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ORIGINAL ARTICLE

Physical activity levels and preferences of patients with breast cancer receiving chemotherapy in Chile

Karol Ramírez-Parada[1] · Kerry S. Courneya[2] · Sabrina Muñiz[3] · César Sánchez[3] · Rodrigo Fernández-Verdejo[4]

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Abstract

Purpose In Chilean patients with breast cancer (BC) receiving chemotherapy we aimed to (a) report the levels of physical activity (PA), (b) compare clinical/socio-demographic parameters among patients with different levels of PA, and (c) explore exercise preferences.

Methods Patients ($n = 112$) completed a questionnaire regarding their PA habits, and another questionnaire regarding their preferences for an exercise program. Patients were then divided into three groups based on the exercise guidelines for patients with BC (150 min/week of moderate exercise, or 75 min/week of vigorous exercise). The groups were (i) not engaging in any moderate-to-vigorous PA (MVPA), (ii) engaging in some MVPA, but not meeting the guidelines, and (iii) meeting the guidelines. Clinical/socio-demographic parameters and preferences for exercise were compared between groups.

Results Only 13% of patients with BC met the exercise guidelines. These patients were younger, had been diagnosed more recently, and had fewer children than patients not engaging in MVPA. There were no differences in the preferences for exercise between groups. Overall, patients preferred to exercise with other patients (76%), at moderate intensity (67%), performing different activities (94%), supervised (94%), with a fixed schedule (69%), and to do group activities (90%).

Conclusion Most patients with BC receiving chemotherapy did not meet the exercise guidelines. Patients > 50 years old and with > 2 children were the most inactive. Efforts to increase PA levels should focus especially on these patients. The preferences for exercise reported here will help to increase adherence to exercise programs and improve outcomes for these patients in Chile.

Keywords Exercise · Breast neoplasm · Cancer treatment · Adherence

Introduction

Breast cancer (BC) is the second most common cancer worldwide and the most frequent among women, with an incidence of 1.67 million cases in 2012 [1]. Chemotherapy has helped to improve the prognosis of patients with BC, but can cause side effects such as pain, hot flashes, weight gain, and reduced physical function [2–5]. These effects impair daily living activities, social interaction, and quality of life [3–5].

Physical activity (PA) represents "any bodily movement produced by the skeletal muscles that results in energy expenditure" [6]. PA is considered as exercise when it is planned, structured, repetitive, and aims to improve physical fitness [6]. Exercise may attenuate some side effects of chemotherapy, improving quality of life and functional outcomes [4, 7–9], and possibly reducing cancer recurrence and mortality [4, 10, 11]. Increasing PA levels, through exercise programs, is thus an important intervention in the multidisciplinary management of patients with BC receiving chemotherapy [12].

Unfortunately, patients with BC often decrease their PA levels after diagnosis [13–15]. Studies conducted in the USA and Germany suggest treatment type and the body mass index influence this response [13, 15]. Patients on chemotherapy and/or radiotherapy decreased their PA levels more than patients without adjuvant therapy or patients on hormone treatment [13, 15]. Also, patients with obesity decreased their PA levels more compared to patients with normal-weight [13, 14]. The

✉ Rodrigo Fernández-Verdejo
fernandezverdejo.rodrigo@gmail.com

[1] Carrera de Kinesiología. Departamento de Ciencias de la Salud. Facultad de Medicina, Pontificia Universidad Católica de Chile, Santiago, Chile

[2] Faculty of Kinesiology, Sport, and Recreation, University of Alberta, Edmonton, Canada

[3] Departamento de Hemato-Oncología, Facultad de Medicina, Pontificia Universidad Católica de Chile, Santiago, Chile

[4] Carrera de Nutrición y Dietética. Departamento de Ciencias de la Salud, Facultad de Medicina, Pontificia Universidad Católica de Chile, Santiago, Chile

systemic impact of chemotherapy may explain its stronger effect on the reduction of PA, and patients with obesity could be more susceptible to this effect due to the presence of comorbidities. Identifying other clinical and sociodemographic factors that characterize physically inactive patients in different cultural contexts may serve to focus better the efforts to promote PA.

To ensure adherence to exercise programs, patients' preferences need to be considered. Of note, previous studies have shown that patients with different cancer types have different exercise preferences [16]. On the one hand, bladder, ovarian, kidney, and colorectal cancer survivors preferred to participate in a home-based program starting after treatment, and to exercise alone or with their relatives [17–20]. On the other hand, BC survivors preferred to participate in supervised group sessions with other cancer survivors [16]. These data highlight the need to identify the preferences of each specific group in order to maximize adherence.

Although low levels of PA in patients with BC from different contexts have been documented, no data exist for Chilean patients with BC receiving chemotherapy. In Chile, BC is the most common cancer for women [21], having a burden of disease 20% higher compared to the global burden [22]. How clinical and/or sociodemographic parameters influence the levels of PA in patients with BC in Chile is unknown. Moreover, data regarding their exercise preferences do not exist, which is essential to promote PA in this cultural context. Therefore, our aims were to (a) report the levels of PA in Chilean patients with BC receiving chemotherapy, (b) compare clinical/sociodemographic parameters among patients with different levels of PA, and (c) explore the exercise preferences of these patients.

Methods

Patients

Patients with BC from the Complejo Asistencial Dr. Sótero del Río, Santiago-Chile were eligible if they (a) were ≥ 18 years old, (b) had BC at any stage, and (c) were on chemotherapy treatment. We studied patients receiving chemotherapy, because exercise has been shown to attenuate the side effects associated with this therapy. Sociodemographic and clinical information was collected from registries and completed with self-reported data if necessary. The Ethical Board at South-East Metropolitan Health Service Research approved the study. All participants provided written informed consent.

Study design

Data collection was conducted between December 2015 and March 2016. Patients with BC completed two questionnaires at any time during their chemotherapy treatment. These questionnaires aimed at determining levels of PA and preferences for an exercise program.

Levels of PA

We used the Godin Leisure-Time Exercise Questionnaire [23] to collect information on the frequency of light (minimal effort, no perspiration), moderate (not exhausting, light perspiration), and vigorous (heart beats rapidly, sweating) PA during cancer treatment. Patients were asked to report all leisure-time PA (aerobic, resistance), intensity level (light, moderate, or vigorous), along with the weekly time engaged at such intensity. The American College of Sports Medicine (ACSM) guidelines recommend that patients with BC engage in ≥ 150 min/week of moderate aerobic exercise, or in ≥ 75 min/week of vigorous aerobic exercise [12]. To identify patients who met these guidelines, we thus considered only aerobic activities (note that only two patients reported resistance exercise in addition to aerobic exercise). We then calculated an index of moderate-vigorous PA (MVPA) as: [Moderate PA (min/week) + 2 × vigorous PA (min/week)] [24]. Patients meeting the guidelines were those achieving ≥ 150 min/week in this index. For analyses, we then divided patients with BC into three groups: (i) not engaging in any MVPA (0 min/week); (ii) engaging in some MVPA, but not meeting the guidelines (1–149 min/week); and (iii) engaging in MVPA and meeting the guidelines (≥ 150 min/week). Sociodemographic and clinical parameters were compared between groups.

Light-intensity PA may represent a starting point for later engagement in MVPA. Therefore, we also explored the total levels of leisure-time PA. Light-, moderate-, and vigorous-intensity activities were assumed to require 3, 5, and 9 metabolic equivalents (MET), respectively [25]. Total levels of leisure-time PA (including light, moderate, and vigorous activities) were calculated and expressed as MET × min/week.

Preferences for an exercise program

Exercise preferences were measured using a questionnaire with closed-ended questions derived from a previous study [16]. A bilingual physiotherapist with knowledge in oncology translated the questionnaire, which collects information about the interest in engaging in an exercise program, and about the preferred characteristics of the program. Patients filled out the questionnaire under supervision in the hospital. Any questions were clarified by the researchers. Thus, we determined the preferred time to begin an exercise program, company, intensity, structure, supervision, schedule, and exercise type. Patients were asked to select only one alternative per question.

Statistics

Data for continuous variables are presented as mean ± SD, and for categorical variables as percentages. Normal distribution of continuous variables was assessed with Shapiro-Wilk test. The age of the patients was the only continuous variable normally distributed. Consequently, we tested differences in age between groups with one-way ANOVA and Bonferroni post-hoc. For the other continuous variables (non-normally distributed), we tested differences with independent samples Kruskal-Wallis, and in case of significant results, pairs of groups were compared using Mann-Whitney *U* test with Bonferroni correction for multiple comparisons. Differences between groups in the distribution of categorical variables were tested using chi-square. IBM® SPSS® version 24 was used to conduct the analyses. *P* value < 0.05 was considered significant.

Results

Levels of PA

A total of 116 patients were invited to participate, and 112 accepted. Table 1 shows sociodemographic and clinical characteristics of the patients. Sixty percent of patients with BC did not engage in any MVPA. Among those engaging in MVPA, only one third met the guidelines (13.4% of all patients). Patients not engaging in MVPA were older ($P < 0.05$), had been diagnosed earlier ($P < 0.05$), and had more children ($P < 0.05$) than patients meeting the guidelines. Body weight and BMI trended ($P < 0.10$) towards significance, suggesting higher values in patients not engaging in MVPA than those meeting the guidelines. There was also a trend ($P < 0.10$) towards differences in the type of axillary surgery. Sixty percent of the patients not engaging in MVPA had not been subjected to axillary surgery, compared to less than 45% in the other groups. No differences between groups were observed for height, disease stage, type of chemotherapy, radiotherapy, breast surgery, marital status, and education.

Among the 67 patients not engaging in any MVPA, 54% engaged in light-intensity PA. Notably, some of these light-intensity exercisers achieved total levels of leisure-time PA (in MET × min/week) similar to patients who engaged in MVPA (Fig. 1).

Preferences in an exercise program

Ninety-five percent of patients were interested in receiving information about PA, and 92% ($n = 103$) reported interest in participating in an exercise program. Table 2 shows the preferences for an exercise program of those 103 patients. Most patients preferred to exercise with other patients, at moderate intensity, performing different activities each session, supervised, with fixed schedule, and to do group activities. These preferences were not different between groups. We also compared preferences between the patients meeting the guidelines ($n = 14$) and all patients who did not meet the guidelines ($n = 89$; patients not engaging in MVPA, plus patients engaging in MVPA but not meeting the guidelines). No differences were observed ($P > 0.05$; data not shown), indicating that preferences for PA are similar in all patients with BC.

There was a trend ($P = 0.077$) for differences between groups for the time they preferred to begin the exercise program. Patients not engaging in MVPA and those not meeting the guidelines seemed to prefer beginning the program earlier than the patients meeting the guidelines (Table 2). A similar trend ($P = 0.080$; data not shown) was observed when comparing patients meeting the guidelines ($n = 14$) with all patients who did not meet the guidelines ($n = 89$). This last result confirms patients not meeting the guidelines (who engage or not in MVPA) tend to prefer beginning the exercise program earlier than patients who meet the guidelines.

Discussion

A growing body of evidence suggests patients with BC can benefit from engaging in PA during and after treatment [4, 7, 9–11]. The low levels of PA previously observed in patients with BC during and after chemotherapy are thus concerning [13]. Our results showed a similar situation in the Chilean context, with only 13% of patients with BC meeting the recommendation for aerobic exercise during chemotherapy. These data highlight the need for the development of strategies to promote PA as an integral part of the multidisciplinary team treatment of these patients in Chile.

Previous reports in different contexts have shown that 17–37% of patients with BC achieve the recommended levels of PA [14, 26, 27]. Of note, those values have been observed in patients not receiving chemotherapy. In patients with BC who were receiving chemotherapy, we found that only 13% achieved the recommended levels of PA. The lower percentage of adherence in our patients is expected, as patients with BC tend to reduce their PA levels during chemotherapy [13, 28]. This reduction may be a consequence of the negative physical symptoms associated with chemotherapy (pain, fatigue, nauseas, hot flashes) [3–5], social factors (lack of motivation or time), and/or lack of information [29]. Considering that PA and exercise attenuate some side effects of chemotherapy, thus improving quality of life [4, 7–9] and reducing cancer recurrence and mortality [7, 10, 11], the inclusion of exercise programs during chemotherapy seems essential.

Clinical and/or sociodemographic parameters may influence the levels of PA. We found that compared to the patients who met the exercise guidelines, patients not engaging in

Table 1 Clinical and sociodemographic parameters of patients with breast cancer receiving chemotherapy

	All patients	Not engaging in MVPA	Engaging in MVPA	
			Not meeting guidelines	Meeting guidelines
n	112	67	30	15
Age (years)*	52.0 ± 11.2	53.5 ± 10.7[#]	51.5 ± 12.3	45.8 ± 9.1
Weight (kg)[&]	69.3 ± 13.0	70.4 ± 10.7	69.2 ± 16.9	64.7 ± 13.6
Height (cm)	156.4 ± 8.2	156.4 ± 9.1	156.6 ± 7.5	156.1 ± 4.8
Body mass index (kg/m^2)[&]	28.4 ± 5.1	28.9 ± 4.7	28.1 ± 5.9	26.5 ± 5.0
Time since diagnosis (months)*	16.7 ± 28.0	15.2 ± 19.5[#]	22.9 ± 43.9	10.9 ± 17.7
Number of children (*n*)**	2.3 ± 1.4	2.6 ± 1.6[#]	2.0 ± 1.0	1.5 ± 1.0
Disease stage (%)				
1	6.3	7.5	3.3	6.7
2	35.7	32.8	40.0	40.0
3	44.6	49.3	36.7	40.0
4	13.4	10.4	20.0	13.3
Type of chemotherapy (%)				
Adjuvant	47.3	44.8	53.3	46.7
Neoadjuvant	52.7	55.2	46.7	53.3
Radiotherapy (%)				
No	67.0	67.2	66.7	66.7
Yes	33.0	32.8	33.3	33.3
Breast surgery (%)				
No	57.1	61.2	50.0	53.3
Partial mastectomy	25.9	22.4	26.7	40.0
Total mastectomy	17.0	16.4	23.3	6.7
Axillary surgery (%)[&]				
No	50.9	59.7	40.0	33.3
Sentinel lymph node biopsy	33.9	25.4	40.0	60.0
Axillary lymph node dissection	15.2	14.9	20.0	6.7
Marital status (%)				
Single	17.0	14.9	16.7	26.7
Married	54.5	55.2	60.0	40.0
Divorced	14.3	13.4	16.7	13.3
Cohabit	5.4	6.0	0	13.3
Widow	8.9	10.4	6.7	6.7
Education (%)				
Elementary	21.8	24.2	20.0	14.3
Secondary	45.5	50.0	46.7	21.4
Technical	23.6	21.2	20.0	42.9
University	9.1	4.5	13.3	21.4

Continuous variables are expressed as mean ± SD. [&] $P < 0.10$, * $P < 0.05$, ** $P < 0.01$ one-way ANOVA or independent samples Kruskal-Wallis. [#] $P < 0.05$ vs. meeting guidelines, Bonferroni post-hoc or Mann-Whitney *U* with Bonferroni correction. [¶] $n = 110$ for all patients, $n = 66$ for not engaging in MVPA, $n = 14$ for meeting guidelines. *MVPA*, moderate-vigorous physical activity

MVPA were older and had more children. Our data thus suggest that age and the number of children may be barriers to engage in PA in Chilean patients with BC. As suggested before, patients who face more of such barriers would be the ones with lower levels of PA [30]. We also found that patients not engaging in MVPA had been diagnosed earlier than patients who met the guidelines. This situation may result from a continuous decrease in PA levels after diagnosis [13]. Therefore, we identified patients > 50 years old, with > 2 children, as the most vulnerable group.

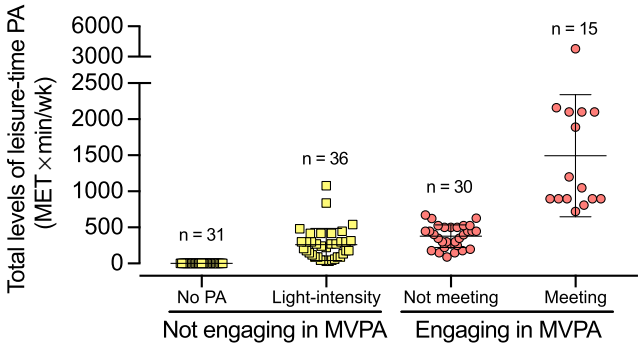

Fig. 1 Total levels of leisure-time physical activity (PA). MVPA, moderate-vigorous physical activity; Not meeting, patients not meeting the exercise guidelines; Meeting, patients meeting the exercise guidelines. Each symbol represents one patient

The low PA levels in our older patients follow the same trends as the Chilean population, i.e., PA levels decrease as people age [31]. These observations suggest this is a population trend, not specific to the patients with BC. The low PA levels in patients with a larger number of children may result from less time to engage in PA due to the time spent caring for children [29]. The clinical implications of our findings are that, when recognized, these patients should be especially encouraged to participate in an exercise program. Support in the care of children should be also provided to these patients during the exercise sessions.

Interestingly, we found that 32% of patients with BC engaged in light-intensity PA. When computing total PA levels (in MET × min/week), we found that some of these patients achieved similar levels compared to patients engaging in MVPA. This indicates that someone that frequently engages

Table 2 Preferences for a PA program in patients with breast cancer receiving chemotherapy

	All patients	Not engaging in MVPA	Engaging in MVPA	
			Not meeting guidelines	Meeting guidelines
n	103	61	28	14
When would you like to begin the program?[&]				
At diagnosis	27.2	27.9	39.3	0
During treatment	33.0	34.4	21.4	50
After treatment	23.3	26.2	17.9	21.4
3–6 months after treatment	1.9	3.3	0	0
1 year after treatment	14.6	8.2	21.4	28.6
Who would you like to exercise with?				
Alone	2.9	1.6	3.6	7.1
Patients	75.7	77.0	71.4	78.6
Friends	4.9	3.3	7.1	7.1
Couple	4.9	4.9	3.6	7.1
Family	11.7	13.1	14.3	0
What intensity do you prefer?				
Light	31.1	29.5	39.3	21.4
Moderate	67.0	67.2	60.7	78.6
Vigorous	1.9	3.3	0	0
You prefer the activities in each session to be[¶]				
The same	5.9	3.3	7.1	15.4
Different	94.1	96.7	92.9	84.6
Do you prefer supervision?				
Yes	94.2	95.1	96.4	85.7
No	5.8	4.9	3.6	14.3
What type of schedule do you prefer?				
Flexible	31.1	24.6	42.9	35.7
Fixed	68.9	75.4	57.1	64.3
What type of activities do you prefer?				
Group	90.3	90.2	92.9	85.7
Individual	9.7	9.8	7.1	14.3

Values are percentages. [&] $P < 0.10$ chi-square test. [¶] $n = 102$ for all patients, $n = 13$ for meeting guidelines. *MVPA*, moderate-vigorous physical activity

in light-intensity PA could match or surpass the energy expenditure of someone who engages in MVPA. Light-intensity PA, by increasing energy expenditure, could thus help to attenuate chemotherapy-induced weight gain [32], potentially protecting patients from morbidities associated with excess body weight. Besides, light-intensity PA represents a good starting point for later engaging in MVPA and therefore to profit from all the benefits that MVPA provides [12].

Most of our patients with BC were interested in receiving information about PA, agreeing with studies in North American patients with other cancer types [17–19]. Therefore, patients with cancer seem to be open to the possibility of engaging in an exercise program, and may be keen to be informed and educated on the matter. This situation needs to be exploited by offering opportunities to participate in such a program. Unfortunately, exercise programs are not formally included as part of the continuous care of BC in Chile [21].

Exercise programs should be adapted to the preferences of the patients in order to promote adherence. We found that 60% of patients with BC preferred to begin the program at diagnosis or during treatment. This is an aspect worth considering, as exercise improves functional outcomes, symptoms, and quality of life during chemotherapy [4, 7–9]. Our patients also preferred the exercise program to include group activities and to be supervised, agreeing with previous data on Canadian patients with BC [16]. These preferences may reflect fear for PA and/or adverse events, as well as lack of self-confidence. Being supervised and in a group could represent a safer setting for these patients. Of note, previous reports showed that patients with other cancer types have other preferences [17–20, 33]. These data highlight that preferences for exercise are group-specific, as recently reviewed [33].

Our study does have its limitations. First, 80% of our patients were in disease stages II or III. Therefore, our findings may not reflect the context of patients with BC in other stages. Second, PA levels were assessed with a self-report method, which may overestimate PA levels [34]. Finally, although a bilingual physiotherapist translated the questionnaire for exercise preferences, the validity of this translated version is unknown. Future studies should focus on objectively measuring changes in PA along the whole cancer treatment to identify the landmarks that mostly impact PA levels. To that end, longitudinally studying patients since diagnosis using accelerometers is an attractive possibility.

In conclusion, our results showed low levels of aerobic PA among patients with BC receiving chemotherapy in Chile. We also observed that patients > 50 years old and with > 2 children are the most inactive ones. Special emphasis in the promotion of PA should thus be put on this group. Knowing exercise preferences for Chilean patients with BC will guide health care practitioners to develop and tailor programs that patients will adhere to. This will in turn maximize the many benefits of MVPA on patients with BC.

Compliance with ethical standards

Control of data The authors declare they have full control of all primary data and agree to allow the journal to review the data if requested.

Conflict of interest The authors declare that they have no conflict of interest.

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