Exercise behaviour and attitudes among fourth-year medical students at the University of British Columbia

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Abstract

Objective To describe the physical activity (PA) levels and counseling attitudes of Canadian undergraduate medical students.

Design Online or paper survey.

Setting The University of British Columbia (UBC).

Participants Fourth-year medical students at UBC from 2007 to 2010.

Main outcome measures Physical activity levels, relationship between exercise behaviour and attitudes toward counseling, and student perception of training in the area of exercise prescription.

Results A total of 546 out of 883 students participated in the survey (62% response rate). Sixty-four percent of students met the Canadian Society for Exercise Physiology 2011 recommendations for PA. Attitudes toward healthy living were related to PA levels, but the rate of counseling patients about exercise was not; however, students who engaged in more strenuous PA were more likely to perceive exercise counseling as being highly relevant to future clinical practice ($P=.018$). Overall, 69% of students perceived exercise counseling to be highly relevant to clinical practice, but 86% thought that their training in this area was less than extensive.

Conclusion Fourth-year UBC medical students engage in more strenuous PA than average age-matched Canadians, which affects their attitudes toward perceived future counseling practices. Encouraging more student participation in strenuous PA and encouraging academic training in the area of exercise counseling might be important next steps in preparing future physicians to effectively prescribe exercise to their patients.

EDITOR'S KEY POINTS

- Regular exercise has been shown to have positive effects on health outcomes. This survey of medical students at the University of British Columbia (UBC) sought to explore the physical activity practices of participants, and to examine whether these practices were related to how participants counseled patients or anticipated counseling patients in the future.
- Students at UBC generally participated in strenuous exercise, and students who perceived exercise counseling as highly relevant to clinical practice performed more strenuous exercise (in minutes per week) relative to students who viewed exercise counseling as somewhat or not at all relevant. Survey results also suggested that medical students at UBC might not have the training they need to effectively address exercise with their patients.
- The authors recommend that medical students be offered programs that promote a healthy educational environment that encourages them to achieve the recommended amount of physical activity per week. Further, they believe curriculums must be designed to give students the skills they need to effectively discuss exercise with their patients later in clinical practice as physicians.

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Comportement et attitudes à l'égard de l'activité physique chez les étudiants en médecine de 4e année à l'Université de la Colombie-Britannique

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Résumé

Objectif Décrire le niveau d'activité physique (AP) pratiqué par les étudiants canadiens du premier cycle de médecine et leur attitude concernant les conseils à donner aux patients.

Type d'étude Enquête par écrit ou en ligne.

Contexte L'Université de la Colombie-Britannique (UBC).

Participants Étudiants en 4e année de médecine à l'UBC de 2007 à 2010.

Principaux paramètres à l'étude Niveaux d'activité physique, relation entre le niveau d'exercice et l'attitude vis-à-vis le counseling et l'opinion des étudiants concernant leur formation dans le domaine de la prescription d'exercice.

Résultats Un total de 546 étudiants sur 883 ont participé à l'enquête (taux de réponse de 62%). Soixante-quatre pour cent des étudiants répondaient aux normes d'AP de la Canadian Society for Exercise Physiology 2011. Il y avait une relation entre le niveau d'AP et l'attitude envers de saines habitudes de vie, mais non avec le fait de donner des conseils sur l'exercice aux patients; toutefois, les étudiants qui pratiquaient les exercices les plus intenses étaient plus susceptibles de considérer les conseils sur l'exercice comme très importants dans leur pratique future (P = .018). Dans l'ensemble, 69% des étudiants étaient d'avis que le counseling sur l'exercice est très pertinent dans la pratique clinique, mais 86% estimaient que leur formation dans ce domaine était moins que suffisante.

Conclusion Les étudiants en quatrième année de médecine à l'UBC font de l'AP à un niveau plus intense que la moyenne des Canadiens du même âge, et cela se reflète dans les conseils qu'ils espèrent donner à leurs futurs patients. Encourager plus d'étudiants à participer à des exercices intenses et promouvoir une formation académique dans le domaine du counseling sur l'exercice pourraient représenter les prochaines étapes permettant de préparer les futurs médecins à prescrire de l'exercice de façon efficace à leurs patients.

POINTS DE REPÈRE DU RÉDACTEUR

- On sait que la pratique régulière de l'exercice a des effets positifs sur la santé. Cette enquête auprès d'étudiants en médecine de l'Université de la Colombie-Britannique (UBC) voulait connaître les habitudes d'activité physique des participants et déterminer si cela se reflétait dans la façon dont ils conseillaient ou prévoyaient conseiller les patients dans le futur.
- En général, les étudiants de l'UBC faisaient de l'activité physique à un niveau intense et ceux qui considéraient que les conseils sur l'exercice étaient hautement pertinents pour la pratique clinique étaient plus actifs physiquement (en termes de minute par semaine) par rapport à ceux qui considéraient le counseling sur l'exercice comme plus ou moins ou pas du tout pertinent. Les résultats de l'enquête donnent aussi à croire que les étudiants en médecine à l'UBC n'ont peut-être pas la formation nécessaire pour parler d'exercice avec leurs patients.
- Les auteurs recommandent qu'on offre aux étudiants en médecine des programmes qui font la promotion d'un milieu de formation sain susceptible de les encourager à atteindre la quantité d'activité physique hebdomadaire recommandée. Ils estiment en outre que les curricula doivent être conçus de façon à fournir aux étudiants les habiletés nécessaires pour pouvoir discuter d'exercice de façon efficace avec leurs futurs patients.

Cet article a fait l'objet d'une révision par des pairs.
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Regular exercise lowers the risk of premature all-cause mortality[1,2] and chronic diseases such as cardiovascular disease, hypertension, stroke, colon cancer, breast cancer, type 2 diabetes, and osteoporosis,[2] in addition to having a role in preventing obesity.[3] When primary care physicians effectively prescribe exercise to their previously sedentary patients, health outcomes improve.[3-6] It is recommended that physicians provide their patients with individualized exercise prescriptions appropriate to age, current medical conditions, and approximate level of physical fitness[7] in order to encourage all Canadians to meet the Canadian Society for Exercise Physiology (CSEP) guidelines for physical activity (PA).

Unfortunately, most physicians, residents, and medical students do not believe they are adequately prepared to create exercise prescriptions for their patients.[8-11] It has been previously reported by Frank et al, however, that physically active primary care physicians in Canada generally counsel patients to exercise more than inactive ones do,[12] and in the United States, medical student exercise behaviour has also been shown to positively correlate with their attitudes about exercise prescription.[13] It is unknown if Canadian medical students follow trends similar to those of their American counterparts, and our survey is the first, to our knowledge, to collect data on the exercise behaviour and attitudes of Canadian medical students.

We hypothesized that the proportion of students meeting the CSEP guidelines for PA would be higher than among the average Canadian young adult population, and that students who engaged in higher levels of PA would perceive exercise counseling to be more important to their future clinical practice. We also hypothesized that there would be a discrepancy between the perceived relevance of exercise counseling and actual training in the area, consistent with findings at other medical schools in Canada,[8] supporting a need for both programs that encourage medical students to engage in regular PA, and greater training as part of the undergraduate medical curriculum in the area of exercise prescription.

METHODS

Subjects

University of British Columbia (UBC) medical students enrolled in their fourth year were eligible to complete the Health and Wellness Questionnaire administered during classroom sessions on paper (in 2007 to 2009) or online using the one45 survey tool (in 2010).

Survey

The Office of Student Affairs administered confidential questionnaires during fourth-year classroom sessions. Students were instructed that their participation was voluntary and responses would be kept anonymous. Aspects of the questionnaire have been validated previously, and it has been used to assess US medical students' exercise behaviour and attitudes in their fourth year of training.[13]

All completed surveys were included in the final analysis. Student responses were excluded if they did not complete the questions estimating exercise behaviour. Exercise behaviour during a typical week in the fourth year of medical school at UBC was estimated using the Godin Leisure-Time Exercise Questionnaire.[14] Godin exercise scores were generated based on the frequency and intensity of exercise bouts lasting longer than 15 minutes using the following equation: (9 × no. of strenuous bouts) + (5 × no. of moderate-intensity bouts) + (3 × no. of light-intensity bouts). The numbers 9, 5, and 3 are the metabolic equivalent units of task, respectively, for strenuous, moderate, and light exercise. Metabolic equivalent units of task are an expression of the energy cost of a given exercise intensity. The Godin Leisure-Time Exercise Questionnaire[14] is a previously validated method of assessing exercise behaviour in medical students by self-report.[13] Following calculation of the Godin Exercise Score, the total number of minutes of moderate and strenuous exercise per week was calculated, and a dichotomous measure was created to compare student results to the 2011 and 1998 CSEP Guidelines for Physical Activity in Adults.[15] The UBC Behaviour Research Ethics Board approved the study.

Statistics

Cross tabulations with independent covariates were generated for median Godin exercise scores. Bivariate linear regression was performed to assess significant relationships between each independent variable and the Godin exercise scores. Pearson correlation was also performed to assess the strength of the relationship between the Godin exercise scores and total minutes of PA performed per week. Finally, a 1-way ANOVA (analysis of variance) was performed to assess if there were significant differences in the number of strenuous exercise bouts between groups of students rating exercise prescription as not at all, somewhat, or highly relevant. A paired *t* test was used to compare strenuous exercise time between students perceiving exercise counseling to be highly relevant and those who believed it to be somewhat or not at all relevant. Significance for all statistical analyses was set at $P < .05$.

RESULTS

The overall response rate was 62%, and the mean (SD) response rate for individual questionnaire items was 93.4% (8.4%). Of the 883 students eligible to complete

the questionnaire, 546 students responded. Data from 468 students were included in the final analysis.

Participant characteristics

Table 1 outlines demographic information for all the participants included in the analysis. Women comprised 58.2% of participants, and the mean (SD) age of the sample was 27.8 (4.2) years. Overall, 64% met the CSEP guidelines of at least 150 minutes of moderate to strenuous exercise per week, and 73% met the 1998 guidelines of at least 30 to 60 minutes of moderate exercise 4 days per week, or 20 to 30 minutes of vigorous exercise 4 days per week. The mean (SD) total PA performed by participants per week was 376.2 (296.5) minutes. Mean (SD) activity performed per week was 139.4 (160.3) minutes of mild activity, 105.5 (109.2) minutes of moderate activity, and 125.8 (142.5) minutes of strenuous activity. The mean (SD) Godin exercise score of participants was 51 (32).

Table 1. Respondents' demographic information

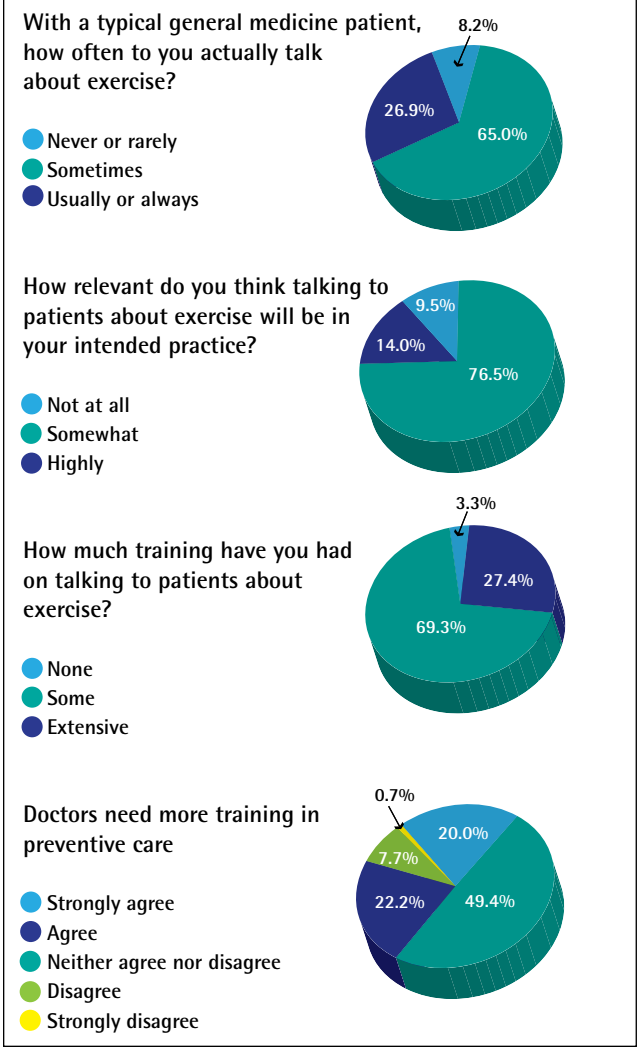
VARIABLES	RESPONDENTS, %*
Race or ethnicity	
• Aboriginal	1.5
• Asian	24.2
• Black	0.4
• White	63.4
• Other	10.1
Marital status	
• Single, never married	60.5
• Separated or divorced	0.6
• Married	27.0
• Common law	11.9
Specialty most interested in pursuing	
• Anesthesiology	9.8
• Community medicine	0.3
• Family medicine	35.2
• Internal medicine	13.0
• Pathology	1.8
• Obstetrics and gynecology	4.1
• Pediatrics	3.6
• Psychiatry	5.0
• Radiology	1.8
• Surgery	14.5
• Other	10.6
Undergraduate major	
• Arts or humanities	7.3
• Sciences	81.9
• Engineering	3.9
• Other	6.9
Primary training location	
• Vancouver, BC	79.3
• Prince George, BC	15.1
• Victoria, BC	14.0
• Other	0.6

*Percentages might not add to 100% owing to missing data.

Perceptions and practices related to PA counseling

Figure 1 demonstrates participants' attitudes and counseling practices. A 1-way ANOVA comparing the frequency of strenuous exercise, broken down by perceived relevance of exercise prescription, demonstrated significant (P=.018) dose-related differences in the number of strenuous exercise bouts per week between students

Figure 1. Lifestyle counseling attitudes and practices of fourth-year medical students at the University of British Columbia



perceiving exercise prescription to be highly relevant (2.76 bouts of strenuous exercise; SE = 0.11) and those perceiving it to be somewhat relevant (2.36 bouts of strenuous exercise; SE = 0.17) and not at all relevant (1.60 bouts of strenuous exercise; SE = 0.24). Additionally, there was a significant (P = .024) difference in minutes of strenuous exercise per week between students perceiving exercise counseling to be highly relevant (137.2 minutes; SE = 8.9 minutes) and those perceiving it to be somewhat or not at all relevant (102.7 minutes; SE = 10.4 minutes).

Associations between participants' perceptions and healthy habits

Linear regression analysis demonstrated significant relationships between individuals' reported PA levels and their perceptions around lifestyle counseling as future physicians (**Table 2**).

DISCUSSION

We hypothesized that fourth-year medical students at UBC engaged in higher levels of PA than average young adults of similar age. Overall, 64% of fourth-year UBC students met current CSEP guidelines of at least 150 minutes of moderate to vigorous activity per week, and 73% of students met previous guidelines set in 1998. This finding is similar to that of Frank et al, who demonstrated that 62% of American fourth-year medical students met the US Centers for Disease Control and Prevention (CDC) PA guidelines (150 minutes of moderate or 75 minutes of strenuous PA per week), compared with 54% of US college-aged adults.[13] It has been previously reported that, in 2007, 64% of adults aged 26 to 35 years met the 1998 CSEP guidelines of 30 to 60 minute of moderate-effort activity at least 4 days per week or 20 to 30 minutes of vigorous activity at least 4 days per week.[16] When using the 1998 guidelines, fourth-year UBC medical students appear more active than age-matched adults. In addition, results from Bryan and Katzmarzyk[16] also demonstrated that Canadians tended to meet guidelines with moderate rather than strenuous PA. Our data show that fourth-year UBC students met CSEP guidelines largely with strenuous PA rather than moderate PA. Although it is difficult to compare across varying guidelines, overall our results demonstrate that fourth-year medical students at UBC are at least as, if not more, physically active than the average Canadian adult population.

Second, our data support the hypothesis that fourth-year UBC medical students engaged in more PA were more likely to view exercise counseling as highly relevant to their intended clinical practice. Frank et al similarly demonstrated that higher perceived relevance of PA counseling was more likely among American medical students complying with CDC PA recommendations.[13] We demonstrated significant differences in strenuous exercise minutes per week between students perceiving exercise counseling to be highly relevant and those perceiving it to be somewhat or not at all relevant (P = .024) and a trend toward a significant linear relationship between Godin exercise scores and perceived relevance of exercise counseling to clinical practice.

Our results also demonstrate that UBC medical students with higher PA levels recognize that their current lifestyle habits will influence future counseling practices. Specifically, those with higher PA levels agreed with the statements that they would be able to provide better counseling if they adhered to a healthy lifestyle, exercised and stayed fit, ate a healthy diet, and maintained a healthy weight. These data also agree with previous findings by Frank et al, which showed that US medical students who met CDC PA recommendations were more likely to acknowledge that physician PA levels influenced patient PA levels.[13]

It has been clearly established that physically active physicians are more likely to counsel their patients on exercise both in the United States[17-19] and in Canada.[12] Frank et al also extended these findings to medical students, when they found that PA levels were positively related to the frequency of actual PA counseling among third- and fourth-year US medical students.[13] Our sample did not follow the same pattern, which might be related to the amount of training or exposure the fourth-year UBC students had had in this area, or it could be owing to the survey's limitation of a relatively small sample size. In addition, our conclusions might be limited by the questionnaire's response rate; 62% of fourth-year medical students at UBC chose to participate in this study. Because participation was voluntary and the study was conducted after morning lectures, we can only speculate on the reasons for this response rate; they might include poor attendance at lectures or refusal by students to complete the questionnaire owing to the large number of surveys UBC medical students are exposed to. Moreover, self-report surveys of this nature might also introduce a social-desirability bias that investigators must acknowledge. It has been previously demonstrated that clinicians over-report their adherence to practice guidelines,[20] but in a 2004 study it was found that social desirability had minimal influence on self-reported PA levels evaluated by the Godin Leisure-Time Exercise Questionnaire.[21]

Most important, our study demonstrates a discrepancy between the perceived relevance of exercise prescription, and the perceived amount of training students have in talking to patients about exercise. Despite 69.3% of our sample placing a high value on exercise counseling, only 14.0% rated their training to provide such

Table 2. Linear relationship between Godin exercise scores and lifestyle counseling attitudes and practices

QUESTION OR STATEMENT	N (%)	MEDIAN GODIN EXERCISE SCORE*	*P* VALUE
With a typical general medicine patient, how often do you actually talk about exercise?			.225
• Never or rarely	27 (8.2)	51	
• Sometimes	215 (65.0)	46	
• Usually or always	89 (26.9)	56	
How relevant do you think talking to patients about exercise will be in your intended practice?			.067
• Not at all	15 (3.3)	34	
• Somewhat	124 (27.4)	44	
• Highly	314 (69.3)	51	
In order to effectively encourage patient adherence to a healthy lifestyle, a physician must adhere to one himself or herself			.001
• Strongly agree	103 (25.3)	54	
• Agree	244 (60.0)	48	
• Neither agree nor disagree	39 (9.6)	39	
• Disagree	20 (4.9)	43	
• Strongly disagree	1 (0.2)	3	
I will be able to provide more credible and effective counseling if I eat a healthy diet			<.001
• Strongly agree	128 (29.2)	54	
• Agree	273 (62.2)	45	
• Neither agree nor disagree	26 (5.9)	58	
• Disagree	11 (2.5)	34	
• Strongly disagree	1 (0.2)	3	
I will be able to provide more credible and effective counseling if I exercise and stay fit			<.001
• Strongly agree	151 (34.2)	53	
• Agree	266 (60.2)	45	
• Neither agree nor disagree	17 (3.8)	28	
• Disagree	7 (1.6)	34	
• Strongly disagree	1 (0.2)	3	
I will be able to provide more credible and effective counseling if I maintain a healthy weight			.03
• Strongly agree	160 (36.3)	53	
• Agree	255 (57.8)	45	
• Neither agree nor disagree	18 (4.1)	48	
• Disagree	7 (1.6)	41	
• Strongly disagree	1 (0.2)	3	

*Godin exercise scores were generated based on the frequency and intensity of exercise bouts lasting longer than 15 minutes using the following equation: (9 × no. of strenuous bouts) + (5 × no. of moderate-intensity bouts) + (3 × no. of light-intensity bouts). Higher scores therefore correspond to higher levels of activity.

counseling as extensive (**Figure 1**). Therefore, it is possible students are simply not addressing exercise with the patients they encounter because they do not feel adequately prepared to do so.

The medical education community acknowledges a training deficiency in the power of exercise to reduce the incidence of chronic disease.[22,23] Moreover, past studies have identified that not only medical students but also residents and physicians feel underprepared to provide their patients with exercise prescriptions.[8,9,18] Not surprisingly, the rate of formal exercise counseling by primary care physicians in Canada is low.[11,24] Lack of training has been consistently reported as a barrier to PA-related counseling of patients,[10,25,26] and residents have expressed that more training in exercise counseling would be valuable.[9] Some medical schools in the

United States, Colombia, and elsewhere abroad have begun to address the lack of exercise counseling curriculums through various methods, including preventive medicine and exercise prescription courses,[27,28] personal health promotion for medical students,[29-31] and moving toward more lifestyle-based curriculums.[32] These interventions have all been successful in improving students' confidence and knowledge regarding how best to counsel patients about exercise, and we hope the results of our study encourage Canadian medical schools to further explore the value of training students in exercise counseling.

Conclusion

The main findings of our study were that students at UBC generally performed strenuous exercise and that students who perceived exercise counseling to be highly relevant to clinical practice performed more strenuous exercise (in minutes per week) relative to students who viewed exercise counseling as somewhat or not at all relevant. Of note, our survey results also suggested that medical students at UBC might not have the training they need to effectively address exercise with their patients.

A 2-pronged approach to improving the preparedness of fourth-year medical students to prescribe exercise would likely be most effective. First, medical students need to be offered programs that promote a healthy educational environment that encourages them to achieve the recommended amount of PA per week (preferably as strenuous exercise). Second, curriculums must be designed to give students the skills they need to effectively discuss exercise with their patients later in clinical practice as physicians.

Ms Holtz and **Ms Kokotilo** were medical students at the University of British Columbia in Vancouver, BC, at the time of this study. **Dr Frank** is a preventive medicine physician. **Dr Fitzgerald** is a pediatrician.

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Contributors

Ms Holtz interpreted the results and wrote the manuscript. **Ms Kokotilo** performed statistical analysis of the data and helped write the manuscript. **Drs Fitzgerald** and **Frank** created and administered the survey in collaboration with the Evaluation Studies Unit of the Faculty of Medicine at the University of British Columbia. **Dr Frank** also substantially contributed to editing the manuscript.

Competing interests

None declared

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