowledge about how or if Aboriginal household dynamics such as crowding or living in multiple-family households influence food insecurity. The HFSSM does not capture the strategies used to cope with food insecurity[14]. Coping strategies for off-reserve Aboriginal households may be unique, such as accessing traditional foods from friends and family with access to land for hunting. To effectively promote and support healthy eating among Aboriginal peoples living off-reserve, there is the need for a comprehensive understanding of the many factors related to food security that influence food procurement, purchasing and eating behaviour, such as cycles of food expenditure in relation to the arrival of pay cheques or government welfare cheques, as well as strategies to meet food needs, including the use of charities such as food banks from community food-assistance providers[23]. Qualitative studies to better understand the circumstances of Aboriginal people's lives under conditions of household food insecurity, as well as coping strategies used by Aboriginal households to address food insecurity, from anxiety to hunger, are required[24]. The findings would allow food security programmes to be tailored to the unique needs of the Aboriginal population.

There are several limitations to the study based on sample size and survey design. Small numbers precluded severe food insecurity being considered an outcome variable even though members of households in this

grouping merited their own analysis given that they may have experienced severe food deprivation and hunger[12]. As a result of the relatively small number of Aboriginal respondents, sociodemographic data were aggregated, even though aggregate data hide disparities and variation in the material and other circumstances of people's lives. The Aboriginal population of Canada is very heterogeneous, culturally, geographically and linguistically; however, separate analysis was not possible for the three cultural groups of Aboriginal respondents. If future surveys were to include a larger sample of the Aboriginal population, disaggregated information for each of Métis, First Nations and Inuit, as well as for individuals with sole and mixed Aboriginal identity, would provide a diversity of data to inform public policy about food security. It is probable that the extent of household food insecurity was underestimated by the survey because some households defined as food secure using the HFSSM may have had marginal food security status[12]. In addition, excluded from the survey sampling frame were populations living in the territories which often have limited economic opportunities and high food costs, and thus a high prevalence of food insecurity[5,7]. Given the demand for a wide range of information on a small population, managing respondent burden in the territories is a significant challenge. Statistics Canada is working with the territorial governments to prioritize data requirements and to make data collection as cost-effective as possible. Health Canada supports this process (personal communication by email, September 2008).

Conclusions

Off-reserve Aboriginal households merit special attention for income security and poverty alleviation programmes. Monitoring changes in income-related household food insecurity in the off-reserve Aboriginal population in future Canadian Community Health Surveys using the HFSSM will allow the effectiveness of initiatives to reduce poverty to be evaluated. A larger sample would permit better discernment of factors that might account for the higher rate of food insecurity in Aboriginal households. Conceptualization of food security for a diversity of Aboriginal peoples requires qualitative research.

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