

Prevalence of specific cardiovascular disease risk factors in young Newfoundland and Labrador adults living in urban and rural communities

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Introduction: The province of Newfoundland and Labrador has a high rate of cardiovascular disease. Risk factors of cardiovascular disease have not been well studied in young adults. There are reasons to believe that the prevalence of cardiovascular disease risk factors may be higher in young adults residing in rural versus urban settings.
Methods: 540 men and women, ages 18 to 34 years and residing in urban and rural areas of Newfoundland and Labrador were compared for cigarette smoking and for body size. Both body mass index and waist circumference measures were used to indicate body size. Education level and family income were also studied. Data were collected via personal interview as part of a larger study, *Nutrition Newfoundland and Labrador*.
Results: No difference was noted between the 2 groups in regular smoking or BMI. More female rural residents had a waist circumference above the accepted cut-off compared with female urban residents (32.5% v. 17.0%).
Conclusion: Young adults in urban and rural areas both experience high rates of modifiable risk factors for CVD. Some may be more prevalent in rural areas. Prevention programs should include young adults, especially those residing in rural areas.

Introduction : La province de Terre-Neuve-et-Labrador a un taux de maladies cardiovasculaires (MCV) élevé. Les facteurs de risque de ces maladies n'ont pas été bien étudiés chez les jeunes adultes. Il y a raison de croire que la prévalence de facteurs de risque de MCV est peut-être plus élevée chez les jeunes adultes en milieu rural qu'en milieu urbain.
Méthodes : 540 hommes et femmes, de 18 à 34 ans, résidant des régions urbaines et rurales de Terre-Neuve-et-Labrador ont été comparés pour la taille du corps et le tabagisme. On a utilisé les indices de masse corporelle et la mesure de circonférence de taille pour indiquer la taille du corps. On a étudié aussi le niveau de scolarité et le revenu familial. On a fait la collecte de données par entrevues personnelles, dans le cadre d'une étude plus grande sur la nutrition à Terre-Neuve-et-Labrador.
Résultats : On n'a constaté aucune différence entre les deux groupes quant aux habitudes régulières de tabagisme ou aux IMC. Plus de femmes des milieux ruraux que des milieux urbains avaient une circonférence de taille supérieure au seuil accepté (32,5 % c. 17,0 %).
Conclusion : Les jeunes adultes des milieux ruraux et urbains sont exposés à des facteurs de risque de MVC modifiables. Pourtant, certains facteurs sont peut-être plus prévalents dans les milieux ruraux. Les programmes de prévention devraient inclure les jeunes adultes, surtout ceux qui résident dans les régions rurales.

INTRODUCTION

The province of Newfoundland and Labrador has a higher level of cardiovascular disease (CVD) mortality than any other Canadian province.[1] Manifestations of CVD are not usually observed until the 4th decade of life or later.[2] However, studies have suggested that abnormalities that develop in the early stages of life may lead to cardiovascular consequences in adulthood.[3] These include consequences of adolescent and early adult obesity, such as

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hypertension and high levels of low density lipoprotein (LDL) cholesterol.[3] Furthermore, many lifestyle factors, such as poor eating habits and physical inactivity, develop in the early years and persist into adulthood.[4]

Frameworks for the determinants of health in populations suggest a community-level influence between various factors and individual health.[5,6] Studies in Canada have demonstrated this community-level influence. Residents of rural communities have been characterized as having lower incomes, higher unemployment rates and lower educational levels compared with urban residents.[7] There is also speculation that rural residents differ from their urban counterparts with regard to their ability to access health services, adequate food supplies and health knowledge.[8]

There has been limited investigation into the health risk behaviours of young Canadians residing in urban versus rural areas.[7] The Canadian Heart Health Surveys considered regional differences throughout provinces in health behaviours,[9] and Statistics Canada in 1996/1997 studied, by province, risk factors for heart disease and stroke.[1] However, these studies did not compare the health status of rural young adults versus their urban counterparts. Newfoundland and Labrador has clear distinctions between what is a rural and what is an urban centre, which is beneficial when studying differences in health status with area of residence. The purpose of this study was to investigate the prevalence of certain CVD risk factors in young adults residing in the province of Newfoundland and Labrador, and to see if these factors were experienced more by those residing in rural versus urban settings.

Methods

We conducted a secondary analysis of data from *Nutrition Newfoundland and Labrador*.[10] This is a cross-sectional study that was conducted on a stratified random sample of non-institutionalized residents of the province in the spring and fall of 1996. This survey is part of a federal–provincial initiative and followed procedures developed in Nova Scotia, Quebec and Saskatchewan, which have previously conducted provincial surveys.[11,12] The surveys allowed for a collection of data on dietary intake and related health issues via personally administered questionnaires. Anthropometric data were collected via direct measurement. The Newfoundland and Labrador Health Insurance Register File was used for selection purposes.[10] A total of 3746 eligible individuals were contacted, and interviews were completed for 1927 of these.

Study sample

For this project, a subset of respondents of *Nutrition Newfoundland and Labrador* were studied. Five hundred and forty young adults aged 18 to 34 years inclusive were randomly selected. Both men (43%) and women (57%) were represented. For the purposes of this study, a subject's area of residence was designated as urban (population ≥10 000) or rural (population <10 000). The data used in the present study were collected in 1996.

Measures

Two indicators of socioeconomic status were investigated: education and total household income.[13] Education level was determined by offering each respondent 4 options: elementary, high school, community college and university. The highest level of education claimed to be completed by each respondent was taken as his or her education level. To assess total household income the interviewer displayed a card to the interviewee, who was asked to choose the option best describing the annual income of his or her household. Nine options were offered. The first 8 stipulated ranges of annual income from <$5000 to >$60 001. Option 9 was "Do not know." Household income categories were defined in relation to reported household income, household size and low-income cut-offs for Newfoundland and Labrador.[14]

Three modifiable risk factors of CVD were investigated:[15] 2 indicators of body size[16,17] and cigarette smoking.[18] Cigarette smoking was measured by comparing the number of self-reported non-smokers to the number of self-reported regular smokers (>1 cigarette per day).

Measures used to indicate body size were body mass index (BMI) and waist circumference. Body mass index was calculated by dividing total body weight (in kg) by shoeless standing height squared (m^2). A BMI <20 is associated with health problems in some people, between 20 and 25 is associated with lowest mortality, between 25 and 27 is associated with increased risk of ill health in some and >27 is associated with the highest risk of developing ill health.[19] Waist circumference was used to estimate the degree of abdominal obesity.[20] A waist circumference ≥102 cm in men and 88 cm in women was shown by Lean and colleagues to be negatively associated with health status.[21] Therefore, these were used as cut-off/standard values.

Nutrition Newfoundland and Labrador did collect

data on dietary intake and physical activity, but these were not analyzed for this project.

Statistical analysis

Sampling weights were calculated prior to data analysis to prevent over-representation of particular geographical areas, ages and genders.[22] Absolute numbers of responses and percentages of totals are tabulated. Chi-squared analyses and *t* tests for independent means were computed to assess differences between groups for CVD risk factors and area of residence. Statistical differences were assigned to $p < 0.05$.

Results

Over 15% of rural residents (15.3%) attained only an elementary education, compared with urban residents (5.2%). Less than 20% of rural residents attained a university education, versus 43% of urban residents (Table 1). With regard to household income, more rural residents appear to have earned a lower level of household income and less earned a higher level when compared to urban residents (Table 2). However, statistical analyses were not able to be performed on these socioeconomic data.

The percentage of regular smokers was high, at 43.0% of rural and 37.6% of urban residents. However, there was no difference between being a regular smoker and living in a rural or urban community, according to a chi-squared analysis of our data (Table 3).The *t* test was also conducted to determine if a relationship existed between area of residence and actual number of cigarettes smoked per day by regular smokers, but no significant difference was observed.

Area of residence was significantly related to waist circumference in women ($p = 0.003$, chi-squared analysis) (Table 3). There were 32.5% of young adult women living in rural areas who had a waist circumference above the accepted cut-off, compared with 17% of young adult women living in urban areas. No statistical difference was noted between waist circumferences of young adult men living in rural versus urban areas. There were no differences detected between BMI levels of the rural and urban groups (chi-squared analysis) (Table 4). The percentage with BMI >27 was high in both groups. Even though it was not significant, a slightly higher number of residents in rural areas had a BMI >27 in comparison to residents of urban areas.

Discussion

Newfoundland and Labrador has the highest rate of CVD mortality in Canada.[1] It is important to investigate the prevalence of CVD risk factors in young adults in rural and urban areas in this province to assist in better understanding how rates of CVD mortality can be lowered.

Research suggests that geographic location, in particular living in urban or rural areas, affects one's health status. Rural residents are more likely to suffer long-term disabilities and have shorter quality-adjusted life expectancies.[23] Our results suggest not only that young adults experience very high rates of some risk factors for CVD but that some are more prevalent in young adults residing in rural versus urban communities.

Both education and household income are measures

Table 1. Education level of 540 rural and urban young adult study participants

	Place of residence, no. (and %) of participants	
Education level	Rural	Urban
Elementary school	33 (15.3)	17 (5.2)
High school	71 (33.0)	75 (23.0)
Community college	68 (32.0)	91 (28.0)
University	42 (19.7)	143 (43.8)

Table 2. Household income level for 461* of the rural and urban young adult study participants

	Place of residence, no. (and %) of participants	
Household income level	Rural	Urban
Lower	78 (40.8)	65 (24.1)
Middle	65 (34.0)	87 (32.2)
Higher	48 (25.2)	118 (43.7)

*Not all subjects were willing to answer questions pertaining to household income.

Table 3. Cardiovascular disease risk factors for the rural and urban young adult study participants

	Place of residence, no. (and %) of participants				
Risk factor	Rural	Urban	χ^2	df	*p* value
Smoking					
Regular smoker, *n* = 187	75 (43.0)	112 (37.6)	1.582	1	0.208
Waist circumference (and cut-offs)					
Women (≥88 cm), *n* = 284*	30 (32.5)	18 (17.0)	8.664	1	0.003
Men (≥102 cm), *n* = 213*	9 (22.8)	12 (18.6)	0.605	1	0.437

df = degrees of freedom
*Not all subjects were willing to have body size measurements taken.

of socioeconomic status that are often used for determining their relationship for overall health.[13] Young adults living in rural areas of Newfoundland and Labrador may have been less likely to have completed postsecondary education compared to their counterparts residing in urban areas. Similar results were observed in the Canadian Heart Health Surveys. Reeder and colleagues found that fewer rural Canadian men and women obtained a university degree in comparison to urban Canadian men and women.[9]

A greater percentage of urban residents appeared to have earned a higher level of household income compared with rural residents in this study, although statistical analysis was not performed. This is supported by the Canadian Health Survey, which suggested that a higher percentage of rural residents earned lower levels of annual household incomes compared with their urban counterparts.[9] In Newfoundland and Labrador this may be partly explained by the fact that many rural residents have seasonally based jobs and their urban counterparts are typically employed year round.[24] Results from the 1995 Adult Health Survey revealed that 53.5% of urban residents (St. John's) were employed year round, compared with 27.8% of rural residents (Northern Community Health Board Region).[25]

There were similar numbers of young adult regular smokers detected in both urban and rural areas. This suggests that both young adult, rural and urban residents have equal opportunities to develop health problems associated with cigarette smoking. According to Ayanian and Cleary, cigarette smoking is presently the largest modifiable risk factor for cardiovascular disease.[18] A recent study from the United States revealed that cigarette smoking was positively associated with younger age groups.[26] Results from the present study reveal that area of residence does not play a role in cigarette smoking. However, it is still a factor in the contribution of CVD for younger age groups in Newfoundland and Labrador. Rates of regular cigarette smoking were high regardless of area of residence (43.0% and 37.6%). Thus, health professionals may need to place more emphasis on the education of young smokers and their increased risk for CVD.[18]

In this study no association was detected between area of residence and BMI. Body mass index refers to both the amount of a person's body fat and how it is distributed over the body. Both have been shown to be associated with health.[3,15,20] Data from the Canadian Heart Health Surveys described some regional and rural–urban differences in body size.[9] This study revealed no association between mean BMI and living in rural versus urban areas for Canadians aged 18 to 74 years.[9] Results from the Canadian Heart Health Surveys were also described by regions. Within the Atlantic region, no substantial differences were noted between area of residence and a BMI >27 kg/m.[9,11]

Thirty-three to 39% of young adult respondents were overweight (BMI > 27). In 1996, the National Population Health Survey illustrated that 39% of all adults residing in Newfoundland and Labrador had a BMI of ≥28.[27] This is considerably higher than the Canadian national average of 31% and is likely a contributor to the fact that this province has the highest level of CVD mortality for both men and women.[1,27]

Recent studies suggest that distribution of body fat should be considered an important risk factor for CVD development.[20] Living in urban and rural areas did affect abdominal adipose tissue distribution. Women living in rural areas were more likely to have a waist circumference >88 cm as compared with urban women. This suggests that women living in rural areas may be at increased risk of developing ill health, including CVD, according to Lean and associates.[21] There was no significant difference detected in abdominal tissue distribution for men in this study.

Table 4. Body Mass Index for 518* of the rural and urban young adult study participants

Body Mass Index (BMI)	Place of residence, no. (and %) of participants	
	Rural	Urban
BMI ≤ 20	12 (5.4)	28 (7.5)
20 < BMI < 25	79 (41.4)	132 (42.5)
25 ≤ BMI ≤ 27	34 (14.4)	44 (16.7)
BMI > 27	80 (38.7)	109 (33.3)

$\chi^2 = 1.309$; degrees of freedom = 3; $p = 0.511$
*Not all subjects were willing to have their body mass measurements taken.

Strengths and limitations

There were some advantages to this study. It used data collected in person by well trained interviewers who worked with a large study that included a high proportion of rural residents. Also, the selection procedure was designed to incorporate stratification by geographic region and so should provide accurate rural representation.

However, there were some limitations. The study did not investigate all risk factors of CVD, such as physical activity and diet. Although efforts were made to represent both rural and urban young adults, there is a high prevalence of out-migration of

Newfoundland and Labrador youth related to high levels of unemployment. Therefore, one might question how truly the findings represent the province's youth. There may be some limitation to comparing these results to those of young adults in other provinces. There is evidence to suggest that residents of Newfoundland and Labrador differ from those of other Canadian provinces in terms of education, income and access to health care. This may partly explain the higher prevalence of CVD in this province. Some respondents did not want BMI measurements taken or did not want to divulge financial information, which could have skewed results. This study is a secondary analysis of data collected for another purpose in 1996. Therefore, although not all comparisons detected statistically significant differences, some important trends were apparent. If the data collected had been focused primarily on the CVD risk factors in question and if the sample size had been larger, more significant findings might have resulted.

Conclusion

Risk factors for CVD exist in young adult residents of Newfoundland and Labrador, and there is some indication that young adults residing in rural areas are at an elevated risk due to distribution of body fat. Less formal education and lower household income may also put rural residents at a higher risk of developing ill health in general. It is important that steps be taken to provide knowledge and assistance to young Newfoundland and Labrador residents on ways to achieve and maintain a healthy lifestyle. This may be especially important to those residing in rural areas.

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