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Immigration and dietary patterns in South Asian Canadians at risk for diabetes

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ABSTRACT

Aim: To examine the relationship between immigration and dietary patterns among South Asian adults at risk for diabetes and living in Canada.

Methods: We recruited 428 South Asian adults affiliated with Sikh and Hindu temples in Metro Vancouver. Of the total sample, 422 completed self-report surveys including demographic background information, and two brief food screeners (fruit/vegetable/fiber intake and fat intake). Food screeners were culturally tailored to include traditional foods consumed in the South Asian community.

Results: Multiple linear regressions examined the relationship between diet and immigration. All models were adjusted for age, sex, marital status, education, income, and employment. Participants reported low levels of meat, fruit and vegetable consumption. Intake of whole milk products, traditional South Asian desserts and snacks were relatively high in comparison to other fat-containing food items. Specific trends in diet were seen in relation to time following immigration with the longer duration of years living in Canada the greater consumption of fruit/vegetable/fiber, non-starchy vegetables, total fat and meat reported; and lower intake of whole milk.

Conclusion: Acculturation appears to influence some dietary patterns in our sample of South Asian Canadian adults. These findings should be considered when designing culturally tailored lifestyle modification interventions for this community.

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1. Introduction

The estimated prevalence of diabetes in Canada is expected to reach 12.1% (5 million) by 2025 (a 44% rise from 9.3% in 2015), and it has been predicted that the cost of diabetes in Canada will reach \$17.4 billion at this time (Canadian Diabetes Association, 2015). In Canada, South Asians are the most rapidly growing immigrant group (Canadian Diabetes Association, 2010, 2015; Creatore et al., 2010) and are at increased risk for developing diabetes compared to long-time Canadian residents and other ethnic immigrants (Canadian Diabetes Association, 2010; Creatore et al., 2010; Public Health Agency of Canada [Internet], 2011; Bakker et al, 2014).

Among known modifiable risk factors for diabetes (Hu, 2002), diet is one that is particularly relevant for the South Asian community (Garduno-Diaz & Khokhar, 2013; Hu, 2002; Isharwal, Misra, Wasir, & Nigam, 2009; Misra, Khurana, Isharwal, & Bhardwaj, 2009; Newby, Muller, Hallfrisch, Andres, & Tucker, 2004). Research on dietary patterns among South Asians immigrants has been conducted predominantly in the United Kingdom (UK) and United States (US)

(Gadgil, Anderson, Kandula, & Kanaya, 2015; Novotny et al., 2012; Samanta et al., 1987). These studies have reported clear trends in diet including a decline in vegetarianism, an increase in red meat and processed food consumption, a high fat and carbohydrate intake, and a decrease in fiber consumption (Barbosa Cuhna, 2010; Gilbert & Khokhar, 2008; Jacka et al., 2010; Turin et al., 2013).

To date, dietary patterns among South Asians immigrants living in Canada have been relatively under-investigated. In a recent Canadian study that recruited South Asian immigrants between ages of 30 and 65 years, immigration to Canada was associated with an increased intake of fruit and vegetables and a decreased intake of high fat and fried foods (Block, Gillespie, Rosenbaum, & Jenson, 2000). South Asian immigrants also reported higher intake of convenience-foods, sugar-sweetened beverages, and red meat in Canada compared to their homeland (Block et al., 2000). To our knowledge, there are no Canadian-based studies that have investigated the association between immigration and dietary patterns in South Asians at risk for developing diabetes. The present study seeks to explore this question.

2. Patients and methods

This cross-sectional study was approved by the University of British Columbia and Fraser Health Clinical Research Ethics Boards

Conflict of interest: There are no conflicts of interest.

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and is part of a larger investigation exploring cardiometabolic health profiles and lifestyle behaviors in South Asian Canadians at risk for diabetes. We recruited a convenience sample of South Asian adults attending Sikh and Hindu temples in the Metro Vancouver area between July 2013 and June 2014. To be eligible, individuals had to 1) identify as South Asian, 2) be 21 years or older, 3) not have a personal history of diabetes, 4) speak Punjabi and/or English, and 4) live in the Metro Vancouver area. If deemed eligible, individuals completed the 7-item American Diabetes Association (ADA) diabetes risk test assessing age, gender, history of gestational diabetes, family history of diabetes, diagnosis of hypertension, physical activity status, and weight. Individuals with a score of ≥ 5 (out of 11 points) were classified as “at risk” for diabetes and invited to enroll in the study. Following informed consent procedures participants underwent a series of screening stations including an interviewer-administered survey measuring dietary intake patterns, years living in Canada, and other socio-demographic background.

2.1. Measures

Measures assessing dietary patterns were reviewed and culturally tailored by a certified diabetes educator of South Asian background, with a degree in nutrition sciences, and 10 years' experience working with South Asians in the Metro Vancouver area.

Fruit, vegetable and fiber intake was assessed using a culturally adapted version of Fruit/Vegetable/Fiber screener (Table 1) initially developed by Block et al. (Garduno-Diaz & Khokhar, 2013). Cultural adaptations included: transforming the food category “any other vegetables” into two separate categories termed “starchy vegetables, including corn, peas, carrots, and beans” and “non-starchy vegetables including broccoli, spinach, or any other greens.” On a 5-point Likert scale, participants were asked to rate the frequency with which they consumed items within the 8 separate food categories over the past month. Responses were scored as 0 = “less than once per week”; 1 = “once per week”, 2 = “two to three times per week”, 3 = “four to six times per week”, 4 = “once per day” and 5 = “2 or more times per day.” A total score was calculated by adding up the numeric values for each food category. We also created 3 subscale scores including (1) fruit; (2) non-starchy vegetables; and (3) starchy vegetables.

Fat intake was assessed using a culturally adapted version of Dietary Fat Screener (Table 1) also initially developed by Block et al. (Garduno-Diaz & Khokhar, 2013). Cultural adaptations included adding two new food categories: South Asian desserts (e.g., jalebi, gulab jamun, laddoo, etc) and South Asian snacks (e.g., bhujia, papad, mathi, samosas, pakora, salted fried nuts). In addition, we also modified the original category “whole milk” to “whole milk or yogurt,

dahi.” On a 5-point Likert scale, participants were asked to rate the frequency with which they consumed items within the 18 food categories. Responses were scored as 0 = “once per month or less”, 1 = “two to three times per month”, 2 = “one to two times per week”, 3 = “three to four times per week”, and 4 = “five or more times per week”. A total score was calculated by adding up the numeric value for each food category. We also created 3 subscale scores including (1) meat (combined categories of hamburgers, beef, pork, fried chicken, hot dogs, breakfast meat); (2) whole milk or yogurt, dahi; and (3) South Asian-specific foods (South Asian desserts and snacks).

The Block screeners have been shown to correlate well with a full length questionnaire for both fruit and vegetable servings ($r = 0.71$) and dietary intake of total/saturated fat ($r > 0.60$) (Block et al., 2000).

Immigration status was defined as number of years living in Canada (if not born in Canada).

Socio-demographic characteristics were reported and included age, gender, marital status (“Currently married” or “Not currently married”), education level (“Less than high school”, “High school graduate”, or “Some college or more”), income (“<\$20,000”, “\$20,000–39,999”, “\$40,000–59,999” or “>\$60,000”), and employment status (“Full-time or part-time job”, “Retired”, or “Unemployed, laid off, homemaker, or in school”).

2.2. Statistical analyses

Descriptive analyses examined frequencies and measures of central tendency for demographic characteristics and dietary patterns. The association between immigration and dietary patterns was explored using multiple linear regressions. All models were adjusted for age, sex, marital status, education, income, and employment. The coefficient for each factor (B) is reported and represents the change in response (e.g., total fat intake) for a 1-unit, or category, change in the factor. Two-sided p values < 0.05 were considered statistically significant. No adjustments for multiple comparisons were made in this exploratory analysis. All statistical tests were performed using IBM SPSS Statistics for Windows, Version 22.0. (IBM Corp., Armonk, NY, USA).

3. Results

Of the 551 who completed the ADA diabetes risk test, 428 participants were deemed eligible and enrolled into the study. Six participants did not complete the demographic items or Block screeners. Results are based on 422 individuals who completed all measures.

Table 1
Food categories for dietary intake measures.

Fruit/Vegetable/Fiber Categories	Fat intake categories
Fruit juice, like orange, apple, grape, fresh, frozen or canned. (Not sodas or other drinks)	Hamburgers, ground beef, meat burritos, tacos
Fruit, fresh or canned (not counting juice)	Beef or pork, such as steaks, roasts, ribs, or in sandwiches
Vegetable juice like tomato juice, V-8, carrot	Fried chicken
Green salad	Hot dogs, or Polish or Italian sausage
Potatoes, any kind including baked, mashed or French fried	Cold cuts, lunch meats, ham (not low-fat)
Vegetable soup or stew with vegetables	Bacon or breakfast meats
Non-starchy vegetables, including broccoli, spinach, or any other greens	Salad dressings (not low-fat)
Starchy vegetables including corn, peas, carrots, and beans	Margarine, butter or mayo on bread or potatoes
	Eggs (not Egg Beaters or just egg white)
	Pizza
	Cheese, cheese spread (not low-fat)
	Whole milk or yogurt, Dahi
	French fries, fried potatoes
	Corn chips, potato chips, popcorn, crackers
	Doughnuts, pastries, cake, cookies (not low-fat)
	Ice cream (not sherbet or non-fat)
	Indian Desserts (jalebi, gulab jamun, laddoo, etc)
	Indian snacks (bhujia, papad, mathi, samosas, pakora, salted fried nuts)

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