Factors associated with exercise preferences, barriers & facilitators of prostate cancer survivors

Running Title: Exercise preferences of prostate cancer survivors

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Abstract

OBJECTIVE: The purpose of this study was to understand the exercise levels, preferences and interests of prostate cancer survivors in Canada.

METHODS: An electronic survey was administered via a prostate cancer specific website and assessed self-reported exercise levels, exercise preferences and interests, exercise barriers and facilitators to exercise.

RESULTS: Based on 103 participants, the majority (75.7%) of prostate cancer survivors did not meet both aerobic and resistance exercise guidelines, despite an interest in exercise. Strongest exercise preferences were shown for resistance exercise, walking, flexibility and bicycling and for performing exercise from a community-based gym or from home. Significant differences in exercise interests and facilitators were found between individuals who were meeting exercise guidelines compared to those who were not.

CONCLUSION: The majority of Canadian prostate cancer survivors are insufficiently active.

Exercise preferences and facilitators appear to be influenced by current exercise levels.

Resistance and aerobic exercise should be considered when programming exercise for prostate cancer survivors.

Keywords: exercise, prostatic neoplasms, cancer survivors, preferences, barriers, facilitators

1. INTRODUCTION

Exercise is an effective strategy to alleviate and manage many of the toxicities of prostate cancer treatments including fatigue, poor body composition and reduced quality of life (Bourke et al., 2016; Cormie & Zopf, 2018; Crawford-Williams et al., 2018; Keilani et al., 2017). It is recommended that individuals with prostate cancer complete a minimum of 150-minutes of moderate-to-vigorous aerobic exercise and two resistance exercise sessions weekly (Rock et al., 2012; Schmitz et al., 2010; Segal et al., 2017). However, despite the known benefits of exercise, objectively measured data reports that only 13% of prostate cancer survivors meet the aerobic exercise guidelines (Thraen-Borowski, Gennuso & Cadmus-Bertram, 2017) and self-reported data shows that only 12% meet both aerobic and resistance exercise guidelines (Galvao et al.,

2015). Given the high and rising 5-year survival rate of Canadian prostate cancer survivors (99%) (Canadian Cancer Society, 2018), combined with commonly experienced treatment-related toxicities (Donovan et al., 2016; Higano, 2003) and the positive impact that regular exercise can yield (Bourke et al., 2016; Campos et al., 2018; Cormie et al., 2015), understanding exercise patterns and preferences of both inactive and active prostate cancer survivors is vital for exercise program development.

To improve exercise adoption and adherence in prostate cancer survivors, previous studies suggest that programming be individualized (Focht et al., 2018), tailored to preferences (Jones & Courneya, 2002; Harrington, Schwenke & Epstein, 2013) and be designed with explicit consideration of exercise barriers including comorbidities, fatigue and older age (Craike, Livingston & Botti, 2010; Keogh, Patel, MacLeod & Masters, 2013). A systematic review from Wong, McAuley & Trinh (2018) reported that the majority of cancer survivors were interested in participating in exercise programs and that tailoring exercise to survivors' preferences may improve exercise adherence. That said, only two studies have explored both exercise preferences and exercise intentions of men living with prostate cancer (Forbes, Blanchard, Mummery & Courneya, 2015; Harrington et al., 2013). Harrington et al. (2013) found that prostate cancer survivors who had received androgen deprivation therapy (ADT) demonstrated a high level of willingness and acceptability of aerobic and resistance exercise, despite low adherence to aerobic exercise guidelines. This indicated that alternative approaches to exercise programming are needed to bridge the existing intention-behaviour gap. Forbes et al. (2015) compared breast, prostate and colorectal cancer survivors and reported that prostate cancer survivors were less likely to prefer physical activity with other cancer survivors. They also found that prostate cancer survivors were less likely to access community fitness centres or to participate in structured or group-based exercise. To the best of our knowledge, there has been no previous Canadian-wide evaluation of the exercise preferences and intentions of prostate cancer survivors. Understanding these details is key to designing effectual exercise programs for men living with prostate cancer.

The primary objective of this study was to understand the exercise preferences, interests and exercise levels (aerobic and resistance exercise) of Canadian prostate cancer survivors. The secondary objective of this study was to evaluate the associations between current exercise levels and participant demographics, health status, exercise preferences, exercise barriers and exercise facilitators, in order to inform the structure of future targeted exercise programming.

2. METHODS

Following approval from the University of British Columbia Research Ethics Board (H12-00573), an electronic survey was made available through an online prostate cancer psycho-social website. The website (www.ifiweretom.ca) was launched in January 2017 and includes information on prostate cancer, treatments, side effects and living with cancer (including physical activity and dietary information). The survey was accessible for 3-months and participants could opt to be entered into a \$500 cash prize draw on completing the survey. The survey landing page provided details of the study including consent and confidentiality. A convenience sampling method was used to recruit participants through the website and via social media. A targeted social media campaign invited individuals with prostate cancer to participate in this survey and directed them to the website. Additionally, local prostate cancer support groups (e.g. Prostate Cancer Supportive Care Program in British Columbia) promoted the survey and website in an electronic patient newsletter. These methods were chosen for ease of recruitment of both active and inactive individuals. Eligible participants consisted of Canadian men who self-identified as having prostate cancer.

2.1 Measures

All variables were collected by self-report. Demographic and medical variables included age, country and province of residence, education level, employment status, sexual identity, cultural affiliation, year diagnosed with prostate cancer, prostate cancer treatment[s] received, current treatment status and the presence of ‘other health challenges’ (e.g. hypertension, hernia or musculoskeletal issues).

Exercise Levels

Current aerobic and resistance exercise levels were assessed using the Godin Leisure Time Exercise Questionnaire (GLTEQ) (Godin & Shephard, 1985). Instructions specified to only count exercise sessions that lasted 10-minutes or longer in duration that was done during free time (i.e., not occupational or housework). We modified the GLTEQ by adding an ‘average session duration (minutes)’ column and a ‘resistance exercise’ row, similar to previous exercise oncology research (Amireault, Godin, Lacombe & Sabiston, 2015; Rogers, Courneya, Verhulst & McAuley, 2008). Participants reported average weekly duration (minutes) and frequency of resistance exercise and aerobic exercise (mild-, moderate- and vigorous-intensity) during a

typical week over the past month. The modified GLTEQ scores were used to perform calculations of whether an individual was meeting the oncology exercise guidelines of 150-minutes of moderate to vigorous aerobic exercise and two resistance exercise sessions weekly.

Exercise interests and preferences

Exercise interests and preferences related to structured exercise were assessed using a 9-item scale adapted from items used in previous studies (Forbes et al., 2015; Jones & Courneya, 2002; Rogers et al., 2008) that were chosen for their relevance to exercise program set-up for prostate cancer survivors. Multiple responses were possible for “What type of exercise are you most interested in?” and “Where would you prefer an exercise program takes place?”. Single responses were required for all other questions, which included interest in participating in a structured exercise program (yes, no, not sure), five questions specific to supervised exercise programs (attendance frequency, time of day, preferred location, distance from home and postcode), and items considered useful for supporting an at-home exercise program (i.e. online program, printed exercise material, exercise videos, none, other).

Exercise barriers and facilitators

Exercise barriers were assessed using a 26-item questionnaire adapted from previous studies (Rogers, Courneya, Shah, Dunnington & Hopkins-Price, 2007; Rogers et al, 2008). The items included questions specific to prostate cancer and were based on previous research reporting exercise barriers in prostate cancer survivors (Keogh et al., 2013). Participants were asked to identify “in the past month, which of the following barriers have interfered with your ability to exercise?” and were able to respond with multiple selections. Additionally, “what is your biggest barrier to exercise?” was also asked with a free-text response. These results were grouped by similar themes prior to analysis. Exercise facilitators were similarly assessed with a 16-item questionnaire adapted from previous studies (Rogers et al., 2007 & 2008) to identify regular exercise facilitators at any time point. The items were based on previously reported exercise facilitators specific to prostate cancer (Craike et al., 2010). Additionally, “what is your biggest exercise facilitator or motivator to exercise?” was asked with a free-text response and the results were grouped by similar themes prior to analysis.

2.2 Statistical analysis

Descriptive and frequency analyses were performed to characterize the sample based on the participants demographic and medical profiles, exercise preferences and exercise behaviours. For the secondary objectives, a chi-square analysis was used to examine associations between exercise levels (dependent variable) with demographic characteristics (e.g. age) and medical variables (e.g. current treatment). Associations between meeting exercise guidelines (independent variable) and exercise preferences, exercise barriers and exercise facilitators (dependent variables) were also performed. Dichotomization of all variables was based on clinically relevant cut-points for prostate cancer and was consistent with previous studies on exercise preferences in cancer populations (Forbes et al., 2015; Jones & Courneya, 2002; Karvinen et al., 2006; Rogers et al., 2007 & 2008). Variables with “yes”, “no” and “not sure” options were analyzed using a trichotomized approach. Calculations of confidence intervals and effect size were performed for all associations. To measure effect size, due to the use of chi-square analysis, coefficient phi (ϕ) was used for dichotomized variables (2x2 contingency table) and Cramer's V used for trichotomized variables (2x3 contingency table), as recommended for this type of analysis (Tomczak & Tomczak, 2014). All analyses were conducted using SPSS 25.0 (IBM Corp). To account for multiple comparisons and reduce type I error, similar to previous studies (Forbes et al., 2015; Rogers et al., 2008; Jones et al., 2002) a P value of <0.01 was used to determine statistical significance. As this was an exploratory study, we reported associations of $p < 0.03$ in our results. Additionally, for all associations a between-group difference of 10% was used as it has been suggested by previous authors to be clinically meaningful (Forbes et al., 2015).

3. RESULTS

Between April 2017 and July 2017, 103 participants completed the online survey. Details of the demographic, medical characteristics and exercise levels are presented in table 1. Participants were between 50–81 years (mean (M) 67 and standard deviation (SD) 6.8 years), the majority were living in British Columbia (69.9%) and were not on current treatment (80.6%). Having an additional health issue (e.g. hypertension, hernia or musculoskeletal issue) was self-identified by 42.7% of participants.

3.1 Exercise levels

Participants reported a weekly average of 1.4 (SD = 1.7) resistance exercise sessions and 260 minutes of moderate-to-vigorous aerobic exercise (SD = 470). Aerobic exercise levels included

an average of 95.7 minutes (SD = 144.1) of mild exercise per week, 169.2 minutes (SD = 375.6) of moderate exercise per week and 91.0 minutes (SD = 141.4) of vigorous exercise per week. The proportion of participants meeting the oncology exercise guidelines are outlined in table 1. Our results show that 24.3% were meeting both the aerobic and resistance exercise guidelines and 28.2% were not meeting either guideline. Additionally, 15.5% of prostate cancer survivors were performing no moderate-to-vigorous aerobic exercise, classified as 'inactive', while 48.5% were performing no resistance exercise.

3.2 Exercise Preferences

Table 2 outlines the exercise programming preferences of prostate cancer survivors. The majority of participants were interested (52.9%) or unsure of their interest (25.5%) in structured exercise. Strongest preferences were for resistance exercise, walking, flexibility exercises and bicycling (reported by 41.7% – 59.2%), with the preferred locations for exercise at a community centre/gym or at home (reported by 42.7% – 56.3%). There were a range of preferences for exercise frequency, with participants indicating they are willing to attend an exercise session once, twice and three times per week (reported by 25.3% - 27.2%). Mixed preferences were also shown for exercise participants, with the strongest response (29.7%) showing no preference, followed by other cancer survivors, the general public or exercising alone (reported by 11.9% - 20.8%). Morning was the time of day most preferred (43.4%) and 69% of participants indicated they would travel up to 10km for a supervised exercise program.

3.3 Exercise barriers & facilitators

Figure 1 outlines the exercise barriers and facilitators reported by participants that interfered with their ability to exercise in the past month. The five most frequently reported exercise barriers (reported by 24% – 31%) were lack of self-discipline, lack of time, fatigue, procrastination, and pain or discomfort. When asked “what is your biggest barrier to exercise”, the three most frequently reported barriers identified (reported by 24% - 29%) were medical/injury/recent treatment, lack of self-discipline or motivation and lack of time or poor scheduling. Participants were asked, “In the past, which of the following has helped or motivated you to exercise regularly?”. The most frequently reported exercise facilitators (reported by 36% - 51%) were health, enjoyment of exercise, routine or habit, and exercising with another person (friend, spouse, carer, family member). When asked “what is your biggest exercise facilitator or motivator to exercise?”, the main facilitator identified was health (44.7%, 95% CI 31.9 – 52.1),

followed by wellbeing/enjoyment and a person, group or event (reported by 22% – 23%, 95% CI 12.5 – 30.5).

3.4 Associations between exercise levels with demographic and medical variables

Receiving current treatment was associated with being more likely to meet the resistance exercise guidelines (65% vs. 34%, $X^2=6.6$, $P=0.01$, $\phi=0.25$) and with reporting fatigue as a barrier to exercise in the previous month (65% vs. 19%, $X^2=16.7$, $P<0.001$, $\phi=0.40$). The majority of current treatment being received was ADT (75%; $n=15$). Having a self-identified “other health challenge” was associated with being less likely to meet the aerobic exercise guidelines (42% vs 67%, $X^2=6.4$, $P=0.01$, $\phi=0.25$) and less likely to meet both exercise guidelines (13% vs 33%, $X^2=5.2$, $P=0.02$, $\phi=0.23$), but neither of these reached statistical significance and both had small effect sizes. There was no association between having a self-identified “other health challenge” and meeting resistance exercise guidelines (38% vs 41%, $P=0.7$). Working (vs being retired or not working) was associated with reporting fatigue (42% vs. 17%, $X^2=7.8$, $P<0.01$, $\phi=0.28$) and lack of time (44% vs. 17%, $X^2=9.1$, $P<0.01$, $\phi=0.30$) as barriers to exercise in the past month. There were no significant associations found between age (<70 years vs ≥ 70 years), education (high school or less vs post-secondary education), years since diagnosis (<5 years vs ≥ 5 years) or receiving any specific treatment (e.g. ADT or Prostatectomy).

3.5 Associations between exercise preferences, barriers and facilitators with meeting exercise guidelines

Table 3 outlines these results in detail. Participants meeting both exercise guidelines were more likely to be interested in participating in resistance exercise and more likely to identify ‘having a gym membership’ as an exercise facilitator. Meeting no exercise guidelines was significantly associated with being less likely to be interested in resistance exercise ($p<0.001$, $\phi=0.43$) and exercise from a community centre or gym ($p<0.001$, $\phi=0.30$), with moderate effect sizes found. A large effect size and significant results indicate that participants who did not perform any resistance exercise (48.5% of sample) were less likely to be interested in participating in resistance exercise ($p<0.001$, $\phi=0.58$) compared to those performing one or more session per week. Participants who did not perform any resistance exercise were also less likely to be interested in a structured exercise program, group-based circuit, and exercise from a community centre/gym, with moderate effect sizes found (Cramer’s $V=0.35$, $\phi=0.40$ & 0.32). Individuals

performing no resistance exercise were also less likely to identify exercise facilitators including exercising with another person and attending a group-based class ($p=0.001$, $\phi = 0.32$ for both variables)

4. DISCUSSION

This is the first study to our knowledge that compares both aerobic and resistance exercise levels of prostate cancer survivors with exercise preferences, barriers and facilitators. Similar to previous research, the majority of study participants were interested in participating in a structured exercise program (Forbes et al., 2015; Fox et al., 2017; Harrington et al., 2013; McGowan et al., 2012). In contrast to previous finding by Forbes et al. (2015), who found prostate cancer survivors preferred home-based exercise and walking, our participants had a strong preference for participating in exercise from a community-based gym setting (community centre, YMCA, leisure centre or local gym) and home-based setting. Our participants indicated that they were most interested in participating in resistance exercise as well as walking, flexibility exercise and bicycling. These differences may reflect variances in the study samples or alternatively may demonstrate the positive impact of local exercise services specific to exercise education and supervised resistance exercise for prostate cancer survivors, provided by the Prostate Cancer Supportive Care Program (Hedden et al., 2018) and the TrueNTH Lifestyle Management Program (Culos-Reed et al., 2018). These programs were implemented in 2015 and 2016 in British Columbia, where 69% of study participants were based, and are offered to prostate cancer survivors to support the adoption of aerobic and resistance exercise. This idea is further supported by our findings that indicate prostate cancer survivors receiving current treatments were more likely to meet resistance exercise guidelines (65% vs. 34%), despite the majority identifying fatigue as a barrier to exercise in the previous month. Participants who are receiving treatment and are based in British Columbia have very likely been made aware of these supportive exercise programs.

Despite a strong interest in participating in exercise, our results show that 75.7% of Canadian prostate cancer survivors do not meet the recommended levels of exercise. We found that only 24.3% of participants are meeting both aerobic and resistance exercise guidelines, 56.3% are meeting the aerobic exercise guidelines, 39.8% are meeting resistance exercise guidelines and 28.2% are meeting no exercise guidelines. These are larger numbers than previously reported by Galvao et al. (2015) who found 12% of Australian prostate cancer

survivors were meeting both guidelines and 33% were meeting the aerobic exercise guidelines. Our results are also higher than Forbes, Blanchard, Mummery & Courneya (2015) who found that 23% of Canadian prostate cancer survivors were meeting resistance exercise guidelines. The differences may be due to the heterogeneity of our sample as it includes participants from localized and advanced treatment pathways and those who had never received, previously received or were currently receiving treatment for prostate cancer. Our sample also had higher education levels than previous studies, with 68.9% of participants having completed some post-secondary education or training, which has been shown to be associated with increased physical activity levels (Moore et al., 2008). Another explanation for this difference could be the positive impact on exercise behaviours of the local exercise support programs.

Additional health challenges, such as comorbidities, can impact exercise adherence (Chipperfield et al., 2013) and have previously been identified as a major barrier to exercise participation in prostate cancer survivors (Craike et al., 2010). Our results show a strong trend that indicates the presence of an additional health challenge may reduce the likelihood of meeting aerobic exercise guidelines ($P=0.01$) but not resistance exercise guidelines ($P=0.7$). This is an important programming consideration, given the positive impact resistance exercise can have on comorbidity management of prostate cancer survivors (Cormie, Turner, Kaczmarek, Drake & Chambers, 2014; Keilani et al, 2017). Considering the clinical implications of this finding, resistance exercise could be an appropriate starting point for exercise programming in prostate cancer survivors who present with other health challenges who are unable or not interested in performing aerobic exercise. It is possible that resistance exercise may reduce initial barriers to exercise adoption in this subset of the population; however, further research would need to be conducted to confirm this.

Perhaps the most important findings from this study are the associations between different levels of exercise with exercise preferences and facilitators. A recent systematic review by Wong et al. (2018) suggests caution when drawing conclusions from preference-based research due to the potential influence of physical activity levels and experience on an individual's physical activity preferences. More specifically, a cancer survivor with limited exercise levels or experience may not know their exercise preferences until they have engaged in regular exercise, and these preferences may change after regular participation. This finding was recently supported by Jackson et al. (2018) in head and neck cancer patients. We also found

significant differences in our study in this area. Participants who were meeting both exercise guidelines were more likely to be interested in resistance exercise and to report having a gym membership as an exercise facilitator. In contrast, those meeting no resistance exercise guidelines were more likely to be interested in walking and exercising from home, and less likely to be interested in participating in a structured exercise program, resistance exercise or group-based circuit class. Our study results do not indicate why these results occurred, and it is possible that as Wong et al (2018) suggests, exposure to exercise may impact an individual's exercise preferences and that those with no exercise exposure do not know their preferences. This finding, if verified by further research, has implications for the delivery of exercise programming for prostate cancer survivors wherein the integration of exercise into standardized clinical cancer care is indicated. Future studies should explore this idea further and evaluate exercise preferences before and after an exercise intervention.

There are several limitations of this study. First, using a self-report exercise questionnaire, whilst most practical given the study design, has been shown to be inferior to objective exercise measures. Common issues include recall bias, social desirability bias and incorrect classification of exercise intensity. We attempted to minimize these issues by choosing a self-report exercise questionnaire that was short (4 questions), asked for recent information (average week in the past month), and provided descriptive examples of typical exercises classified at each intensity (e.g. moderate-intensity: fast walking). Regardless of these efforts, without objectively measured physical activity levels it is difficult to provide stronger conclusions from the findings of this study. The second limitation is the cross-sectional study design, which does not allow us to infer causality. Finally, using a convenience sampling method of Canadian prostate cancer survivors where the majority (68.9%) of participants were located in British Columbia limits the generalizability to broader prostate cancer populations. Our sample was more educated than previous samples of Canadian prostate cancer survivors, and while other demographic variables are similar, this factor could limit the generalizability of our findings.

5. CONCLUSION

The majority (75.7%) of Canadian prostate cancer survivors do not meet both aerobic and resistance exercise guidelines and 28% meet no exercise guidelines, despite indicating they were interested in participating in exercise. Strongest exercise preferences were for resistance exercise, walking, flexibility and bicycling delivered from a community-based gym setting or

from home. Our findings show that exercise preferences and facilitators of prostate cancer survivors in our study were different between those meeting and those not meeting the oncology exercise guidelines. Further understanding of this area could impact exercise programming and the use and interpretation of preference-based data. Future research should explore this interaction further, especially considering the integration of exercise preference data into program offerings may enhance the uptake of exercise in prostate cancer survivors.

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TABLES

TABLE 1 Demographic Characteristics of Canadian prostate cancer survivors

Characteristic	Mean (n=103)	SD
Age (years)	67	6.8
Time since prostate cancer diagnosis (years)	5.4	4.9
Characteristic	Number (n = 103)	%
Age Category (years)		
<60	13	12.6
60 – 64	22	21.4
65 – 69	26	25.2
70 – 74	29	28.2
75+	13	12.6

Canadian Province/Territory		
British Columbia	71	68.9
Alberta/Saskatchewan/Manitoba	7	6.8
Ontario/Quebec/New Brunswick/Nova Scotia	25	24.3
Education		
Graduate degree	27	26.2
Post-secondary education (college or undergraduate degree)	44	42.7
High school or less	32	31.1
Employment Status		
Retired or Not Working	58	56.3
Working (FT, PT, Self-employed)	45	43.7
Sexual Identity		
Heterosexual or straight	99	96.1
Bisexual or Gay	4	3.9
Time since diagnosis (years) (n=101)		
< 5 years	55	54.5
≥ 5 years	46	45.5
Treatment type received†		
Prostatectomy	73	70.9
Radiation Therapy	36	35
Brachytherapy	8	7.8
Androgen Deprivation Therapy	30	29.1
Active Surveillance	13	12.6
Other (E.g. HIFU)	6	5.8
Currently receiving treatment	20	19.4
Self-identified “other health challenge”	44	42.7
Exercise guidelines		
Meets both exercise guidelines (aerobic and resistance exercise)	25	24.3
Meets no exercise guidelines	29	28.2
Meets aerobic exercise guidelines	58	56.3
Meets resistance exercise guidelines	41	39.8

† Multiple responses possible

Table 2: Descriptive statistics for exercise programming preferences of Canadian Prostate Cancer survivors

Variable	Number (%)	95% CI
Interested in taking part in some type of structured exercise program? (n = 102)		

Yes	54 (52.9)	44.3 – 63.7
Not Sure	26 (25.5)	17.5 – 34.5
No	22 (21.6)	14.0 – 30.0
Type of exercise most interested in (n = 103) [†]		
Resistance exercises (strengthening exercises, free weights, weight machines)	61 (59.2)	51.4 – 70.6
Walking	56 (54.4)	46.4 – 65.6
Flexibility exercises	47 (45.6)	37.4 – 56.6
Bicycling	43 (41.7)	33.5 – 52.5
Balance exercises	33 (32.0)	24.0 – 42.0
Sports (specify)	28 (27.2)	19.4 – 36.6
Yoga or Pilates	26 (25.2)	17.6 – 34.4
Water activities or swimming	23 (22.3)	15.0 – 31.0
Group-based circuit training	18 (17.5)	10.6 – 25.4
Jogging/running	12 (11.7)	5.7 – 18.4
Other (specify)	10 (9.7)	4.3 – 15.7
Preferred location of exercise program (n = 103) [†]		
Community centre, YMCA, leisure centre, local gym	58 (56.3)	48.4 – 67.6
Home	44 (42.7)	34.4 – 53.6
Other	16 (15.5)	9.0 – 23.0
No preference	15 (14.6)	8.2 – 21.8
Cancer centre or hospital	7 (6.8)	2.1 – 11.9
Not sure	3 (2.9)	0 – 6.2
For a supervised exercise program led by an exercise professional:		
a) How often would you be interested in attending? (n = 99)		
Once a week	26 (26.2)	17.3 – 34.7
Twice a week	27 (27.2)	18.2 – 35.8
Three times a week	25 (25.3)	16.4 – 33.6
More than three times a week	6 (6.1)	1.3 – 10.7
No preference	15 (15.2)	7.9 – 22.1
b) What time of day would you prefer to exercise? (n = 99)		
Morning	43 (43.4)	33.2 – 52.8
Afternoon	12 (12.1)	5.6 – 18.4
Morning or afternoon	14 (14.1)	7.1 – 20.9
Evening	17 (17.2)	9.6 – 24.4
No preference	13 (13.1)	6.3 – 19.7
c) Who would you prefer to exercise with? (n = 101)		
Alone	14 (13.9)	7.3 – 20.7
Other cancer survivors	21 (20.8)	13.1 – 28.9
General public	12 (11.9)	5.7 – 18.3
Family/spouse/carer	7 (6.9)	2.0 – 12.0
Friends	4 (4.0)	0.2 – 7.8
No preference	39 (38.6)	29.5 – 48.5
Other	4 (4.0)	0.2 – 7.8

d) How far are you willing to travel? (n = 100)		
0 to 10 km	69 (69.0)	59.9 – 78.1
10 to 20 km	25 (25.0)	16.5 – 33.5
20 – 30 km	5 (5.0)	0.7 – 9.3
> 30 km	1 (1.0)	0.0 – 3.0

† Multiple responses possible

Table 3. Associations between physical activity levels and exercise preferences, barriers and facilitators in Canadian prostate cancer survivors

Group	Preference	Association	X ²	P	ES
Meeting both exercise guidelines (n=25) vs. meeting one or no exercise guidelines (n=78)	More likely to be interested in participating in resistance exercise	84% vs. 51%	8.4	0.004	0.29
	More likely to be interested in participating in a group-based circuit*	32% vs. 13%	4.8	0.028	0.22
	Less likely to prefer exercise based from a home setting*	24% vs. 49%	4.7	0.030	0.21
	More likely to identify exercising with another person as a facilitator*	56% vs. 30%	5.8	0.016	0.24
	More likely to identify appearance as a facilitator*	48% vs. 22%	6.4	0.011	0.25
	More likely to identify having a gym membership as a facilitator	48% vs. 21%	7.2	0.007	0.27
Meeting no exercise guidelines (n=29) vs. meeting one or both guidelines (n=74)	Less likely to be interested in participating in resistance exercise	25% vs. 72%	18.7	<0.001	0.43
	Less likely to be interested in participating in a group-based circuit	0% vs. 24%	8.1	0.004	0.28
	Less likely to prefer exercise from a community centre or gym	32% vs. 65%	9.1	0.003	0.30
	More likely to identify procrastination as a barrier to exercise*	39% vs. 19%	4.7	0.030	0.21
	Less likely to identify having a gym membership as a facilitator	7% vs. 35%	7.8	0.005	0.28
	Less likely to identify encouragement from another person as a facilitator	4% vs. 28%	7.2	0.007	0.27

Performing no resistance exercise (n=50) vs. performing 1+ weekly resistance exercise (n=53)	Less likely to be interested in participating in a structured exercise program[†]	36% vs. 69%	12.2	0.002	0.35
	More likely to be interested in participating in walking*	66% vs. 43%	5.3	0.021	0.23
	Less likely to be interested in participating in resistance exercise	30% vs. 87%	34.4	<0.001	0.58
	Less likely to be interested in participating in a group-based circuit	2% vs. 32%	16.1	<0.001	0.40
	More likely to prefer exercise based from a home setting	56% vs. 30%	7.0	0.008	0.26
	Less likely to prefer exercise from a community centre or gym	40% vs. 72%	10.5	0.001	0.32
	Less likely to prefer to exercise in a group with other cancer survivors*	10% vs. 31%	7.0	0.030	0.26
	More likely to identify procrastination as a barrier to exercise*	34% vs. 15%	5.0	0.025	0.22
	Less likely to identify exercising with another person as a facilitator	20% vs. 51%	10.7	0.001	0.32
	Less likely to identify having a gym membership as a facilitator	14% vs. 40%	8.5	0.003	0.29
	Less likely to identify attending a group-based class as a facilitator	10% vs. 38%	10.8	0.001	0.32
	Less likely to identify encouragement from another person as a facilitator	10% vs. 32%	7.5	0.006	0.27

Results where $P < 0.01$ are shown in bold. * is used where $P = 0.01 - 0.03$ (not significant). Associations where $p > 0.3$ and/or association difference is $< 10\%$ are not shown (not significant). Effect size (ES) is calculated by coefficient phi (ϕ) for dichotomized variables and Cramer's V for trichotomized variables ([†]). Small effect size $\phi < 0.3$, moderate effect size $0.3 \leq \phi < 0.5$, large effect size $\phi \geq 0.5$.

FIGURE 1 LEGEND

Figure 1. Self-reported exercise barriers and facilitators (in the past month) of Canadian prostate cancer survivors. Multiple responses were possible. $N = 103$. Items scoring $< 10\%$ are not shown. Error bars represent 95% confidence intervals.

[†] Included injuries or chronic medical issues (e.g. back pain, sciatica) and occupational/household physical activity.

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