

## A B S T R A C T

The purpose of this study was to determine the cardiovascular health needs of university students living in residence. A survey was administered to students living in residences at a university in Nova Scotia, Canada to identify eating patterns, physical activity, smoking behaviours and perceived stress. Data were analyzed using descriptive statistics and chi-square tests of association. Qualitative data were collected using focus group interviews. Results showed that fewer than half of the students participated in exercise three or more times per week, and 82% ate less than the recommended amount of fruits and vegetables. As perceived knowledge of CVD increased so did level of physical activity and consumption of fruits and vegetables. Fifty-six percent of students rated their stress as high or very high; exams and course assignments are a major cause of this stress. Fifteen percent of the university students surveyed were daily smokers. Barriers to a healthy lifestyle include time constraints and limited food choices in the residence cafeteria.

## A B R É G É

Cette étude avait pour objet de déterminer les besoins en santé cardiovasculaire des étudiants universitaires vivant en résidence. Il a été demandé à des étudiants vivant en résidence à l'Université de la Nouvelle-Écosse, de remplir un questionnaire en vue d'identifier leurs comportements alimentaires, leur activité physique, leur tabagisme et leur perception du stress. Les données ont été analysées à l'aide de statistiques descriptives et des tests d'association du type chi carré. Des données qualitatives ont été recueillies à l'aide d'interviews avec des groupes témoins. Les résultats ont montré que moins de la moitié des étudiants font de l'exercice trois fois ou plus par semaine, et que 82 % d'entre eux consomment moins de fruits et légumes que la quantité recommandée. Le niveau d'activité physique et la consommation de fruits et légumes augmentent parallèlement à une plus grande connaissance des maladies cardiovasculaires. Cinquante six pour cent des étudiants évaluent leur stress comme étant élevé, voire très élevé; les examens et les travaux imposés sont jugés comme un important facteur à l'origine de ce stress. Quinze pour cent des étudiants interrogés fument tous les jours. Au nombre des obstacles à l'adoption d'un mode de vie sain, on trouve les contraintes de temps et un choix limité d'aliments dans les cafétérias des résidences universitaires.

# A Cardiovascular Health Needs Assessment of University Students Living in Residence

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Cardiovascular disease (CVD) claims more lives in Canada than any other disease. Although CVD tends to manifest itself later in life there is evidence that atherosclerotic deposits actually begin to develop early in life.<sup>1</sup> Therefore, early modification of risk factors is encouraged to decrease CVD morbidity and mortality.

When students leave home, they are left to assume primary responsibility for their health. First-year students experience many changes, including coping with being away from family and friends and with a new environment. It is during this transition that students have an increased risk for making unhealthy lifestyle choices.<sup>2</sup> Poor nutrition, physical inactivity, smoking and stress are CVD risk factors which affect students. This study examined these risk factors in a group of students at Dalhousie University in Nova Scotia, Canada.

Various studies and review articles have documented the potential benefits of physical activity on health and well-being, including decreased risk for CVD<sup>3-10</sup> and favourable effects on blood pressure,<sup>11,12</sup>

cholesterol<sup>13</sup> and diabetes mellitus.<sup>14</sup> Other benefits of physical activity for the students may include decreased anxiety and depression, and enhanced work and recreation performance.<sup>15</sup> However, a Queen's University study<sup>2</sup> found that only 50% of students engaged in physical activity for a minimum of 20 minutes on two or fewer days per week, which does not meet recommended physical activity guidelines.<sup>15</sup> The same study identified irregular adherence to Canada's Food Guide by university students.<sup>2</sup> In another study,<sup>16</sup> adolescents were reported to know relatively little about making low fat choices and were uncertain about the development of heart disease.

The prevalence of smoking among university students varies.<sup>17-19</sup> *Canada's Health Promotion Survey-1990* found that 20% of 15-19 year olds are regular daily smokers.<sup>20</sup> Another recent study of the health behaviour of Texas college students reported that one third smoke regularly.<sup>21</sup>

Studies also indicate that stressful life events, such as starting university, contribute to hypertension, a risk factor for CVD.<sup>22,23</sup> Goldberg and Comstock<sup>23</sup> reported that university students are more likely to experience stressful life events than individuals who are working. The Queen's University study found that 60% of students were concerned about a work/leisure balance.<sup>2</sup> This is of interest, as Lesko and Summerfield<sup>22</sup> found that incidence of illness was significantly correlated with the number of exams written and the number of assignments.

## PURPOSE

The purpose of this study was to conduct a cardiovascular health needs assess-

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**TABLE I**  
**Profile of Dalhousie University Students Living in Residence Who Completed the Cardiovascular Health Promotion Needs Assessment (n=607)**

Mean age (years)	19
Range (years)	17-24
Gender (%)	
Male	35
Female	65
Year of study (%)	
1	68
2	22
3 or more	10
Course of study (%)	
BA	28
BSc	49
Health professions	7
Other	16
Year in residence (%)	
1	70
2	23
3 or more	7

ment to determine physical activity levels, eating patterns, smoking behaviours, and perceived stress levels of male and female students living in the residences of a Nova Scotia university and to identify ways to meet these needs. This study was undertaken to add to the Canadian data available on this topic. Cardiovascular health promotion programs currently offered in the university community may benefit students and have a positive impact on their physical, emotional and social well-being. However, a well-developed, comprehensive approach to cardiovascular health promotion for university students is lacking.

**METHODS**

A closed-ended questionnaire was designed by an advisory committee of researchers from the Cardiac Prevention and Rehabilitation Research Centre, University administration and student services. Content was validated by having a group of university residence students review and comment on the questions. The questionnaire was sent to all students living in residence at one Nova Scotia university (approximately 1,100). Ten percent of the student population live in residences, and most (60%) are first-year students. The response rate was 55% (n=607) (Table I). The respondents reflected the target population. As more females participated, a gender comparison is important. Quantitative

**TABLE II**  
**Differences by Gender\* of Students Reporting Physical Activity, Consumption of Fruits and Vegetables and Rates of Smoking**

	Level of Physical Activity		
	Males	Females	Total
n	210	362	572
Number of Times per Week (%)			
Fewer than 1	17.6	17.1	17.3
1 or 2	31.9	35.4	34.1
3 to 5	33.8	34.5	34.3
5 or more	16.7	13.0	14.3
* df=3; $\chi^2=1.762$ ; p=0.623			
	Daily Consumption of Fruits and Vegetables		
	Males	Females	Total
n	212	373	585
Number of Servings (%)			
Fewer than 1	10.9	5.6	7.5
1 or 2	51.9	42.4	45.8
3	23.1	31.0	28.2
4 or 5	12.3	15.0	14.0
More than 5	1.9	5.9	4.4
* df=4; $\chi^2=16.253$ ; p=0.003			
	Rates of Smoking		
	Males	Females	Total
n	208	365	573
Frequency (%)			
Every day	16.4	13.2	14.3
Occasionally (< every day)	12.5	11.5	11.9
Not at all	71.2	75.3	73.8
* df=2; $\chi^2=1.370$ ; p=0.504			

data were analyzed using the SAS statistical system. Descriptive statistics and chi-square tests of association were calculated.

Information was also collected using focus groups. Participants were recruited by having students sign their name and phone number to the questionnaire if they were interested in participating in a discussion group. Six focus groups (n=21) were conducted lasting 45 minutes to one hour. The facilitator used a semi-structured interview guide and asked additional questions to clarify responses and encourage discussion. Written and taped results were analyzed for recurring themes. Data were coded and grouped into categories.

**RESULTS**

More than half of students reported exercising fewer than three times per week (51%) (Table II). There was no significant difference in exercise level by gender (df=3,  $X^2=1.762$ , p=0.623). As perceived knowledge of the effects of physical activity on cardiovascular health increased so did the frequency of exercise (df=12,  $X^2=67.520$ , p<0.001). Walking was the activity reported most frequently (64%). Most students

(77%) reported lack of time as a barrier to physical activity, and 53% cited lack of motivation or willpower. There was moderate interest in attending a physical activity information session (29% would attend) and a physical activity program in residence (47%) (Table V).

Eighty-two percent of students ate three or fewer servings of fruits and vegetables per day (Table II). Females ate significantly more servings than males (df=4,  $X^2=16.253$ , p=0.003). Three quarters (76%) of students ate fried food at least once a week, and 42% had fried foods three or more times per week (Table III). An overall analysis of the data showed that as perceived knowledge of the relationship of nutrition to heart health increased, students ate more fruits and vegetables (df=16,  $X^2=70.322$ , p<0.001) and fewer fried foods (df=12,  $X^2=40.265$ , p<0.001). Males ate more unhealthy foods than did females (Tables III and IV). Only 38% of those surveyed were interested in an information session on nutrition (Table V).

Thirty-six percent of students surveyed reported gaining 10 or more pounds in the previous year. Only 56% of males had an

**TABLE III**  
**Differences by Gender\* of Students Reporting Consumption of Processed Meats, Baked Desserts, Red Meats, Fried Foods and Snack Foods (%) (n=583; 212 males, 371 females)**

	Never		< Once per Week		1-2 Times per Week		3 or More Times per Week	
	Males	Females	Males	Females	Males	Females	Males	Females
Processed Meats * df=3; $\chi^2=126.576$ ; $p<0.001$	5.6	31.3	24.4	41.5	40.4	22.4	29.6	4.9
Baked Desserts * df=3; $\chi^2=22.145$ ; $p<0.001$	8.5	11.6	31.6	43.1	32.1	32.4	27.8	12.9
Red Meats * df=3; $\chi^2=157.258$ ; $p<0.001$	2.4	18.6	5.2	30.5	37.0	36.9	58.5	14.0
Fried Foods * df=3; $\chi^2=116.943$ ; $p<0.001$	1.4	8.9	5.6	25.7	22.5	39.5	70.4	26.0
Snack Foods (e.g., chips, candy bars, chocolate) * df=3; $\chi^2=3.391$ ; $p=0.335$	3.3	3.5	20.7	22.4	38.5	43.9	37.6	30.2

**TABLE IV**  
**Difference by Gender\* of Students Reporting Daily Consumption of Fruits and Vegetables**

	Males	Fruits and Vegetables Females	Total
n	212	373	585
Number of Daily Servings			
Fewer than 1	10.9	5.6	7.5
1 or 2	51.9	42.4	45.8
3	23.1	31.0	28.2
4 or 5	12.3	15.0	14.0
More than 5	1.9	5.9	4.4

\*  $p=0.003$

**TABLE V**  
**Percentage of Students Interested in Attending Sessions on Physical Activity, Nutrition, Smoking and Stress**

	Would Attend Session	Would Not Attend	Not Sure
Physical activity	29.4*	33.3	37.3
Nutrition	47.2†	23.4	29.3
Smoking	37.4	31.1	30.3
Stress	16.7	59.7	23.6
	42.8	24.7	32.5

\* information session  
 † physical activity session

ideal body mass index (BMI=20-25) compared with 63% of females. Twenty-six percent of males had a BMI greater than 27 compared to 11% of females (df=3,  $X^2=38.198$ ,  $p<0.001$ ). More females than males had a BMI less than 20 (18% vs 5%).

Fifteen percent of students living in residence were daily smokers, and 24% had smoked at least 100 cigarettes in their life. There was no significant difference in smoking rate with respect to gender (df=2,

$X^2=3.334$ ,  $p=0.189$ )(Table II) nor was there a gender difference in frequency of smoking (df=12,  $X^2=1.370$ ,  $p=0.504$ ). The most popular location cited for smoking was bars (77%). Half of the students were in favour of a completely smoke-free campus. While 39% of students who smoked wanted to stop smoking (41% were not sure), only 17% said they would attend a smoking cessation program (Table V).

Fifty-six percent of students surveyed rated their stress as high or very high. The

two most frequent sources of stress were exams (77%) and course assignments (69%). There was interest in attending a session in residence on how to manage stress; 43% said they would attend, and 33% were not sure (Table V).

Focus group participants were aware of most CVD risk factors and how to reduce these factors. However, they were not concerned about heart disease at their age. Participants explained that exercising and eating healthy were important to maintaining a healthy weight and for staying in shape.

Focus group participants described the effect of other health issues on their current health status. They were concerned about stress due to school and social pressures, lack of sleep, fatigue, anorexia and other eating disorders (particularly for young women).

Although students may already have some information, barriers interfere with their ability to act on this information. For example, participants stated that although students already know the negative effects of smoking, smoking socially in bars is an important part of their culture. Participants also explained that students may be able to identify which foods are nutritious but make the high fat food choices because they seem to taste better or because healthful choices are less readily available. Time constraints due to courses and inconvenient times and additional fees for university gym activities were cited as barriers to physical activity.

## DISCUSSION

As students do not consider physical activity and eating nutritiously as ways to help prevent heart disease, it may be more useful to promote physical activity and good nutrition in terms of body image, as suggested by focus group participants. Women in particular are likely to be concerned about their body size. Sciacca and colleagues<sup>24</sup> identified that although 17% of women were in excess of normal BMI standards, 40% considered themselves overweight. The same figures for males were 20% and 24% respectively. Altabe and Thompson<sup>25</sup> in a study of adults aged 17-40, found that women had higher levels of body dissatisfaction than men.

Only half (49%) of university students indicated activity levels within the recommended guidelines of the American College of Sports Medicine.<sup>15</sup> This indicates a need to increase activities aimed at improving cardiovascular fitness. A study by Pierce and colleagues also found that both college men and women had relatively low levels of cardiovascular fitness, with women showing higher relative levels than males.<sup>26</sup>

The positive relationship between perceived knowledge and participation rate in physical activity emphasizes the importance of increasing knowledge. This is congruent with a study by Liang and colleagues<sup>27</sup> who reported that medical students' attitudes towards health promotion and disease prevention and exercise were a major predictor of physical fitness levels.

The results indicate that students also need to improve their eating behaviours. The major barrier to healthful eating cited by both questionnaire and focus group participants was lack of healthful food choices. Students expressed an overwhelming sense of lack of control with respect to healthful eating at the cafeterias in the residences. Fewer than 20% met Canada's Food Guide guidelines for fruits and vegetables,<sup>28</sup> and a large proportion of students (30%) who rated their knowledge as high or very high still ate fried foods three or more times per week, suggesting this is an area which requires considerable attention to barriers.

A previous study of three-day food intake of medical students<sup>29</sup> found that

male students exceeded current recommended intakes of fat, saturated fat, cholesterol and sodium. In the present study, female students ate unhealthful foods less frequently than did males. This may be related to a concern of females for gaining weight and a dissatisfaction with body image. It is disconcerting that 18% of female students surveyed were underweight. The larger percentage of males with a BMI greater than 27 (a risk category for obesity) may be misleading because it is not clear whether this is due to a higher lean body mass (i.e., muscle tissue) or a higher percentage of body fat. A significant number of students (36%) gained 10 or more pounds in the previous year, which is likely related to the poor eating habits. This is problematic, as obesity is a risk factor for heart disease.

Only 17% of students who indicated that they were daily smokers reported that they would attend a smoking cessation program; an additional 24% were not sure. The Queen's University study reported that 57% of university students who were currently smoking have expressed tobacco-related concerns.<sup>2</sup> If a smoking cessation program is to be offered in residence, an innovative marketing plan will have to be developed given the limited support for such a program (17%) and likely attrition. Helping interested students link up with existing smoking cessation programs and ensuring implementation of tobacco reduction policies (e.g., no smoking in residence) might be useful alternatives.

The social aspect of smoking was emphasized by students surveyed and focus group participants. Bars and friends' homes and rooms were reported most frequently as places to smoke. Derman and colleagues<sup>30</sup> reported that cigarette smoking, even occasionally, identifies a subgroup of college students who are at increased risk of binge drinking and illicit drug use.

Both the questionnaire and the focus groups indicated that many university students are experiencing a significant amount of stress in their lives due to exams, course assignments and associated time constraints. Since stress is a risk factor for heart disease,<sup>31</sup> this could be a focus for preventive efforts. Many students living in residence stated they would use a stress

management course offered at the residence. As fewer than 10% of students surveyed have used existing counselling services on campus to manage stress, an in-house service may better assist students to deal with stress in healthy ways (e.g., by exercising, taking time out) and to organize their time.

## CONCLUSION

Leaving home to attend university and living in residence is a crucial time which can influence individuals to make healthy or unhealthy lifestyle choices. Increasing physical activity, eating healthful foods, reducing smoking and learning stress management techniques early on will allow students to maximize the benefits of a healthy lifestyle. Although individuals have a personal responsibility for selecting a healthy lifestyle, the appropriate supports can assist students in optimizing their health. It is necessary to provide education and implement university policies and services that create a supportive environment in which to make heart-healthy lifestyle choices. A comprehensive program could include a buddy system for physical activity, improved food choices in the cafeteria, a holistic smoking reduction program and stress management sessions in residence. Based on this needs assessment, a model for cardiovascular health promotion for students living in residences at Dalhousie University will be developed. This model will be useful in planning, implementing and evaluating cardiovascular health promotion programs in other universities in Nova Scotia and Canada.

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