Exercise and Nutrition in Older Canadian Women

Opportunities for Community Intervention

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ABSTRACT

Background: The objectives of this study were to examine age differences in the extent to which older Canadian women exercise and eat nutritiously, and to identify the interventions they desire to help them adopt and maintain physical and nutritional fitness.

Methods: A cross-sectional postal survey of 5,000 community-dwelling women aged 55-95 was conducted across Canada in October 2003. The survey queried exercise frequency, nutritional risk, functional status, and factors deemed facilitative to adopting and maintaining a physically fit and nutritiously healthy lifestyle.

Results: Data from 2,484 women were available for analysis; 31% were 75 years and older. Among women aged 55-74 versus those over age 75, 62% compared to 56% reported exercising 3 times/week for 20 minutes or longer ($p=0.003$), 33% in both age groups were eating nutritiously, and 24% compared to 21% were both exercising and eating nutritiously. Thirty-five percent of women aged 55-74 who were not exercising or eating nutritiously desired increased availability of low-cost, suitable health promotion programs and additional written materials to improve these health habits, compared to 25% of women in the 75 year and older group ($p<0.001$). Improved transportation to programs was the only intervention preferred by women aged 75 years and older (OR 1.66 (1.30-2.11)). Sedentary women and those at higher nutritional risk were two to three times more likely to identify encouragement from health professionals (OR 1.93 (1.48-2.52)), as well as from family and friends (OR 3.03 (1.89-4.85)) as important facilitators.

Interpretation: Women aged 55-74 who do not exercise and eat nutritiously are most receptive to a variety of health-promoting community interventions.

MeSH terms: Aging; women; exercise; nutrition; life style; intervention

La traduction du résumé se trouve à la fin de l'article.

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Numbers of Canadian women aged 55 years and older are expected to rise by 67%, from 4 to 6.7 million over the next 20 years.^{1,2} These women will live longer than men, and are expected to experience more years of disability, worse overall health status and higher rates of health care utilization.³⁻⁷ Nonetheless, 93% of senior women will continue living at home,⁸ a self-stated sign of independence and preserved quality of life.^{9,10} Epidemiological studies suggest that one way to help older women remain independent is to encourage them to engage in sufficient physical activity and consume a nutritionally adequate diet. Physical activity has been linked to less cardiovascular disease, stroke, diabetes, osteoporosis, cancer, high blood pressure, obesity, depression and disability with age.¹¹⁻¹⁵ Similarly, higher intakes of fruits, vegetables and fibre, and lower intakes of fat and animal products have been associated with lower rates of cancer, cardiovascular disease, diabetes, high blood pressure, high cholesterol, and obesity.¹⁵⁻¹⁷ Even among frail elderly women, community-based group exercise programs are effective in reducing falls and future morbidity,¹⁸ and nutritional interventions have been shown to prevent weight loss and improve emotional functioning.¹⁹ However, little data have been reported on these common lifestyle habits in older women.

Despite the many benefits of exercise and nutrition, many older women remain sedentary, or are at risk for marginal deficiencies of protein, vitamins and trace elements.²⁰⁻²⁴ Up to 40% of women aged 65 years and older are obese.^{25,26} Older women are also at risk for poor diet quality and nutritional risk.²⁷⁻²⁹ Some women state a lack of time and willpower, economic constraints or poor access to programs and resources as reasons for not participating in physically active and nutritionally healthy lifestyles.³⁰⁻³⁴ Others hesitate to exercise without their physician's advice or accord.^{34,35} Many mistakenly believe that they do enough to keep healthy, when in fact they do not.³⁶

Two additional factors that have been overlooked also contribute to the challenge of optimizing women's engagement in physically and nutritionally fit lifestyles: the failure to consider a woman's chronological age and her preference for community interventions. Older women are not a

homogeneous group, with women aged 65-74 more closely resembling those in age groups under 65 than they do those aged 85 and over, and those in the 75-84 age range spanning the transition period.³⁷ A woman's age and associated co-morbidity may influence her propensity to exercise or eat nutritiously, as well as her preference for programs to help her facilitate these lifestyle choices.

The objective of this large population-based study was to examine age differences in the extent to which older Canadian women are exercising and eating nutritiously, as well as age-associated rates of preference for various programs that could help women adopt or maintain physically active and nutritionally sound lifestyles.

METHODS

Sample

Participants were women who responded to the WOW – What Older women Want – health study, a cross-sectional postal survey aimed at identifying older women's priorities for healthy aging, conducted across Canada in October 2003.³⁸ The sampling frame for the survey consisted of all households across Canada whose private addresses were registered with Canada Post. The study sample list was generated by obtaining an age-stratified random sample of 5,000 community-dwelling women aged 55 years and older who had responded to another Canada Post survey during the previous 12 months. The response rate to the WOW survey was 52%. Respondents were slightly healthier and better educated than the average senior Canadian woman, but were otherwise similar on all other socio-demographic variables.³⁸ The present analysis was conducted on 2,484 completed surveys that contained exercise and nutritional risk information. The study was approved by the Ethics Review Board of the Institut universitaire de gériatrie de Montréal.

Measures

Data on physical activity, nutritional risk, physical and mental function, and a needs assessment of community interventions were collected as part of the WOW survey. Exercising 3 or more times per week for 20 minutes or longer was evaluated with a single question (yes/no). Nutritional risk was

assessed by the Seniors in the Community: Risk Evaluation for Eating and Nutrition (SCREEN©) questionnaire, a 15-item scale developed and validated for identifying community-dwelling older adults at risk for impaired nutritional status.^{39,40} Assessment of its measurement properties at the high-risk cut-off score of 45, which is the limit proposed for epidemiologic research, shows a sensitivity of 81%, a specificity of 55%, and a positive predictive value of 58%. SCREEN© scores range from 0-60, with a score >50 indicating absence of nutrition risk, a score of 46-50 indicating moderate nutritional risk, and a score of ≤45 suggestive of high risk of impaired nutritional status. Items query weight change, the number of foods avoided, frequency of eating, consumption of fruits and vegetables, meats and alternatives, milk and milk products, fluid, chewing and biting food, swallowing food, eating alone, meal replacements, appetite, money for food, cooking, and grocery shopping. Physical health and function were measured by the Physical Component Subscale (PCS) of the Measuring Outcomes Study: Short-Form-12 (SF-12) survey, a well-known and validated instrument for measuring health status in the elderly.⁴¹⁻⁴³

Using both clinical and public health criteria, a list of factors deemed facilitative for adopting and maintaining a physically fit and nutritionally healthy lifestyle was presented to the respondents. These factors were derived from validated tools used in a broad spectrum of Canadian and Australian studies on socio-environmental barriers to exercise, as well as focus group discussions with older adults.³⁰⁻³⁶ Factors included more community programs, lower cost of health programs, better transportation to programs, more written information on what to do, finding a suitable exercise program tailored to individual needs, more encouragement and support from health professionals, and more encouragement and support from family and friends.

Standard socio-demographic questions were used to elicit data on age, marital status, living arrangements and educational level. The 6-digit postal code was retained for each respondent to identify whether she resided in an urban or rural area. Self-reported data on weight and height were

collected, and body mass index (BMI) (weight (kg)/height (m²)) was calculated to provide an estimate of obesity.

Statistical analysis

To evaluate the extent to which age influenced the participants' exercise and eating habits, two age groups were compared: those younger than age 75 and those aged 75 years and older. This age breakdown was selected because women aged 55-64 closely resembled those aged 65-74, and there were too few women in the 85 and older age group ($n=69$) to allow for separate reliable statistical estimates. Within the 55-74 and 75 and older age groups, differences in the characteristics of women who exercised and ate nutritiously versus those who did not were estimated using *t*-tests for differences in means and χ^2 tests for differences in proportions (two-sided significance level of $p<0.05$). Women who exercised and ate nutritiously were identified as those who reported an exercise frequency of at least 3 times/week for 20 minutes or longer and who scored >50 on the SCREEN© questionnaire.

Rates of preference for seven different interventions that might facilitate engagement in physically fit and nutritiously healthy lifestyles were calculated for women aged 55-74 years and those aged 75 years and older depending on their level of physical activity and nutritional fitness. To quantify the extent to which age and the level of physical activity and nutritional fitness influenced a woman's likelihood of selecting specific interventions to improve exercise and nutrition habits, logistic regression analyses were used to regress age and lifestyle habits on each of the seven possible interventions. All analyses were adjusted for physical health. Results are expressed as odds ratios (OR) with 95% confidence intervals (CI). Analyses were conducted using the SAS software package (version 8.2, SAS Institute, Cary, NC).

RESULTS

In this large national sample of 2,484 predominantly white (95%), community-dwelling women, 31% of respondents were aged 75 years and older. Women in the 75 year and older age group were more likely to be widowed, living alone, living in an urban area, and to report worse physical

TABLE I

Characteristics of the Respondents and Comparison of Women Who Exercise and Eat Nutritiously Versus Those Who Do Not According to Age Group

Variable	Characteristics of the Entire Sample (n=2,484)			Comparison of Women Who Exercise and Eat Nutritiously* vs. Those Who Do Not					
				Age 55-74			Age ≥75 years		
	<75 (n=1723)	75+ (n=761)	p-value†	Mean (±SD) or %					
	Yes (n=411)	No (n=1312)	p-value†	Yes (n=157)	No (n=604)	p-value†			
Age	67.7 (±4.8)	79.2 (±3.6)	<0.0001	67.9 (±4.8)	67.6 (±4.8)	0.40	78.7 (±3.0)	79.3 (±3.8)	0.10
Marital status									
Never married	4%	5%		4%	4%		5%	5%	
Married	66%	43%	<0.0001	73%	63%	0.001	42%	44%	0.81
Divorced	10%	4%		8%	11%		3%	5%	
Widowed	20%	48%		14%	22%		50%	47%	
Living alone	27%	50%	<0.0001	23%	28%	0.02	53%	49%	0.43
Education									
Elementary school	15%	19%		9%	17%		10%	21%	
High school	52%	50%	0.15	46%	54%	0.001	53%	49%	0.007
College	20%	18%		24%	18%		22%	18%	
University	13%	13%		21%	11%		16%	12%	
Living in rural area	24%	20%	0.04	22%	24%	0.43	18%	20%	0.62
Body mass index	26.2 (±3.9)	25.3 (±4.0)	<0.0001	25.3 (±3.6)	26.5 (±4.0)	<0.0001	24.9 (±3.5)	25.3 (±4.1)	0.27
Physical Health (PCS) score	44.7 (±11.0)	41.5 (±11.7)	<0.0001	49.9 (±8.5)	43.0 (±11.2)	<0.0001	48.8 (±8.8)	39.6 (±11.6)	<0.0001
General question on perceptions of engaging in a healthy lifestyle									
Always/Quite a bit	61%	62%	0.10	87%	53%	<0.0001	86%	55%	<0.0001
Exercising 3 times/week	62%	56%	0.003	100%	50%	<0.0001	100%	45%	<0.0001
SCREEN (nutrition) score									
51-60 (good)	33%	33%	0.29	100%	10%		100%	14%	
46-50 (low risk)	30%	33%		0%	40%	<0.0001	0%	43%	
45 or less (high risk)	37%	34%		0%	50%		0%	44%	<0.0001
Both exercising and eating nutritiously*	24%	21%	0.08	100%	0%	<0.0001	100%	0%	<0.0001

* Exercising 3 times/week and nutritional SCREEN© score >50

† t test for difference in means and χ^2 test for difference in proportions

Figure 1. Women's exercise and nutrition habits according to age group

health status (Table I). Comparison of the exercise and nutritional habits of women aged 55-74 to those aged 75 and older revealed that 62% compared to 56% reported exercising 3 times/week for 20 minutes or longer ($p=0.003$), only 33% in

both age groups were eating nutritiously, and 24% compared to 21% were both exercising and eating nutritiously ($p=0.08$). In a subanalysis of the small group of women aged 85 years and older ($n=69$), 33 women (48%) reported exercising

3 times/week, 13 (21%) ate nutritiously, and only 8 women (12%) were both exercising and eating nutritiously (Figure 1).

Among women aged 55-74, being widowed and living alone were characteristics associated with not exercising and eating nutritiously, but these associations were not significant in the older age group (Table I). Lower educational attainment and worse physical health status were significant correlates of poor habits in both groups. Similar mean physical health scores were observed among younger and older women who exercised and ate nutritiously.

The top three factors women deemed facilitative for optimizing good exercise and nutrition habits included more affordable health promotion programs, more varied programs suited to meeting different needs, and obtaining more written information on what to do (Figure 2). The highest endorsement rates (35%) were made by women aged 55-74 who were not exercising and eating nutritiously, followed by 25% of the non-active women in the 75 and older group. Table II quantifies the extent to which age and level of physical and nutritional fitness influenced the likelihood that respondents selected various

interventions as being facilitative for improving lifestyle habits. In almost all instances, younger women were more apt to desire interventions than older women, except for better transportation to programs, where younger women were 40% less likely to endorse this intervention than older women (OR 1.66 (1.30-2.11)) for women aged 75 and older compared to younger women). Sedentary women and those at higher nutritional risk were two to three times more likely than their active counterparts to identify encouragement from health professionals (OR 1.93 (1.48-2.52)), as well as from family and friends (OR 3.03 (1.89-4.85)). The relationship between fitness level and four of the interventions – finding a more suitable exercise class, getting encouragement from health care professionals as well as from family and friends, and having access to better transportation – diminished by greater than 10%, but still remained significant, when physical health was adjusted for in multivariate analyses. This can be explained by the fact that poor self-rated health was independently associated with an increased likelihood of selecting these four interventions among women in our sample (data not shown).

DISCUSSION

Regular physical activity is known to prevent, delay, modify and treat many of the major health conditions experienced by older women. Nutritious eating is also a prerequisite for optimal health in later years. Despite a growing recognition of the importance of appropriate exercise and eating habits to health outcomes, the majority of older women have failed to adopt these behaviours. Indeed, in a survey conducted in Alberta to determine awareness and use of Canada's Physical Activity Guide to Healthy Active Living, only 21% of Albertans reported being aware of the guide and there was no difference among age groups.⁴⁴ The present large cross-sectional study of older community-dwelling Canadian women suggests that only 24% of women aged 55-74 and 21% of women aged 75 years and older are both exercising three times per week and eating nutritiously.

The finding that healthy exercise and eating attributes were not substantially dif-

Figure 2. Proportion of women endorsing different interventions according to age group and level of physical and nutritional fitness

ferent by age group in this sample of relatively healthy older women was surprising. While statistically different, exercise rates in our sample were relatively high both among women aged 55-74 (62%) as well as in those over age 75 (56%), exceeding several other survey estimates.^{45,46} For instance, the Canadian Community Health Survey showed an average exercise rate of 47% for all women aged 20 to 64 years old.⁴⁵ An American study of 153,000 adults looking at the prevalence of healthy lifestyle characteristics (defined as non-smoking, healthy weight (BMI 18.5-25.0), consuming 5 or more fruits and vegetables per day, and regular physical activity (≥ 30 minutes ≥ 5 times per week)), found that only 3% engaged in all 4 characteristics, and there was little variation among subgroups.⁴⁷ Similarly, in a random sample of 685 seniors from a large Midwestern health plan, only 13% met all five health behaviour-related factors.⁴⁸ Yet other studies confirm our findings that healthy community-dwelling women exhibit a strong propensity to remain physically active in later years.⁴⁹ Among 1,491 active community-dwelling adults aged 70-79 participating in the Health, Aging and Body Composition study, 79% reported exercising or having an active lifestyle.⁴⁹ Disparities among studies might be explained by the characteristics of the

women studied and different definitions of physical activity. The older women in the WOW study were relatively healthy, independent, community-dwelling individuals. Nonetheless, these findings challenge a possible misconception that healthy older women are less apt to be physically active, especially over age 75.

In contrast to exercise rates, nutrition-related habits were found to be poor, with only one third of respondents free of nutrition risk regardless of age. While the prevalence of malnutrition among community-dwelling older adults in Canada is unknown, the presence of risk factors suggests that 40 to 50% of Canadian community-dwelling older adults could be at moderate to high risk of becoming malnourished.⁵⁰ In a randomized postal survey of 425 seniors attending a seniors' recreation centre in Guelph, Ontario, 57% of respondents were assessed as being at nutritional risk.⁵¹ Common nutrition-related problems included significant weight change in the previous 6 months, low intakes of fruits, vegetables and milk products, and dietary restrictions. Although women aged 55-74 in the present study had higher mean BMI than women aged 75 years and older, all were equally at risk of nutrient deficits and malnutrition.

Older middle-aged women were far more likely to endorse factors deemed

TABLE II

Odds Ratios Associated with Younger Age and the Level of Physical and Nutritional Fitness on the Probability of Selecting Interventions That Could Facilitate Exercise and Nutritious Eating Habits

Specific Intervention Predictors	Odds of Selecting the Specific Intervention to Facilitate Exercise and Nutritious Eating Habits (odds ratio)	95% Confidence Intervals
Lower cost of programs		
Age (<75)	1.61	1.33-1.96
Age, adjusted for level of physical and nutritional fitness	1.64	1.34-1.99
Age, adjusted for physical health	1.70	1.40-2.08
Level of physical and nutritional fitness (not exercising and eating nutritiously)	1.42	1.15-1.77
Level of physical and nutritional fitness, adjusted for age	1.56	1.17-1.81
Level of physical and nutritional fitness, adjusted for physical health	1.32	1.06-1.65
Suitable exercise classes		
Age (<75)	1.70	1.40-2.09
Age, adjusted for level of physical and nutritional fitness	1.85	1.50-2.27
Age, adjusted for physical health	1.74	1.43-2.13
Level of physical and nutritional fitness (not exercising and eating nutritiously)	1.58	1.28-1.97
Level of physical and nutritional fitness, adjusted for age	1.62	1.30-2.03
Level of physical and nutritional fitness, adjusted for physical health	1.41	1.12-1.78
More written information of what to do		
Age (<75)	1.42	1.17-1.73
Age, adjusted for level of physical and nutritional fitness	1.45	1.19-1.77
Age, adjusted for physical health	1.50	1.23-1.84
Level of physical and nutritional fitness (not exercising and eating nutritiously)	1.76	1.40-2.20
Level of physical and nutritional fitness, adjusted for age	1.78	1.42-2.24
Level of physical and nutritional fitness, adjusted for physical health	1.64	1.29-2.07
Encouragement from health care professionals		
Age (<75)	1.36	1.09-1.70
Age, adjusted for level of physical and nutritional fitness	1.39	1.21-1.91
Age, adjusted for physical health	1.53	1.12-1.74
Level of physical and nutritional fitness (not exercising and eating nutritiously)	1.93	1.48-2.52
Level of physical and nutritional fitness, adjusted for age	1.96	1.50-2.56
Level of physical and nutritional fitness, adjusted for physical health	1.59	1.21-2.10
More community programs		
Age (<75)	1.42	1.10-1.84
Age, adjusted for level of physical and nutritional fitness	1.43	1.11-1.89
Age, adjusted for physical health	1.45	1.11-1.86
Level of physical and nutritional fitness (not exercising and eating nutritiously)	1.32	0.99-1.76
Level of physical and nutritional fitness, adjusted for age	1.34	1.01-1.79
Level of physical and nutritional fitness, adjusted for physical health	1.31	0.97-1.76
Access to better transportation		
Age (<75)	0.60	0.47-0.77
Age, adjusted for level of physical and nutritional fitness	0.61	0.48-0.78
Age, adjusted for physical health	0.67	0.52-0.86
Level of physical and nutritional fitness (not exercising and eating nutritiously)	1.89	1.36-2.63
Level of physical and nutritional fitness, adjusted for age	1.86	1.33-2.59
Level of physical and nutritional fitness, adjusted for physical health	1.46	1.03-2.06
Encouragement from family and friends		
Age (<75)	1.80	1.28-2.55
Age, adjusted for level of physical and nutritional fitness	1.86	1.32-2.64
Age, adjusted for physical health	2.01	1.42-2.86
Level of physical and nutritional fitness (not exercising and eating nutritiously)	3.03	1.89-4.85
Level of physical and nutritional fitness, adjusted for age	3.10	1.90-4.50
Level of physical and nutritional fitness, adjusted for physical health	2.60	1.60-4.20

important to help adopt and maintain physically active and nutritionally healthy lifestyles compared to the group of women aged 75 years and older in our sample, even when physical health and nutritional status were accounted for. Having better transportation to programs was the only intervention preferentially endorsed by women in the older age group. These findings suggest a window of opportunity in the immediate post-menopausal period to provide support to women seeking to improve their lifestyle habits. In our study, mid-life women identified health professionals as key agents of change, as well as family or friends. Women who require the most change in behaviour, i.e., those who neither exercise nor eat nutritiously, were

most open to support for behaviour modification. Public health interventions aimed at optimizing physical and nutrition fitness may be more successful if targeted to these individuals.

Limitations in our data warrant discussion. First, a response bias may exist as only half of potential respondents answered the questionnaire, and these women were slightly better educated and healthier than the average senior Canadian woman.⁵ Second, the validity and reliability of a single-item question for self-reported physical activity has been widely debated.⁵²⁻⁵⁴ Finally, the list of factors deemed facilitative for increasing engagement in exercise and nutritious eating was not validated in a subsample of our study partici-

pants. It may therefore have been incomplete, or not representative of programs preferred by older women in Canada.

The Canadian Healthy Living Strategy seeks to improve health and reduce health disparities, by emphasizing healthy eating and physical activity, and maintenance of healthy weights. Our participants' preferred interventions – lowering the cost of health promotion programs, tailoring programs to a variety of different levels and needs, and encouraging and training health care providers to counsel women on initiation of exercise and nutritious eating – are thus consistent with the goals of the Healthy Living Strategy and could help older women adopt and maintain physically active and nutritiously sound lifestyles.

As the older female population continues to grow, it is critically important that efforts be made to encourage women who might not typically exercise or eat well to begin engaging in healthy practices. This health promotion approach will prevent disability, improve quality of life, and reduce the burden of health care costs in coming years.

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RÉSUMÉ

Introduction : Cette étude, menée auprès de Canadiennes âgées, visait à examiner les différences liées à l'âge dans le niveau d'activité physique et les habitudes alimentaires et à répertorier les interventions préférées par ces femmes, afin de les aider à adopter et à conserver un bon régime d'exercice et d'alimentation.

Méthode : Une enquête postale transversale a été menée en octobre 2003 auprès de 5 000 femmes de 55 à 95 ans résidant dans la communauté un peu partout au Canada. Les questions de l'enquête portaient sur la fréquence de l'activité physique, le risque nutritionnel, l'état fonctionnel et les facteurs facilitant l'adoption et le maintien de bonnes habitudes de vie en matière d'activité physique et d'alimentation.

Résultats : L'analyse a porté sur des données provenant de 2 484 femmes; 31 % avaient 75 ans et plus. Chez les femmes de 55 à 74 ans, 62 % ont indiqué qu'elles pratiquaient une activité physique trois fois par semaine pendant 20 minutes ou plus ($p=0,003$), contre 56 % des femmes de 75 ans et plus. Dans les deux groupes d'âge, 33 % avaient une alimentation adéquate. La proportion des femmes qui faisaient de l'exercice et s'alimentaient bien était de 24 % chez les 55 à 74 ans et de 21 % chez les 75 ans et plus. Trente-cinq p. cent des femmes de 55 à 74 ans et 25 % des femmes de 75 ans et plus ($p<0,001$) qui ne faisaient pas d'exercice ou qui ne mangeaient pas bien ont exprimé le souhait d'avoir un meilleur accès à des programmes de promotion de la santé accessibles et économiques, de même qu'à des informations écrites, pour leur permettre d'améliorer leurs habitudes de santé. Chez les participantes de 75 ans et plus, la seule intervention souhaitée était d'avoir accès à des transports améliorés (RC=1,66 [1,30-2,11]). Les sédentaires et les femmes présentant un risque nutritionnel élevé étaient de deux à trois fois plus susceptibles de mentionner l'encouragement des professionnels de la santé (RC=1,93 [1,48-2,52]) et l'encouragement de la famille et des amis (RC=3,03 [1,89-4,85]) comme étant des facteurs importants d'une amélioration de leurs habitudes de vie.

Interprétation : Les femmes de 55 à 74 ans qui sont sédentaires et dont l'alimentation est sous-optimale sont plus ouvertes à un éventail d'interventions communautaires de promotion de la santé.

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