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Knowledge, attitudes and practice of oncologists and oncology health care providers in promoting physical activity to cancer survivors: an international survey

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Abstract

Objective: To investigate knowledge, attitudes and practices of oncologists towards physical activity (PA) in cancer survivors, and the association between oncologists' own PA behavior and PA promotion. Methods: Oncologists (n=123) completed a survey based on the Theory of Planned Behavior (TPB). Participants reported PA promotion behavior, PA involvement, attitudes, intentions, social norm, Perceived Behavioral Control (PBC), confidence and knowledge of exercise prescription. Structural equation modelling (SEM) evaluated these associations. Results: Less than half of oncologists reported regularly promoting PA to patients (46%), with 20% providing written information and 23% referrals. Only 26% were physically active. TPB SEM pathways explained 54.6% of the variance in PA promotion (CFI=0.905, SRMR=0.040). Social norm was the only significant pathway to intention, but also a significant indirect pathway to PA promotion (p=.007). Confidence to promote PA, PBC and intentions were direct significant pathways to PA promotion (p<.05). Exploratory SEM pathways explained 19.6% of the variance of PA behavior, which in turn explained 13.1% Social Norm, 10.7% Attitude, 10.0% Confidence to Recommend and 17.8% PA promotion behavior (CFI=0.921, SRMR=0.076). Instrumental-attitude was a direct significant pathway to PA behavior (p=.001). PA behavior was a direct significant pathway to social norms, attitude, confidence to recommend, and PA promotion ($p < 0.05$). Conclusions: Oncologists reported a modest ability to promote PA, low PA promotion rates and limited knowledge of exercise prescription. Patient physical activity promotion may be improved through strategies that increase oncologists' PBC, confidence and their own personal PA participation.

Keywords: behaviour change, cancer survivors, exercise, health promotion, motivation, oncology.

Introduction

Improved early detection and treatment has led to an increase in the numbers of people surviving cancer [1-2] with two-thirds of patients living beyond 5-years after diagnosis [3]. Interventions that focus on avoiding recurrence, reducing comorbidities including diabetes and cardiovascular disease (CVD), and improving physical and psychological well-being are essential for healthy survivorship trajectories [4]. One strategy to reduce the risks of CVD and cancer recurrence is to promote physical activity (PA). Survivors who are physically active have lower CVD-related morbidity [5], lower recurrence risk [6-10] and improved survival compared to those who are inactive [11].

The American Cancer Society recommends that survivors participate in 150-minutes of moderate-intensity PA per week [12]. However, less than 30% are meeting these recommendations [1, 13]. Despite patients' wishing to receive PA information, with their preferred source of information being oncologists and oncology nurses [14-18], many do not receive PA guidance from their treating specialists [15, 16, 18-20].

Clinicians are instrumental in facilitating health behavior change in survivors, and the transition from cancer patient to cancer survivor has been described as a 'teachable moment', whereby patients may be more motivated to make health behavior changes such as increasing PA [4]. Oncologists should promote the PA guidelines, refer patients to exercise specialists [21] and recognise their role as an important source of motivation for survivors to participate in regular PA [1, 13, 19, 22]. However, data regarding oncologists' attitudes, knowledge and practice in relation to PA habits and promotion are limited [18, 20, 22-24]. A recent study found that only 40% of oncologists recommended exercise to patients in the previous month [19, 22, 24]. In a large population based study less than one third of colorectal cancer patients recalled receiving PA advice [25].

Barriers to the promotion of PA include lack of time, knowledge, patient motivation [23], exercise referral pathways [20] and safety concerns [20, 24]. A recent Canadian study found that 80% of cancer clinicians were not aware of the PA guidelines [20].

Oncologists' own PA levels may influence their practice [24] with those who are physically active being more likely to recommend PA to patients [26]. There are limited data regarding barriers to oncologists' recommending PA to patients. Several psychosocial factors influence clinician behaviors and the use of theories to explain clinician behaviour has been recommended [27]. The theory of planned behaviour (TPB) has been found to explain ~31% of variance in healthcare professionals' behaviour [28] and has has demonstrated superior predictive power in explaining healthcare professionals' behaviour than other theories [28]. Therefore, the TPB has been identified as an acceptable model for explaining clinician behaviour [28-29] and is the theoretical model upon which the present study is based. How attitudes towards exercise, perceived behavioral control (PBC) and oncologists' own PA levels may influence their practice with regard to PA promotion has not been investigated. Prior studies have tended to focus on promotion of PA during treatment [19, 20, 24] and not following treatment, when PA advice may be better received [16, 17, 30, 31]. No study has explored oncologists' knowledge, attitudes and practices in relation to PA and PA promotion internationally and across a range of cancer types.

Our objective was to explore the attitudes and behaviors of oncology clinicians in relation to their own PA involvement and their perceptions, knowledge, confidence, barriers and practices towards PA promotion in survivors. Specific aims were to: determine oncologists' existing PA knowledge in relation to recommendations; examine personal PA behavior and whether it predicts PA promotion; determine level of confidence and control to promote PA; explore barriers to promoting PA. It was hypothesized that oncologists who were regularly active, knew PA guidelines, held favourable attitudes towards PA, and had confidence and control to promote PA, would more frequently advise patients to be active. We hypothesized that favourable attitudes towards exercise, and perceptions of confidence and control to promote PA in patients would predict intentions to promote PA and subsequent behavior.

Methods

Study Design

The study design was a cross-sectional survey of oncologists and oncology health care providers. The study was approved by the St John of God Healthcare Human Research Ethics Committee (Reference 954).

Participant Recruitment

Participants were members of 8 oncology societies: American Society of Clinical Oncology (ASCO), Clinical Oncology Society of Australia (COSA), Medical Oncology group of Australia (MOGA), Breast Surgeons of Australia and New Zealand (BreastSurgANZ), Canadian Association of Medical Oncologists (CAMO), European Society for Medical Oncology (ESMO) and the European Society for Radiotherapy and Oncology (ESRO) and completed an anonymous online questionnaire.

Data Collection

Oncology membership organisations were contacted and asked to disseminate the questionnaire to their members. Participating organisations were sent an email comprising a cover letter that explained the purpose of the study, estimated time to complete the survey (10 minutes), and a link to the questionnaire using Survey Monkey®. Inclusion criteria included oncology clinicians that were members of the professional organizations. Consenting organizations sent an email to their members with a link to the questionnaire and sent a reminder email one-month later. Participants were presented with a brief introductory passage: “The aim of our study is to investigate the knowledge, attitudes and behaviors of oncology clinicians regarding PA promotion in cancer survivors. You

will be asked questions about your experiences of PA, your opinions concerning PA promotion in patients, your confidence and current practices related to PA promotion. All responses are anonymous and strictly confidential". Consent was presumed at completion of questionnaire.

Study Instrument

The survey was based on the TPB [32] and from items used in previous research examining the practices and attitudes of oncologists regarding PA promotion [23, 24]. Basic demographic information was collected including gender, age and clinical specialization. In order to assess PA knowledge, we asked 'for those patients that you do recommend PA, what are your general recommendations in regards to the following (each in a separate box): 1) Frequency (number of sessions per week); 2) Intensity (e.g., light, moderate, vigorous); 3) minutes per session; 4) Type of activity (e.g., aerobic, strength training).

The second section of the questionnaire concerned attitudes, confidence and PBC for PA promotion in addition to behavior. Three items were used to assess attitude using a 6-point likert scale. The scale displayed high internal consistency (Cronbach alpha, $\alpha = 0.78$). One item assessed social norms asking whether participants believed that discussing PA with patients was part of their role. Two items were used to assess PBC concerning PA promotion using a 6-point likert scale. For example, 'How much control do you feel you have over promoting increased PA in patients over the next three-months? The scale displayed low internal consistency (Cronbach alpha, $\alpha = 0.34$). Participants were asked about their confidence to recommend PA to survivors after treatment using the 6-point scale. Participants were also asked for an open response to the following question: 'what (if any) is the greatest barrier or impediment to you promoting PA to patients over the next three months?' The following question assessed their confidence to promote PA to patients when that barrier (previously self-reported) was present, using the 6-point scale. PA promotion behavior was assessed two items. For example, 'Over the course of the past three months, how often have you actively encouraged or prescribed PA to survivors'. The scale displayed high internal consistency (Cronbach alpha, $\alpha = 0.85$).

Personal *attitudes* toward PA were assessed via response to the statement "For me, doing moderate-intensity PA for 30-minutes a day at least five-times per week in the next fortnight would be…" This statement was then paired with six, 5-point adjective scales to assess both instrumental (e.g., worthwhile) and affective (e.g., enjoyable) attitudes. Both scales displayed high internal consistency (Cronbach alpha, $\alpha = 0.90$ respectively). Personal PA behaviour was assessed using a single item on a 6-point scale ranging from 'everyday' to 'almost never': 'In the course of the past two weeks, how often have you participated in moderate-intensity PA for at least 30-minutes a day?'

Data Analysis

The analyses were conducted with SPSS V22 [33] and Mplus [34]. Statistical significance was set at $\alpha = 0.05$. Open-ended questions were analyzed using thematic analysis [35] with similar codes collated to form themes. Knowledge of the guidelines was coded as 'yes' or 'no' and determined by whether their exercise prescription matched the recommended PA guidelines (i.e., 150 minutes of moderate-intensity PA per week) [12].

The path model outlining the conceptual framework for the present study is presented in Figure 1. The model can be partitioned into a theoretically-driven model, based on the TPB [32] (Model 1) and an exploratory model (Model 2). Structural equation modelling (SEM) was employed to test the fit of the models using a bivariate Pearson correlation matrix and the maximum likelihood method. SEM is a flexible tool exploring interrelationships amomg variables for model testing, using multiple dependents and investigation of mediating variables. Maximum likelihood estimation was used as it can account for missing data with minimal bias [36]. In order to accommodate non-normality in the data, standard errors for each path coefficient and each indirect effect were estimated with a bootstrapping procedure based on 1000 draws. The only variable correlated with PA promotion behavior was gender ($r_{pb} = 0.18$, $p = 0.05$) whereby males scored significantly higher than females. Therefore, gender, was controlled in both path analyses. The overall SEM fit was evaluated using the standardized root mean square residual (SRMR) and the comparative fit index (CFI). The SRMR measures the discrepancy between the predicted model and

observed model. SRMR values lower than 0.08 indicate acceptable fit with lower values indicating better fit [37, 38]. The CFI measures the extent to which the model of interest is better than an alternative model where measured variables are uncorrelated; values closer to 1 are considered acceptable fit. For the present study, CFI values ≥ 0.9 were considered indicative of good model fit [39]. The root mean square error of approximation (RMSEA) was not reported for this study as it has been shown to underestimate model fit with small sample sizes [40].

Results

A total of 123 oncologists completed the survey from the following organisations: ASCO (n= 39, 31.7%), COSA (n= 35, 28.5%), MOGA (n= 16, 13%), BreastSurgANZ (n= 13, 10.6%), CAMO (n= 5, 4.1%), ESMO (n= 4, 3.3%) and ESRO (n=3, 2.4%). Gender was evenly split (51.3% female) and the majority (61%) were aged between 36 and 55. A further 22%, 12.7%, and 4.3% were aged 56-65, 26-35 and over 65 respectively. Regarding clinical specialization, the majority were either Medical Oncologists (56.8%) or Surgical Oncologists (30.5%) followed by Oncology nurses (6.8%), Radiation Oncologists (4.2%) and other (1.7%) (see Table 1). The response rate is unknown due to the independent distribution of the survey link by targeted organizations, however based on estimated memberships, the response rate is likely very low.

Table 2 provides an overview of survey items. Participants agreed (94.3%) that PA can improve Quality of Life for survivors, reduce fatigue (82%) and CVD risk (70%). 80% were confident in recommending PA to patients after treatment, 69.9% believed it was part of their role, 66% intended to promote PA to patients during consultations, but only 46% reported regularly promoting PA over the past three months. Additional questions found that just 20% of respondents provided written information and 23% referred patients to an exercise specialist.

In relation to PBC, only 35 % of participants reported having a lot of control over promoting PA to survivors. Further, only 37% reported providing exercise prescriptions that matched the PA guidelines (i.e., the minimum dose to benefit health) and only 26% of oncologists reported being sufficiently physically active.

Barriers to PA promotion among oncologists, gleaned from open responses (n= 111) included a lack of time (n=38, 34%), access to trained specialists or referral pathways/availability of programs (n=28, 25%) and patient lack of interest (n=25, 22%). Other barriers included a lack of affordable exercise programs (n=12, 11%), lack of training or guidance on exercise prescription (n=7, 6%), insufficient patient education pamphlets or materials (n=4, 4%). Only 15.5% were very confident in promoting PA when their aforementioned personal barrier(s) were present.

Model Testing

SEM path diagrams of Models 1 and 2 are presented with standardized estimates and squared multiple correlations (Bivariate Correlation Matrix, Table 3). Model 1 (Figure 2) reported a good model fit (CFI = .905; SRMR = .040). Standardized parameter estimates indicate that social norm was associated with intention to promote PA ($\beta = 0.34$, $p = .006$). Regarding PA promotion behavior, intentions ($\beta = 0.57$, $p < 0.001$), confidence to promote ($\beta = 0.21$, $p < 0.01$) and PBC ($\beta = 0.16$, $p < 0.05$) were significant direct pathways with increases in PBC and confidence to promote PA in the presence of obstacles associated with an increase in PA promotion behavior. There was one significant mediation pathway from social norms, through intentions, to PA promotion behavior ($\beta = .191$, $p = .007$), whereby an increase in social norms was associated with an increase in intentions, and in turn associated with an increase in PA promotion behavior. Variance of the model explained 37.7% of intentions and 54.6% of PA promotion behavior.

The exploratory model found pathways from knowledge of the PA guidelines to PA behavior (p = .793), from PA behavior to PBC (p = .205) and from PA behavior to Confident to promote PA (p = .183) were not significant and these were removed from the final model (Model 2, figure 3) which reported a good model fit (CFI = .921; SRMR = .076). The direct pathways from instrumental attitudes to PA behavior (β = 0.32, p < 0.01), and from PA behavior to PA promotion behavior were positive and significant (β = 0.42, p <0.01) explaining 19.6% of the variance. PA behavior was associated with social norms (β = 0.36, p < 0.001), attitude (β = 0.19, p = 0.020), confidence to recommend PA (β = 0.32, p < 0.001), and PA promotion behavior (β = 0.42, p < 0.001) explaining 12.1%, 10.7%, 10.0% and 17.8% variance respectively. Three mediating pathways from instrumental attitudes through PA behavior were found with social norms (β = 0.12, P = 0.01); confidence to recommend PA (β = 0.10, p = 0.01) and PA promotion behavior (β = 0.14, p < 0.01).

Discussion

To our knowledge, this is the first study to explore the knowledge, attitudes, confidence and behaviors of an international sample of oncologists toward PA promotion to patients. Our findings lend some support for the TPB but not all tenets were supported. Social norm was found to be the only predictor of intentions to promote PA, while intention, confidence and PBC all were significantly associated with PA promotion behavior. Instrumental attitude was associated with oncologist PA behavior and PA behavior was associated with PA promotion. PA behavior also predicted social norms, attitudes and confidence to recommend PA. Overall, oncologists held positive attitudes towards PA, agreed that discussing PA with patients was part of their role, were confident in recommending PA and displayed strong intentions to promote PA in practice. However, they perceived a modest level of control to promote PA, particularly in the presence of self-reported barriers and modest PA promotion rates. Further, over 60% of exercise prescriptions provided did not match current guidelines [12], and few oncologists were themselves sufficiently active.

Consistent with previous research [19, 22, 24], less than half of oncologists regularly promoted PA to patients. Consistent with previous findings [20] less than a fifth of oncologists reported providing written information, less than a quarter reported referring patients to exercise specialists and only 6% referred patients to exercise programs. The majority in the current study did not cite the correct PA guidelines [12], indicating that those who do promote PA, may not be doing so correctly. This is consistent with the findings of a Canadian study in which just 15% of oncology care providers were able to identify the correct exercise guidelines [20]. Accurate knowledge of the exercise guidelines is crucial as recall of oncologist PA advice is associated with higher levels of PA [13, 25].

Given that barriers encountered may interfere with the execution of behavior, the TPB outlines that PBC may influence behavior directly [32]. Our study is the first to support this direct pathway in that PBC was positively associated with PA promotion behavior amongst oncologists suggesting that having control over PA promotion (i.e., the opportunities, skills, resources and confidence to promote PA), appear to be main factors influencing oncologists' PA promotion behavior. Lack of clinic time to counsel patients, limited access to exercise specialists and/or referral pathways/availability of programs, patient lack of interest and lack of training or guidance on exercise prescription were the main barriers to PA promotion reported in the present study and are consistent with previous studies [19-20, 23-24, 26]. In contrast, patient safety concerns as a barrier to PA promotion [20, 24] were not reported in our study, perhaps due to the focus on patients who have completed active treatment. Further, many of these perceived barriers may be modifiable such as lack of knowledge and the development of referral pathways. Lack of time is less modifiable, however, interventions including brief advice have demonstrated promise [1, 13, 25, 41]. A 30-second exercise recommendation by oncologists' has been shown to increase breast cancer patients' PA level by 3.4 MET hours per week [13]. Therefore, an exercise prescription tool could be developed to assist oncologists in providing an effective exercise recommendation in a brief time. Patient resistance or lack of interest may be inaccurate since patients report desiring guidance concerning PA and would prefer to receive this information from their oncologists [14-18, 42].

Oncologists' own PA behavior was significantly associated with PA promotion behavior. This supports findings from a US study, which reported oncologists who were physically active were more likely to offer PA advice [26]. This positive association is further supported by evidence that oncologists that were more physically active held more favourable attitudes towards the promotion of PA and were significantly more likely to identify the correct exercise guidelines [20, 24], supporting the notion that clinicians' lifestyle behaviors impact their health promotion practices [43, 44]. Our study is also the first to find that oncologists' PA behavior is positively associated with social norms, attitudes and confidence to recommend PA to patients.

The TPB was not fully supported in the present study. Although social norm, intention and PBC explained intention and behavior, respectively, as the TPB suggests, attitude and PBC were not associated with intention. However, confidence also predicted PA promotion demonstrating the importance of integrating evidence-based constructs from different theories. Instrumental attitudes predicted PA behavior and PA behavior predicted PA promotion behavior. As such, future interventions to increase oncologists' PA levels should consider promoting the value of PA participation and positive outcome expectations. Testing the TPB among oncologists from other countries is needed to better understand PA promotion in differing contexts. Additionally, other theories should be investigated or integrated (e.g., Health Action Process Approach) to determine which psychological constructs better explain PA behaviors among oncologists.

Conclusion

In this study, oncologists had positive attitudes towards PA, agreed that discussing PA with patients is part of their role, were confident in recommending PA and intend to do so. However, they perceived a modest level of ability to promote PA, particularly in the presence of self-reported barriers, and displayed

modest PA promotion rates and limited knowledge of appropriate exercise prescription. Since oncologists' PBC, intentions, confidence and their own PA levels influence PA promotion, strategies aimed at improving these factors should be explored [42].

Study Limitations

Limitations of the study include its cross-sectional design, which precludes making causal associations between psychological variables and oncologists' practices. Participants may have overestimated their promotion practices and their own PA. The low internal consistency for PBC should also be noted. Given the low response rate the sample may not be representative. Our study should be regarded as 'hypothesis-generating' to inform the development of interventions to increase PA promotion amongst oncologists. A further limitation is that only organizations from developed countries were invited to participate in the study and that the relatively small sample size precluded comparisons by country or oncology clinician type (i.e., surgical, medical, radiation, nurse). Information on medical training and country of origin that may influence physical activity knowledge and promotion was not collected and represents a limitation. Strengths of the study include its international sample, integration of aspects of theoretical models, and the inductive approach, rather than pre-determined, to examining barriers to PA promotion, subsequent confidence and exercise prescription.

Clinical Implications

Our findings highlight the importance of introducing strategies to improve PA promotion practices among oncologists. First, education is necessary to disseminate accurate knowledge concerning the recommended PA guidelines. Second, given that a lack of time is the greatest impediment to promoting PA, resources and brief interventions should be developed and tested, for example comparing a 30-second verbal recommendation with a written green prescription [42]. Finally, the association between oncologists' own PA and promoting PA to their patients, suggests this aspect is worth pursuing.

Conflict of Interests

The authors’ do not have any conflict of interest to declare.

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