Older Adults, Chronic Disease and Leisure-time Physical Activity

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Abstract

Background—Participating in regular physical activity is an important part of healthy aging. There is an increased risk for inactivity associated with aging and the risk becomes greater for adults who have a chronic disease. However, there is limited information on current physical activity levels for older adults and even less for those with chronic diseases.

Objective—Our primary objective was to determine the proportion of older adults who achieved a recommended amount of weekly physical activity (1000 kcal/week). The secondary objectives were to identify variables associated with meeting guideline leisure-time physical activity (LTPA), and to describe the type of physical activities that respondents reported across different chronic diseases.

Methods—In this study we used the Canadian Community Health Survey Cycle 1.1 (2000/2001) to report LTPA for adults aged 65 years and older. This was a population-based self-report telephone survey. We used univariate logistic regression to provide odds ratios to determine differences in activity and the likelihood of meeting guideline recommendations.

Results—For adults over 65 years of age with no chronic diseases, 30% reported meeting guideline LTPA, while only 23% met the recommendations if they had one or more chronic diseases. Factors associated with achieving the guideline amount of physical activity included a higher level of education, higher income and moderate alcohol consumption. Likelihood for not achieving the recommended level of LTPA included low BMI, pain and the presence of mobility and dexterity problems. Walking, gardening and home exercises were the three most frequent types of reported physical activities.

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Conclusion—This study provides the most recent evidence to suggest that older Canadians are not active enough and this is accentuated if a chronic disease is present. It is important to develop community-based programs to facilitate LTPA, in particular for older people with a chronic disease.

Keywords

physical activity; aging; chronic disease; health survey

Introduction

Participating in regular physical activity is an important part of healthy aging by preventing or slowing the progression of some chronic diseases (1). Numerous studies highlight the strong association with physical activity and a lower risk of developing chronic diseases such as stroke, diabetes, osteoporosis and heart disease (2–7). Yet despite the potential benefits, the World Health Organization (WHO) issued a warning in 2003 that physical inactivity is a serious worldwide health problem such that 2 million deaths are attributable annually to a sedentary lifestyle (8). Further, decreasing the number of physically inactive adults by only 10% is estimated to save approximately $CAD 5 billion in costs for medical care, sick leave, and lost revenue (9). Over 85% of older adults report that they have at least one chronic disease (10) and these individuals have a higher risk for inactivity (1). There is limited information on current leisure-time physical activity (LTPA) for older adults and even less for those with chronic disease, yet this information is necessary to develop effective interventions.

Physical activity is a broad term that encompasses both leisure-time activity (sports, exercise) and activities of daily living (household living tasks, transportation). The American Heart Association and the American College of Sports Medicine guidelines (AHA-ACSM) (11) recommend that older adults should engage in 30 minutes or more of moderate intensity physical activity five days per week. The US Surgeon General's Report recommends a weekly amount of physical activity as approximately 1000 kcal/week (or 150 kcal/day) (1). This moderate amount of physical activity can result in overall health benefits [even in people with chronic diseases (12)], and the secondary prevention of other chronic disease states (4,5,7). Recent literature has focused more on secondary prevention of chronic diseases (e.g., obesity, depression, osteoporosis, falls and fractures and osteoarthritis) (13), and there is great potential to enhance the quality of life of individuals with chronic diseases through physical activity.

It is important to quantify the level and types of LTPA currently undertaken by older adults living with a chronic disease to inform future interventions. Therefore, our primary objective was to establish the level of physical activity undertaken by older adults (aged 65 years and older). We also compared reported LTPA of healthy older adults with those respondents who had at least one chronic disease. Our secondary objectives were to i) identify the characteristics that were associated with achieving the recommended amount of weekly LTPA (1000 kcal/week) and ii) report LTPA patterns in six specific clusters of chronic diseases: musculoskeletal, stroke, degenerative neurological disorders, vascular/heart

disease, diabetes, and respiratory diseases. This population-based investigation can provide an important contribution to our understanding of LTPA in older adults and a foundation for the development of sustainable physical activity interventions.

Methods

Data Collection and Subjects

We used the Canadian Community Health Survey (CCHS) Cycle 1.1 (2000/2001). This 45-minute telephone interview was conducted by Statistics Canada to provide health information for 136 health regions across Canada. Cycle 1.1 was undertaken with a sample size of 130,000 randomly selected participants over the age of 12 years who lived in the community. The CCHS asked information pertaining to chronic diseases, health-related quality of life, health resource utilization, socio-demographics and LTPA. Only one randomly selected respondent per household was recruited. All interviewing took place using centralized telephone facilities in four of Statistics Canada's regional offices starting in September 2000. For the purposes of our study, we used the responses from people aged 65 years and older. This study was approved by the local research ethics board. The research and analysis are based on data from Statistics Canada and the opinions expressed do not represent the views of Statistics Canada.

In the CCHS, chronic disease status was determined by asking the respondents to identify from a list of 29 diseases that had lasted or was expected to last 6 months or more and had been diagnosed by a health professional. We calculated the proportion of people who achieved the recommended amount of weekly activity (1000 kcal/week) in two groups based on the presence of disease state (with and without at least one chronic disease). For our secondary objective, we clustered those individuals who reported specific chronic diseases into six groups: musculoskeletal, stroke, degenerative neurological disorders (Parkinson's disease and multiple sclerosis), vascular/heart disease, diabetes mellitus and respiratory diseases. For example, if a participant had heart disease and osteoarthritis, then there would be a physical activity entry in both the vascular/heart disease cluster as well as the musculoskeletal cluster.

During the telephone interview, a checklist of 22 physical activities (such as walking, gardening, ice hockey etc.) was used to ask respondents which LTPA they engaged in over the past 3 months. Once an activity was indicated, direct questions were asked about the duration and frequency for each activity. We derived a LTPA variable by multiplying the activity frequency by the amount of time spent in the activity. We calculated the total kcal/week by multiplying the appropriate kilocalorie score [based on metabolic equivalent of the task values including individual body weight (14)] for each of the activities by the amount of time spent during the week doing the activity. We classified respondents with a weekly energy expenditure of >1000kcal/week as sufficient to met the US Surgeon General's Report guideline (1).

The CCHS collected information on variables such as age, gender, education, annual income, smoking, body mass index (BMI), and marital status. We categorized these variables as socio-demographic or physical variables. *Socio-demographic Variables:* Age

was collected as a continuous variable while gender, education, income, smoking and marital status were collected as categorical variables. Smoking status was determined by asking respondents if they smoked daily, occasionally or not at all. BMI was determined by the reported weight in kilograms divided by reported height in meters squared. For alcohol consumption, the number of weekly drinks was recorded. To categorize the results into meaningful units, we used the National Institute on Alcohol Abuse and Alcoholism (NIAAA) and the World Health Organization (WHO) definition of moderate drinking as consuming 56 drinks per month (1–2 drinks/day) and "at-risk" drinking as greater than 56 drinks/month or one binge drinking session (>5 drinks on one occasion) (15,16). Due to the nature of CCHS reporting, we are unable to assess the category > 56 drinks/month characterized as risky drinking because the number of drinks above this level was not reported. *Physical Variables:* Other variables we investigated included pain, mobility and dexterity which were derived from the Health Utility Index Mark III (HUI Mark III). The HUI Mark III is a generic index of health status that provides a measure of population heath (17). These attributes from the HUI Mark III were dichotomized to provide information regarding having or not having a problem regardless of severity.

Statistical analysis

The raw data were obtained from the Statistics Canada Research Data Centre remote site in Vancouver, British Columbia. The proportional sampling scheme used by Statistics Canada enable sampling weights to be derived, and our reported estimates are representative of the 3.6 million Canadians aged 65 years and older. *Primary Objective:* We provide a comparison of participants (with and without at least one chronic disease) who met the recommended amount of weekly LTPA (1000 kcal/week), using proportions and mean kcal/week. *Secondary Objectives:* We described the population using proportions of people who met the recommended amount of LTPA (1000 kcal/week) using different variables; age, sex, education, annual income, marital status, smoking status, alcohol consumption, BMI, mobility, dexterity and pain status. We used univariate logistic regression to provide odds ratios (OR) and 95 % confidence intervals (CI) within each variable to determine differences in activity and risk for meeting guideline recommendations. Dummy variables were created for all categorical measurements with three or more response options. Lastly, to address the type of LTPA by chronic disease cluster, we report frequency of activity and inactivity by participants across six different disease clusters (musculoskeletal, degenerative neurological, vascular/heart disease, diabetes, respiratory and stroke). All data were analyzed using SAS (Version 9, Cary, N.C.) software.

Results

The CCHS Cycle 1.1 raw data contained 24,233 responses from Canadians age 65 years and older; this represents an 84.7% response rate. This equates to an estimated 3.6 million people when sampling weights were used. Sixty percent (60%) of the respondents were women and 76% reported having one or more chronic diseases. Fifty-one percent (51%) of respondents reported a musculoskeletal disorder; 21% reported a vascular/heart disease, 13% degenerative neurological disease, 13% diabetes, 12% with respiratory conditions and 5% of the population reported having the residual effects of a stroke. The mean LTPA in the

No Chronic Disease Group was 829.7 kcal/week, while it was only 636.5 kcal/week for the Chronic Disease Group (Table 1). Thirty percent (30%) of respondents without any chronic disease achieved or exceeded the 1000 kcal/week threshold while only 23% of participants with one or more chronic disease achieved the recommendation.

Socio-demographic and Physical Determinants of LTPA

More men than women achieved the recommended amount of weekly activity regardless of the presence of a chronic disease (Table 1). For women and men, the proportion of respondents who met the guidelines decreased with advancing age; men aged 65–74 years without a chronic disease had the highest proportion that met guidelines (41%) compared with older women 80 years+ with a chronic disease, who recorded the lowest proportion (7%). Respondents who were married were more likely to meet guideline recommendations. The presence of a physical impairment and pain lowered the proportion of people who met activity recommendations regardless of disease status.

Socioeconomic differences were observed in both populations regardless of chronic disease status. Education and income had parallel trends; in the No Chronic Disease Group, higher proportions of people met the physical activity guidelines if there was a higher level of education or income (39% and 37% respectively). Interestingly, those respondents in the highest income and education categories in the Chronic Disease Group (30%) attained the same proportion as the overall mean for the No Chronic Disease Group.

Respondents who did not smoke were more likely to meet physical activity guideline recommendations, and this proportion decreased if people smoked, even occasionally (32% of the No Chronic Disease Group and 24% of the Chronic Disease Group). The proportion of people meeting the guidelines was only 16% for people who smoked daily and had one or more chronic disease.

Alcohol consumption had the opposite likelihood to meet recommendations compared with smoking. We found regardless of disease status, those who reported higher amounts of alcohol consumption were more likely to meet the physical activity recommendations. For example, in the No Chronic Disease Group, 22% of non-drinkers met the guidelines compared with 38% of respondents who consumed 30 drinks or more/month. A similar effect with drinking was observed, in the Chronic Disease Group where the proportion of people achieving the guidelines rose from 16% of non-drinkers to 34% of moderate plus drinkers.

Interestingly, only a small proportion of people who were underweight met guideline recommendations (11% of the No Chronic Disease Group and 5% of the Chronic Disease Group). Conversely, in the No Chronic Disease Group, people with a BMI >25 (classified as overweight and obese) had a higher proportion meeting the physical activity guidelines (34%) compared with people who are considered to have a "normal" BMI (30%). This was not observed in the Chronic Disease Group where the group classified as "overweight" had the highest proportion of people meeting physical activity guidelines (27%) compared with the "normal" (23%) and the "obese" groups (20%).

For physical variables, we found that the presence of a physical impairment lowered the proportion of people who met physical activity recommendations regardless of disease status. If there was a mobility problem, the proportions dropped from 31% to 9% for the No Chronic Disease Group and 27% to 6% for the Chronic Disease Group. A similar trend was observed for dexterity problems, however the proportion did not drop as low (16% of the No Chronic Disease Group versus 12% for Chronic Disease Group). The presence of pain reduced the proportion of people meeting recommendations from 31% to 14% in the No Chronic Disease Group versus 26% to 15% in the Chronic Disease Group.

Association between respondent variables and recommended amount of physical activity

In univariate analysis, we observed that advancing age, low socioeconomic and educational levels, smoking and physical measures (low BMI, impaired mobility status or dexterity and presence of pain) were significantly associated with not meeting physical activity guidelines. Protective variables observed in both groups included higher education, higher income and moderate alcohol consumption (Table 1). For people who attained post-secondary education, there was a greater chance of meeting guideline weekly exercise compared with people who did not complete secondary education. For alcohol consumption we found that moderate drinking was associated with a 2 (no chronic disease) to 2.5 (chronic disease group) times decreased risk of inactivity.

LTPA reported by chronic disease

We note similarities in types of exercises reported by participants in different disease clusters. Across all chronic diseases, the top three activities were walking (38–56%), gardening (17–33%) and home exercises (14–20%) (Table 2). These activities had higher frequency of participation compared with more vigorous activities such as jogging (frequency range 0.1 to 0.6%), aerobic exercise classes (2.6–4.5%) and sporting games (0.2–1.2%). Participants in the stroke cluster had the highest proportion of inactivity (27%) and this cluster consistently reported the lowest participation in other activities. For example, in the stroke cluster only 38% of respondents use walking for physical activity compared with all other chronic diseases (50–56% participation) and the No Chronic Disease group (61%).

Discussion

In this population-based survey of older adults, we observed that respondents reported a low level of participation in LTPA. Specifically, we report that 30% of people over the age of 65 years met the 1000 kcal/week recommended guidelines for weekly physical activity, and the presence of a chronic disease reduced the proportion of people meeting recommended guidelines by 7%. Further, the group without any chronic diseases reported expending 23% more kilocalories per week. Those groups most at risk for not meeting recommended guidelines include older women, those individuals with a lower socioeconomic status, people who smoke and those with physical impairments.

Low attainment of recommended weekly LTPA in older adults

The current study highlights that only 30% of older adults are active enough to meet guideline recommendations and these figures have not changed much in the past few years.

In 1990, the US National Health Interview Survey, as reported by Jones and coworkers (18), 32% of Americans over the age of 65 years met the Surgeon General's activity guidelines; men recorded higher proportions of meeting guideline activity (44%) compared with women (22%). Brown and coworkers used the 2001 US-based Behavioral Risk Factor Surveillance System (BRFSS) to quantify adherence to recommended activity levels (19). This questionnaire was administered to approximately 75,000 Americans aged 50 years of age or greater. Overall only 29% of respondents with disabilities met the recommendation. Approximately 37% of men and 23% of women with disabilities between 65–74 years met the recommended level of physical activity, and these results are consistent with our findings. However, unlike our data from the CCHS, the BRFSS 2001 was able to capture household and transportation activities in addition to LTPA. These studies all underscore the low level of activity by older populations and highlights that the amount of weekly physical activity achieved by older adults has not changed drastically in the past 10 years.

Several socio-demographic variables were associated with participation in LTPA. We found that respondents with a higher income and higher level of education were more likely to meet physical activity recommendations. These results extend previous literature (20) by showing the strong association between higher education, economic status and the greater chance of meeting recommended exercise guidelines. Surprisingly, we found drinking alcohol (even daily consumption) had a positive association with reaching recommended levels of LTPA. Currently, there are several definitions of drinking behavior, and we used the NIAAA and the WHO definition of moderate drinking and "at risk" drinking". We observed that people who report moderate drinking are more likely to achieve the recommended level of LTPA. (Moderate drinking refers to consuming one to two drinks per day, such as a drink of wine with dinner.) These results may reflect the social nature associated with activities such as walking clubs or group sports or perhaps respondents who value the benefits associated with exercise are aware of cardio-vascular literature suggesting that moderate alcohol consumption has the potential to positively impact on some health outcomes (21– 23). Due to the cross-sectional nature of this database, this does not imply a causal effect of alcohol consumption and LTPA. While we were unable to analyze the relation between excessive drinking and activity levels because of limitations related to the data, we would hypothesize that excessive drinking may not have the same level of protective effect and this is worthy of future study.

Several physical variables were associated with meeting or not meeting guideline exercise. We found that individuals who were overweight and even those classified as "obese" had higher proportions of meeting the guidelines while respondents who were classified as "underweight" were less likely to achieve recommendations. Similar results were also observed in the 1990 US National Health Interview Survey (18). Using the 1000 kcal/week recommendations, Jones and coworkers reported that 30% of respondents who were underweight met the physical activity guidelines compared with those who were normal weight (38%) and overweight (39%). Our results sound counter-intuitive; that more people in the No Chronic Disease Group who are classified as "obese" are achieving recommended guidelines. Some of these results may speak to the issue that the BMI scale may not adequately reflect the population and that an individual classified as overweight or obese by the BMI method may simply have more muscle mass or, it is easier to misclassify with older

adults when an individual presents at extreme ranges of BMI (24). Although our results were significant, this finding cannot be viewed simply at the univariate level. Potentially any benefit that may be observed by a higher BMI must be considered in the larger context of the multi-system health risks associated with obesity. It is possible that these results may indicate that people with a higher BMI are aware of the corresponding health risks and are actively engaged in physical activity to lose weight and improve health.

We found that individuals with pain, mobility and/or dexterity problems were less likely to meet guideline physical activity recommendations. Moreover, those with mobility problems were less likely to meet the physical activity guidelines compared with individuals with dexterity problems. These results highlight that physical impairment is a significant risk factor for inactivity. Given that walking is the most often cited form of physical activity, this finding is not surprising-- mobility problems and pain can impact directly on ambulation while dexterity issues may be an indication of a more significant health problem or it can also limit the ability to hold a walking aid.

The effect of chronic disease on participation in LTPA

We found that walking was the activity most used for LTPA for this population. We note that similar proportions of people across different chronic diseases were participating in walking activities likely because it is an accessible activity that requires minimal instruction and equipment. In a recent one-year longitudinal cohort study that used a simple walking program for women with existing functional limitations, researchers found that walking was sufficient to maintain functional ability (25). Thirty-minutes of walking on most days can provide important health benefits (26) which may support why physicians are more likely to recommend walking as an ideal form of physical activity (25).

Noteworthy in our study are the activity proportions by the cluster of people with the residual effects of a stroke. In this disease cluster, respondents reported the highest proportion of inactivity and the lowest proportions of participation in the other activities. Stroke can lead to inactivity with resultant secondary complications such as osteoporosis, fragility fractures and progression of heart disease (28,29). Our data supports this lower LTPA level, however, it, does not specify if the phenomenon is because of individual physical limitations or because of lack of opportunities such as organized physical activity programs or facilities in the community.

We found that one-third or less of older adults are meeting the recommended amount of exercise guidelines, and these results have not changed significantly in the past 10 years. What our study does not have the capacity to answer is why individuals are not exercising at a sufficient level. Is this a knowledge translation problem where the benefits of exercising have only reached a small proportion of people? Or, is it that people are aware of the benefits of exercise but do not have adequate facilities, such as low-cost seniors-oriented community centers and the like? Alternatively, is it that individuals are aware of the benefits of exercise, have the opportunity but may not have the confidence or motivation to participate? There are a multitude of reasons why a large proportion of seniors are not meeting guideline exercise levels. What our data may indicate is that these challenges may

not change over the short-term. Rather, development and utilization of sustainable healthy exercise attitudes will take time to reach an impact at the population level.

To this end, it is important to target those people who are most at risk through community-based programs that promote physical activity. As we found similarities across disease clusters strategies to promote physical activity may want to focus on the individual's ability rather than being disease-specific. These programs should also consider what motivates individuals to change and how to sustain a positive behavior change. Future programs must address both the intrinsic barriers such as confidence, ability, motivation and knowledge as well as the extrinsic barriers such as economics, opportunity and environmental factors.

We note several limitations in our study. We acknowledge that the CCHS data set only captures LTPA and not activities of daily living (which can make a significant contribution to health status and energy expenditure). Previous research calculates that on average women spend almost 3 hours/day and men spend 2 hours/day in household activities such as meal preparation, cleaning and childcare (30). Thus, these activities can account for our marginally lower results, especially in women, compared with similar surveys. Secondly, the CCHS does not capture disease severity, and this makes it difficult to ascertain the relation between LTPA and severity of chronic disease. Third, as this data was collected over a one-year period, seasonal variation of energy expenditure can make a significant difference in the physical activity outcome (31). The CCHS study design attempted to accommodate for seasonal variation by sampling equally throughout the year. Fourth, our results raise the issue of whether the current methods used to estimate energy expenditures are adequate for people over 65 years. Individuals with a chronic disease may expend more energy to achieve the same activity as a healthier individual. Alternatively, in a population that may be challenged physically, a lower level of activity may be sufficient to maintain function and provide secondary prevention from other chronic diseases.

Finally, the CCHS is a self-report cross-sectional survey and there is potential for recall and respondent bias when answering the questions. The CCHS data collection tried to address the issue of non-response through several methods including an introductory letter sent prior to the telephone interview and, in addition, several attempts were made to contact people who had not completed the questionnaire. Consequently, this population-based survey had a very high response rate (84.7%) to reduce some of the bias. Nonetheless, interpreting any causality of the results needs to be viewed cautiously.

Only one-third or less of older Canadians report meeting the recommended guidelines for weekly LTPA and these results have not changed substantially in the past 10 years. Given the accessibility and benefits of walking, perhaps more efforts are necessary to promote this mode of physical activity at a population level. Developing and testing LTPA initiatives are urgently needed in the older age group to encourage and maintain participation in physical activities.

Acknowledgments

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Table 1

Description of participants 65 years or older with and without a chronic disease who met the recommended 1000kcals/week of leisure-time physical activity; CCHS Cycle 1.1(2000/2001). Odds ratios are provided for the variables for the two groups (with and without a chronic disease).

	No chronic disease			1 or more Chronic diseases		
	Recommended N(%)	Insufficient N(%)	Odds ratio (95% CI)	Recommended N(%)	Insufficient N(%)	Odds ratio (95% CI)
Total	279599 * (30.2)	647529(69.8)		623245(23.2)	2066111(76.8)	
Socio-demographic Variables						
Age by gender						
Women (years)						
65–74	26.7	73.3	1	21.9	78.1	1
75–79	18.1	81.9	1.65(1.62, 1.68)	12.7	87.3	1.93(1.9, 1.9)
80	14.5	85.5	2.15(2.11, 2.20)	7.4	92.6	3.51(3.5, 3.6)
Men (years)						
65–74	40.6	59.4	1	38.0	62.1	1
75–79	35.9	64.1	1.22(1.20, 1.24)	27.3	72.7	1.63(1.61, 1.64)
80	26.9	73.1	1.86(1.83, 1.90)	20.8	79.2	2.33(2.30, 2.35)
Education						
Less than Secondary School Graduation	23.3	76.7	1	18.9	81.1	1
Secondary School, Graduation and/or Some Post-Secondary	33.4	66.6	0.61(0.60, 0.61)	25.5	74.5	0.68(0.67, 0.68)
Post-Secondary Graduation	38.9	61.1	0.48(0.47, 0.48)	29.5	70.5	0.56(0.55, 0.56)
Annual Income						
No income	11.9	88.1	1	11.6	88.4	1
< $15K	23.3	76.7	0.44(0.41, 0.48)	16.0	84.0	0.69(0.65, 0.72)
$15–29K	29.1	70.9	0.33(0.30, 0.36)	20.6	79.4	0.50(0.48, 0.53)
$30–49K	33.2	66.8	0.27(0.25, 0.29)	27.7	72.3	0.34(0.32, 0.36)
>$50K	36.9	63.1	0.23(0.21, 0.25)	29.8	70.2	0.31(0.29, 0.32)
Marital Status						
Married/common-law	32.1	67.9	1	27.2	72.8	1

	No chronic disease			1 or more Chronic diseases		
	Recommended N(%)	Insufficient N(%)	Odds ratio (95% CI)	Recommended N(%)	Insufficient N(%)	Odds ratio (95% CI)
Single/Widow/Separated/Divorced	26.8	73.3	1.29 (1.28, 1.30)	17.4	82.6	1.78(1.77, 1.79)
Smoker						
Non-smoker	31.6	68.4	1	24.0	76.0	1
Occasionally	26.9	73.1	1.26(1.21, 1.30)	19.1	80.9	1.34(1.31, 1.37)
Daily	20.3	79.7	1.81(1.79, 1.84)	16.4	83.6	1.61(1.59, 1.63)
Alcohol						
None	21.7	78.3	1	15.8	84.2	1
<1x/month	26.6	73.4	0.76(0.75, 0.77)	20.1	79.9	0.74(0.74, 0.75)
1–3x/month	34.1	65.9	0.54(0.53, 0.54)	25.7	74.3	0.54(0.54, 0.55)
4 –29 x/month	37.4	62.6	0.46(0.46, 0.47)	32.6	67.4	0.38(0.38, 0.39)
30 or more/month	37.5	62.5	0.46(0.45, 0.47)	33.9	66.0	0.36(0.36, 0.37)
Physical Variables						
BMI						
Underweight(BMI<18.5)	11.1	88.9	3.45(3.33, 3.59)	4.9	95.0	5.54(5.38, 5.72)
Normal(18.5 BMI<25)	29.7	70.3	1	23.1	76.9	1
Overweight(25 BMI<30)	33.5	66.5	0.80(0.80, 0.81)	27.3	72.7	0.82(0.82, 0.83)
Obese(30 BMI)	33.5	66.5	0.82(0.80, 0.83)	20.3	79.7	1.24(1.23, 1.26)
Mobility Status						
No mobility problem	31.0	69.0	1	26.9	73.0	1
Mobility Problem	9.3	90.7	2.29(2.14, 2.45)	6.5	93.5	5.33(5.27, 5.39)
Dexterity Problems						
No dexterity problems	30.3	69.7	1	23.5	76.5	1
Dexterity problems	15.9	84.1	2.29(2.14, 2.45)	11.5	88.5	2.37(2.32, 2.4)
Pain						
No pain or discomfort	30.8	69.2	1	26.2	73.9	1
Pain prevents no activities	26.4	73.6	1.24(1.21, 1.27)	27.2	72.8	0.95(0.94, 0.96)

	No chronic disease			1 or more Chronic diseases		
	Recommended N(%)	Insufficient N(%)	Odds ratio (95% CI)	Recommended N(%)	Insufficient N(%)	Odds ratio (95% CI)
Pain prevents activities	14.4	85.6	2.64(2.55, 2.73)	14.6	85.4	2.07(2.05, 2.09)

*
Results are weighted to provide proportional representation of the Canadian population.

Table 2

Frequency of different physical activities reported by clusters of chronic diseases. Results are reported as proportions within each chronic disease cluster for CCHS Cycle 1.1(2000–2001).

Leisure-time physical activity	Entire Cohort	None	Musculoskeletal	Vascular-Heart	Degenerative Neurological	Diabetes	Respiratory	Stroke
	N(%) 3,647,791 100%	927,128 25.4%	1,850,682 50.7%	760,427 20.9%	488,677 13.4%	463,151 12.7%	444,206 12.2%	178,655 4.9%
None		13.1	20.9	23.9	17.2	25.6	24.4	26.9
Walking	56.1	61.3	53.9	51.5	55.7	49.6	49.8	37.8
Gardening	32.0	37.9	30.4	26.7	32.6	23.5	24.3	16.9
Home exercises	18.1	17.1	20.3	15.9	20.0	14.1	16.8	13.9
Social dance	6.0	7.9	5.4	4.4	5.7	4.1	4.1	2.0
Golfing	5.8	7.7	5.1	4.3	5.3	3.6	3.0	1.1
Weight training	1.7	1.8	1.6	1.0	2.3	1.6	1.4	1.3
Fishing	3.0	3.5	2.7	3.0	2.4	3.0	2.4	0.7
Swimming	7.1	8.7	6.9	5.4	7.9	4.3	5.7	2.7
Bicycling	5.5	8.4	4.3	3.7	5.6	3.6	3.6	3.3
Jogging-running	0.7	1.2	0.5	0.3	0.6	0.4	0.5	0.1
Exercise class-aerobics	3.8	4.0	3.9	3.3	4.5	3.0	4.2	2.6
Sporting Games ∞	1.0	1.7	0.7	0.3	1.2	0.4	0.2	0.2

∞ baseball, softball, tennis, volleyball, basketball, hockey

Note: Each column will not add to 100% as respondents were able to answer yes to more than one activity and to chronic disease. Results are weighted to provide proportional representation of the Canadian population.