Comparison of Dietary Intake Between Francophones and Anglophones in Canada: Data From CCHS 2.2

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ABSTRACT

OBJECTIVE: To compare the dietary intake and food choices between Francophone Canadians in a state of linguistic minority (outside of Quebec) and the English-speaking majority.

METHODS: We used the 2004 Canadian Community Health Survey (CCHS) cycle 2.2 (general health and 24-hour dietary recalls) to describe dietary intake of Francophone Canadians (excluding Quebec) and compare them to the English-speaking majority. The linguistic variable was determined by languages spoken at home, first language learned and still understood, language of interview, and language of preference. The mean differences in daily nutrient and food intake were assessed by t and chi-square tests.

RESULTS: Differences in total energy and daily food intakes by language groups were not observed in the sample; however, significant differences in weekly consumption were found in different age and sex categories: lower fruits and vegetables consumption, and vitamins and macronutrients intakes for older Francophone men and higher intakes of energy and saturated fat from “unhealthy” foods for Francophone men 19-30 years of age. Based on the Acceptable Macronutrients Distribution Range (AMDR), approximately 50% of the sample exceeded their acceptable energy intake from saturated fats, and 80% were below their required intake of linoleic fatty acid.

CONCLUSION: We confirmed that belonging to Francophone minorities in Canada affects food choices and nutritional well-being of this population. The most vulnerable groups identified by our study were Francophone men in the youngest (19-30) and older (50 and over) age categories. The extent to which the cultural setting influences the diet and, in turn, the health of the minority population needs further examination.

KEY WORDS: Nutrition; diet; energy intake; food intake; official language minorities

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

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In its recent report, Health Canada stressed a need to better understand how individual and environmental determinants operate in different populations and different life circumstances, with particular emphasis on nutritionally vulnerable groups.¹ Understanding the eating behaviour of a population requires taking into account not only individual but also contextual determinants of food choices. Contextual settings including cultural factors are believed to have a strong impact on an individual's food intake, attitudes and behaviours.² The importance of understanding the eating habits of populations is reflected in the effort to reduce risk and prevent chronic diseases and the worldwide attention to the dramatic increases in overweight and obesity.³ We believe that the contextual differences between the Francophone minority and the Anglophone majority in Canada may be reflected in the nutrition status of both populations. The Francophone official language minority communities in Canada represent approximately one million people: 51% of them live in the province of Ontario, followed by 22% in New Brunswick. In the remaining provinces, the Francophone population accounts for less than 4% of the population. The health status of the Francophone minority is generally poorer in any given province and it can be attributed to the circumstances of living as minorities.⁴⁻⁷ Francophones are often ranked lower with respect to average income, level of schooling, and occupation scales.^{8,9} They are also more likely than Anglophones to engage in certain risky health behaviours involving

alcohol and tobacco abuse.¹⁰ These predictors are known to be associated with unhealthy dietary choices. However, the nutrition status of the official language minority is poorly documented in the literature; fruits and vegetables consumption is often the only reported variable for nutrition intake.^{4,5} Our goal is to describe more extensively the nutrition status of Francophone minorities in Canada to better understand factors that may contribute to the observed differences in health status between Francophone minority and Anglophone majority populations reported in the literature.

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Table 1. Demographic and Socio-economic Characteristics of the Sample of Francophone and Anglophone Populations in Canada Except Quebec

	Francophones %	Anglophones %
Sex		
Males	49.0	49.3
Females	51.0	50.7
Age (years)		
19-30	16.8	22.0
31-50	43.7	41.4
51-70	27.2	26.4
70+	12.3	10.2
Area of residence*		
Urban	72.0	83.8
Rural	28.0	16.2
Income quintiles		
1 st quintile	19.6	19.7
2 nd quintile	16.8	20.2
3 rd quintile	18.3	20.3
4 th quintile	21.9	20.0
5 th quintile	23.4	19.9
Self-perceived health		
Males		
Poor or fair	3.6	1.9
Good	16.6	19.0
Very good	31.7	31.2
Excellent	38.4	33.3
Females		
Poor or fair	2.7	2.6
Good	25.1	19.5
Very good	29.4	32.2
Excellent	32.9	31.6
Have at least one chronic disease		
Males		
19-30	15.7	18.1
31-50	25.8	28.9
51-70	70.6	58.4
70+	78.8	81.1
Females		
19-30	22.3	23.8
31-50	39.0	34.8
51-70	75.6	65.0
70+	70.3	86.0
Food security status		
Food secure		
Males	92.9	92.6
Females	89.8	91.6
Food insecure without hunger		
Males	1.9	3.8
Females	8.5	5.4
Food insecure with moderate or severe hunger		
Males	2.4	2.6
Females	1.6	2.4
Activity		
Males		
Active	20.8	20.1
Moderate	17.5	24.6
Inactive	61.6	55.3
Females		
Active	17.5	18.2
Moderate	21.1	24.2
Inactive	61.4	57.6
Body Mass Index (BMI)		
Males		
Underweight/normal	25.3	33.7
Overweight	50.6	42.3
Obese	24.1	24.0
Females		
Underweight/normal	46.0	45.1
Overweight	24.1	31.5
Obese	29.9	23.0

* Significantly different at $p < 0.05$.

METHODS

Data source

The current study is a secondary analysis of the 2004 Canadian Community Health Survey (CCHS) cycle 2.2 (Nutrition), a national population-based survey on food consumption.¹¹ Data for the survey

Table 2. Proportion of Francophones and Anglophones With Macronutrients Intake Above and Below the Acceptable Macronutrients Distribution Range (AMDR)

		Anglo- phones	Franco- phones
Above AMDR	% of energy from total fat	20.2%	16.3%
	% of energy from saturated fat	49.7%	50.4%
Below AMDR	% of energy from protein	0.7%	<1%*
	% of energy from carbohydrates	18.9%	20.2%
	% of energy from linolenic fatty acid	28.1%	32.1%
	% of energy from linoleic fatty acid	75.8%	79.1%

* Estimated value.

was collected from 35,107 respondents of all ages living in private occupied dwellings in the ten provinces, excluding pregnant women and women who were breastfeeding. All participants completed an initial 24-hour dietary recall and a subsample of 10,786 completed a second recall, 3 to 10 days later. The response rate in the first and the second recalls was 76.5% and 72.8%, respectively. We used the general component of the survey and two 24-hour dietary recall components to describe dietary intake and nutritional well-being of official language minorities (Francophones) in Canada (except for Quebec) and to compare them to the English-speaking population. Only respondents who were 19 years and older and who could be identified as either Francophone or Anglophone were included in this analysis. The linguistic variable was determined by languages spoken at home, first language learned and still understood, language of interview, and language of preference (French, English, and bilingual). The final sample used for analysis consisted of 29,965 adults aged 19 years and over (28,329 Anglophones and 1,636 Francophones) living in all provinces of Canada except Quebec.

Statistical methods

Cross tabulation and chi-squared test were used to describe socio-economic status of both populations.

Estimates by age and sex for the average daily nutrient and food intakes, average percentage of daily energy intakes (in Kcal) from carbohydrates, fats, proteins, and fibre, and daily energy intakes from different food groups for Francophones and Anglophones were derived using the first 24-hour recall.

The combined first and second recalls were used to assess the proportion of both populations with inadequate vitamin and macronutrient intakes. Usual intakes of macronutrients and vitamins were estimated with the Software for Intake Distribution Estimation (SIDE),¹² using data from both recalls. Percent of energy intake from different food sources were compared with the Acceptable Macronutrient Distribution Range (AMDR), the value that is estimated to meet the requirements of 50% of healthy individuals.¹³ Vitamins A, B, C and selected elements (magnesium, sodium, zinc and iron) were compared with the Estimated Average Requirement (EAR).¹⁴⁻¹⁸ When the EAR values were not available, Adequate Intake (AI) or Upper Limit (UL) were used instead.¹³ Estimation of food consumption was based on the reported daily frequency of consumption representing the number of times per day respondents consumed food items. Descriptive statistics (frequencies, means, and medians) were used to estimate nutrients and food intakes. The mean differences in daily nutrient and food intake were assessed by t and chi-square tests with bootstrap variance estimation. Stratification by age and sex was performed in every analy-

Figure 1. Distribution of energy intake from different food sources (%) for Francophone and Anglophone men and women

sis. Energy intake was additionally stratified by different food groups.

Food groups' definition was based on the Eating Well with Canada's Food Guide (2011) which separates food into four groups: vegetables and fruits, milk and alternatives, meat and alternatives, and grain products.¹⁹ Based on Canada's Food Guide to Healthy Eating for People Four Years Old and Over, we included an "Other" food group category that covered foods that are mostly fats and oil (butter, cooking oil), and sugars (jam, honey, syrups, candies); high fat and/or high salt snack foods (chips); beverages (soft drinks, tea, coffee, alcohol); and spices, herbs and condiments.²⁰

All estimates were based on data weighted to represent the Canadian adult population. To account for the complex sampling design, variance estimation (95% confidence intervals) and significance testing (chi-square or t-test) on differences between estimates were calculated using the bootstrap technique provided by Statistics Canada. Significance was defined as $p < 0.05$. Analyses were conducted in SAS 9.2.

RESULTS

Francophones in Canada

We retained a sample of 29,965 (28,329 Anglophones (94.3%) and 1,636 Francophones (5.7%)). Significantly more Francophones lived in rural parts of Canada (28% vs. 16%, $p = 0.002$). There were fairly equal gender, age as well as socio-economic factor (income, education) distributions across both populations (Table 1). Approximately 8% of both populations experienced food insecurity, with a higher proportion of food insecurity in Francophones in Ontario, Central, and Western Canada than in the Eastern region (7.2%, 8.6% and 6.7%, respectively).

Just under 25% of men (Francophones and Anglophones) were obese (Body Mass Index (BMI) of ≥ 30 kg/m²) and 50.6% of Francophone men

and 42.3% of Anglophone men were overweight (BMI between 25 and 29.9), while 24.1% of Francophone women and 31.5% of Anglophone women were overweight and 29.9% and 23.5% were obese, respectively. There was no difference between Francophones and Anglophones in self-perceived general and mental health. In both populations, men were more likely than women to perceive themselves as being in good health. Alcohol consumption and smoking status were similarly distributed in Francophone and Anglophone populations. In terms of self-reported physical activity, slightly more than half the respondents were inactive, with approximately one in four being moderately active and one in five being active.

Comparison of daily nutrient intakes for Francophone and Anglophone populations

The average daily energy intake was 2369 and 2340 kilocalories (kcal) for Francophone and Anglophone men, and 1778 and 1763 kcal for Francophone and Anglophone women, respectively. Seven in 10 Francophone and Anglophone men and 5 in 10 Francophone and Anglophone women had energy intakes that exceeded their energy needs. On average, carbohydrates, fat, saturated fat, and proteins contributed 50%, 31%, 10%, and 17% of total energy intake, respectively (Figure 1). Differences in total energy intakes by language groups were not observed in the total sample; however, significant differences were found in different age categories.

Food choices of the youngest Francophone and Anglophone populations

The diet of Francophone men in the 19-30 year age group seemed to be less healthy than that of their Anglophone counterparts: they had significantly higher energy intakes from the "other" foods and consumed more fat (mean difference: 12.8g [4.4, 21.1]) including saturated fats (1.9 [0.2, 3.5]) from the "other" food group. They also

Figure 2a. Differences in daily food consumption between Francophone and Anglophone men aged 51 and over

Figure 2b. Differences in daily food consumption between Francophone and Anglophone women aged 51 and over

had lower energy intake from fruits and vegetables and meats and higher energy intake from milk products (Figure 3a). The opposite was observed for the young Francophone women: their daily energy intake from fruits and vegetables and milk products was higher than that of Anglophone women while their energy intake from the “other” food category was lower (Figure 3b).

Eating habits of the older population

In terms of vitamin intake and food consumption, Francophone men in the two older age categories (51-70 and/or 70+) had significantly lower intakes of vitamins B₆ and C compared to Anglophone men (-0.24 mg [-0.4, -0.05] and -38.7 mg [-57.1, -20.3], respectively). Francophone men aged 70 and older consumed approximately three times fewer vegetables on a weekly basis than Anglophone men and those 51-70 years old consumed two times fewer fruits (-2.7 [-3.9, -1.6] and -2.39 [-3.57, -1.22], respectively). Francophone men aged 51-70 also had more sugar coming from “Other” foods (mean difference: 10.4 g [0.4, 20.3]).

Francophone women in the same age category exhibited better eating habits than men and did not differ significantly from Anglophone women (Figures 2a and 2b).

Francophone men and women (aged 70+) had significantly lower cholesterol intakes from meats (mean difference: -14.8 [-25.3, -4.1]) and “other” foods (-6.4 [-12.0, 0.9]) than their Anglophone counterparts.

Macronutrients – Acceptable Macronutrients Distribution Range (AMDR)

More than 80% of Francophones and Anglophones were within the required range for percentage of total energy intakes from fat, protein, and carbohydrates. However, in terms of percentage of usual energy intake from saturated fat alone, 50% of both groups were above the accepted value. For percent of energy intakes from linoleic fatty acid, more than 75% of both populations did not meet the average requirements (Table 2).

Micronutrients – Proportion of Francophones and Anglophones below the EAR/AI measures

Figure 4 depicts the proportion of males and females in different age groups and in the two linguistic groups below the requirement for some key nutrients (namely vitamins A, B₆, B₁₂ and C). Vitamin A intake seems to be the most limiting in the diet of Canadians in both linguistic groups with more than 50% of Francophone and Anglophone men, 43.3% of Anglophone women, and 21.5% of Francophone women not meeting the average requirements for vitamin A. In terms of minerals, magnesium intake was insufficient for between 20 and 40% of the population depending on age and sex: 32% and 39.5% for Francophone and Anglophone men and 20% and 40% for Francophone and Anglophone women in the 19-30 age category. For the population over 30 years of age, these proportions were even higher. On the other hand, almost 100% of the population exceeded the upper limits for sodium intake.

DISCUSSION

In this study, we aimed to describe nutrition status of Francophone minorities and compare it to that of the Anglophone majority in Canada. An increased worldwide interest in studying nutrition as an important factor of healthy living provided the motivation for

this research. We identified two groups requiring particular attention within the Francophone population living in a situation of linguistic minority, namely men between the ages of 19 and 30 years and men 51 years and older. Young Francophone men's dietary behaviour (fewer fruits and vegetables and more fatty foods) is of concern. However, although identifying these differences is a good starting point, a study that links the unhealthy behaviour of this particular population to socio-economic factors such as education or income could be helpful in understanding the observed differences. For older Francophone men, several vitamins and minerals were consumed in suboptimal quantities, and fruits and vegetables were consumed significantly fewer times by men 70 years and older, placing this already vulnerable population at an increased risk for chronic disease. Low consumption of fruits and vegetables has been linked in the literature with increased risks for cardiovascular disease,^{21,22} diabetes²³ and cancers.^{24,25} For example, it has been calculated that in the Netherlands, cancer cases could be down by 19% (large consensus for gastro-intestinal cancers followed by hormone-related cancers) and cardiovascular deaths by 16% annually if fruit and vegetable consumption were increased from 250 g/day to the recommended 400 g/day for the general Dutch population.²⁶ Several studies on the health status of Francophone minorities in Canada have confirmed poorer health outcomes in comparison with the Anglophone majority.^{4,8} Understanding determinants of the less-than-optimal dietary behaviour observed in some age categories among men is essential for targeting dietary and health messages successfully and recognizing that cultural settings might have an impact on the eating habits of Francophones and Anglophones. It might also provide insight into potential means of promoting healthy eating through strategies appropriate to the specific need of the Francophone population in Canada who might be experiencing some inequalities in access to health services.^{4,5} Similarly, understanding the determinants behind the generally better diet of Francophone women (compared to men and Anglophone women) provides an avenue for elucidating the relative impact of the minority status on dietary behaviour.

While there was no difference in energy intake between linguistic groups, the high rates of overweight and obesity in both populations are indicators that energy intakes are higher than required. Physical inactivity, reported by more than 50% of the sample, has also been directly linked to increased obesity.²⁷ This might point to the variables associated with the obesity epidemic affecting the country and probable associations with the increased burden of chronic disease and subsequent elevated cost to the health system.^{28,29} However, the cross-sectional data analyzed here are not sufficient to elucidate the underlying causes of this dietary behaviour. Also, the sample size of Francophone minorities prevented analysis of nutrition intakes in this population by factors other than age and sex. Looking at other socio-economic factors could provide better understanding of nutrition status of vulnerable groups of Francophone minorities.

In general, it is safe to report that adherence to Canada's Food Guide was observed to be poor in the sample. Of special concern are high intakes of fat and sodium in the general population and low intakes of linolenic acid. High intakes of fat and sodium have been linked with increased risk of chronic disease.^{30,31} In contrast, linolenic acid's protective effect against cardiovascular diseases has

Figure 3a. Distribution of energy intake from five food groups for Francophone and Anglophone men (19-30 years old)

Figure 3b. Distribution of energy intake from five food groups for Francophone and Anglophone women (19-30 years old)

Figure 4. Proportion of Francophones and Anglophones with vitamin intakes below the Estimated Average Requirement (EAR)

been reported in experimental and prospective studies,^{32,33} even if its role in preventing certain cancers remains inconclusive.^{34,35} Reduced intakes of fat and sodium and particular attention to the quality of fat consumed, in addition to increased intakes of foods rich in vitamins A, C and B₆ as well as magnesium, are recommended.

There are also a few methodological limitations when using the CCHS. First, data analyzed here were based on two 24-hour recall questionnaires, which are prone to recall bias and under-reporting. It is estimated that total energy intake for the population aged 12 or older is 10% higher than reported. The extent of under-reporting varies with a number of factors such as BMI, physical activity, lifestyle factors, and level of household education.³⁶ It would be therefore beneficial to identify under-reporting groups of respondents. In addition, the analyses based on only the first 24-hour recall do not take into account day-to-day variations. As a consequence, the mean values of intakes would not change but the distribution and confidence intervals are wider than presented. Also, diet quality is believed to be better described through a single composite measure rather than by a single food or nutrient intake.³⁷

There are also some methodological issues with the measures of proportion of population below the recommended intakes. For example, AI measures should be interpreted with caution and cannot be used if the median intakes are lower than the recommended value. For this reason, vitamin D deficiency could not be established by this study. In contrast to our results, other studies where vitamin D intake was measured based on plasma 25(OH)D concentration suggest that only about 4% of Canadians suffer from

a deficit in vitamin D.³⁸ For the same reasons, the deficiencies for calcium and fibre in Francophone and Anglophone populations might not be reliable.

Finally, while many studies address the nutrition of Canadians, few exist on the influence of social and economic factors such as social norms, family structure and dynamics on food choices and nutritional well-being of Francophones living in a state of linguistic minority in Canada. Due to the strong interactions between population characteristics and eating habits, we would expect eating patterns, food choices and nutritional well-being to also differ between Francophones and Anglophones in Canada. We identified Francophone men between the ages of 19 and 30 and older than 51 as requiring particular attention because of their less-than-optimal diet. However, the Francophone population in this study was undersampled and caution needs to be exercised when interpreting the results. A study designed specifically to address Francophone minorities in Canada would be required to better portray the nutritional situation of this population. Qualitative studies with young and older Francophone men might be useful in investigating determinants associated with the dietary behaviour and lifestyle as these methods have been shown to develop a more in-depth understanding of different populations' behaviour.³⁹⁻⁴¹ Effective programs that use "[...] environmental and policy approaches, intervene comprehensively and across multiple levels, make use of economic evaluations, make better use of existing analytic tools, understand the politics and local context, address health disparities, and conduct sound policy research"⁴² are urgently needed and should be put in place.

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RÉSUMÉ

OBJECTIFS : Comparer l'apport et le choix alimentaires entre la minorité linguistique francophone canadienne (hors Québec) et la majorité anglophone.

MÉTHODES : Nous avons utilisé l'Enquête de 2004 sur la santé dans les collectivités canadiennes (ESCC), cycle 2.2 pour décrire l'apport alimentaire des Canadiens francophones et les comparer aux anglophones. La variable linguistique a été déterminée par les langues parlées à la maison, première langue apprise et encore comprise, langue de l'entrevue, et la langue de préférence. Les différences moyennes en nutriments et la prise alimentaire ont été évaluées par t-test et chi carré.

RÉSULTATS : Il n'y a aucune différence dans l'apport alimentaire total quotidien entre les groupes, mais des différences significatives existent dans la consommation alimentaire hebdomadaire pour certaines catégories de sexe et d'âge. Des apports plus faibles en fruits et légumes ainsi qu'en macronutriments et vitamines pour les hommes francophones âgés et une plus grande consommation d'énergie et de gras saturés provenant des aliments « autres » chez les jeunes hommes francophones ont été observés. Selon l'Étendue des valeurs acceptables pour les macronutriments (ÉVA), environ 50 % de l'échantillon ont dépassé leur apport énergétique acceptable de graisses saturées, et 80 % étaient en dessous de leur apport nécessaire d'acide gras linoléique.

CONCLUSIONS : Nous avons démontré que l'appartenance à la minorité linguistique francophone au Canada a un impact sur le choix alimentaire. Les groupes vulnérables sont les hommes entre 19 et 30 ans et au-dessus de 50 ans. Jusqu'à quel point cet aspect culturel influence-t-il la diète et conséquemment la santé demeure une question à élucider.

MOTS CLÉS : nutrition; régime alimentaire; apport énergétique; apport alimentaire; minorité linguistique