Relationship Between Physical Activity Level and Characteristics of Patients with Cancer

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ABSTRACT

Evidences have shown that Physical Activity (PA) can decrease side effects, such as fatigue and pain, as well as promote increase of muscular endurance, oxygen consumption and quality of life of patients with different phases of cancer treatments. However, studies have demonstrated that patients with cancer diagnosis may show insufficient levels of PA. Therefore, it is necessary to check the profile of such patients. Thus, the aims of this study were to verify the level of physical activity and its association with the characteristics of the patients' profile. It is a field study that included 247 patients of both sex, above 18 years old any type of cancer. The International Physical Activity Questionnaire-Ipaq-Bref was used to measure PA and the clinical profile was assessed using a questionnaire. The breast cancer was most common type (32.4%), the mean age was 60.08 ± 13.12 and patients in general have inadequate levels of PA, independent of treatment phase. It was found negative association between age and time of PA (rho=-0.145, p<0.05), years of diagnosis were associated with the level of PA: less than one year of diagnosis can be a significant predictor of low physical activity level (OR= 28.457; 95% CI 1.706 – 474.589; p= 0.020) and for moderate physical activity level (OR= 29.578; 95% CI 1.409 – 620.746; p= 0.029). Implementation of public policies to spread information and to offer PA programs to patients with cancer are needed, especially in the beginning of the treatment.

Keywords: cancer; physical activity; Ipaq.

RELAÇÃO ENTRE O NÍVEL DE ATIVIDADE FÍSICA E AS CARACTERÍSTICAS DO PERFIL DE PACIENTES COM CÂNCER

RESUMO

Evidências demonstram que a prática de Atividade Física (AF) pode diminuir os efeitos colaterais, tais como fadiga e dor, além de promover aumento da resistência muscular, consumo de oxigênio e qualidade de vida em pessoas com câncer em diferentes fases do tratamento. Estudos demonstraram, no entanto, que pacientes com diagnóstico de câncer podem apresentar níveis insuficientes de AF. É necessário, portanto, verificar o perfil desses pacientes. Assim, os objetivos deste estudo foram verificar o nível de atividade física e sua associação com as características do perfil dos pacientes. Trata-se de estudo de campo com 247 pacientes de ambos os sexos, acima de 18 anos de idade e com qualquer tipo de câncer. O questionário Internacional de Atividade Física foi utilizado para checar a AF; o perfil sociodemográfico e clínico foi verificado com questionário. O câncer de mama foi o tipo mais comum (32,4%), e a média de idade foi 60,8 ± 13,12 e os pacientes, em geral, apresentaram níveis inadequados de AF, independentemente da fase de tratamento. Foi encontrada associação negativa entre idade e AF (rho=-0,145, p<0.05). O tempo de diagnóstico foi associados com o nível de AF: menos de um ano de diagnóstico pode ser um preditor significante de baixos níveis de PA (OR= 28.457; 95% CI 1.706 – 474.589; p= 0.020) e de níveis moderados de AF (OR= 29.578; 95% CI 1.409 – 620.746; p= 0.029). Políticas públicas para divulgar informações e oferecer programas de AF para pacientes com câncer são necessárias, especialmente no início do tratamento.

Palavras-chave: cancer; atividade física; Ipaq.

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INTRODUCTION

Analyses of the Global Burden of Disease Study 2017 revealed that 17.1% of the deaths from 1990-2017 were due to neoplasms (SORYANO *et al*., 2020). Cancer treatments, such as chemotherapy and radiation therapy, can trigger a series of undesirable side effects, both acute and chronic, which can significantly affect patients. In the cases of breast, prostate, head and neck, and lung cancers, psychosocial illnesses such as anxiety, body image disorders, and depressive conditions are triggered. In addition, fatigue has been one of the main undesirable symptoms and can last for years after treatment (GEGECHKORI; HAINES; LIN, 2017).

Cancer patients can also develop a series of other harmful conditions, such as increased body fat, low body mass index and waist circumference, which can contribute to the risk of developing cardiovascular diseases. They may also present an increased risk for falls and possible bone fractures, due to low physical fitness of the lower limbs (ORTIZ *et al*., 2018).

Limitations on patients' physical functionality are frequent, and can directly impact the perception of general quality of life (CANÁRIO *et al*., 2016). However, studies have also demonstrated that Physical Activity (PA) practice can assist in increasing patient's functional status and quality of life (LUGO *et al*., 2019).

Both aerobic and resistance exercises have brought adaptive responses that consequently lead to benefits for cancer patients. Predominantly aerobic training can assist in increasing cardiorespiratory capacity and consequently VO_{2peak}, and also in the long-term decrease inflammatory marker such in c-reactive protein. While the predominance of resistance exercises can help to increase strength and muscle mass (HOJMAN *et al*., 2017).

Besides, PA can provide decrease of the occurrence, recurrence, progression and mortality cases from such illness (CORMIE *et al*., 2017; LUGO *et al*., 2019) and it can contribute substantially to decrease the symptoms of fatigue, and to increase the functional status and the perception of the patient's health (HOJMAN *et al*., 2017).

However, evidences suggest the benefits to be achieved with the practice of physical exercises by cancer patients, it is known that these patients have insufficient levels of this practice (WOOD *et al*., 2020) and these levels can continue low even after the conclusion of the treatment (ORTIZ *et al*., 2018).

A better understand about factors that can influence the physical activity level of patients with cancer diagnosis is required to make public police to improve it. Thus, the aims of this study were to verify the level of physical activity and its association with the characteristics of the patients' profile.

METHODS

It is a field study with a cross-sectional design with 247 patients, that was conducted in two specialized centers for cancer treatments that belong to a Regional Network of Health Care responsible for 81% of the treatment of cancer in their region, in the city of Piracicaba, Brazil (FOPS, 2014).

The study inclusion criteria consisted of patients with cancer diagnose, those 18 years of age or older, and those who agreed to sign the written informed consent form. It was excluded patients that stopped the interview before its end.

This study complied with the tenets of the Helsinki Declaration and it was approved by Ethics Committee in Research of a University in São Paulo – Brazil (approval number: 93/2015).

Each participant was approached at the oncology outpatient clinics while he (she) was waiting to be attended. A profile questionnaire was used to identify characteristics such as sex, age, type of cancer and treatment phase.

To check the Physical Activity (PA) level achieved by patients it was used the International Physical Activity Questionnaire (Ipaq – Bref), validated for the Brazilian population (MATSUDO *et al.*, 2001). This instrument is widely used to subjectively evaluate the subject perception about their physical activity level in the last week.

The classification of patients' PA level, was made through the calculation of the number of metabolic equivalents (Met's-minutes / week) corresponding to each type of activity referred, being the walk = 3.3 * (minutes) * (days), considered in the present study as low activity, moderate activity = 4.0 * (minutes) * (days) and activity vigorous = 8.0 * (minutes) * (days), with the total Met's-minutes / week being the sum of the results.

The data normality of the data was checked with Shapiro Wilk (S-W) and Kolmogorov-Smirnov (K-S) tests (with Lillie for correction). The results showed a non-normal distribution of the sample ($p<0.05$). Thus, no parametric measures were used.

Data were expressed by the descriptive statistics (mean, dispersion measures and frequencies). The qui-square for categorical variables and the Spearman´s correlation test were used to verify associations between profile of the patient and PA. The multinomial logistic regression test was used to evaluate the associations of clinical profile characteristics upon PA level. All statistical analyses were performed using the Statistical Package for the Social Sciences (SPSS 20.0). The statistical significance accepted was 5% ($p<0.05$).

RESULTS

The mean age of the patients were 60.08 ± 13.12 years old with a range of 24 to 86. About 56.3% were elderly, 62.3% were female, the most of them were diagnosed with breast cancer (32.4%) and were in the post treatment phase (61.5%). Table 1.

Table 1 – Characteristics of participants overall stratified by physical activity level (n= 247)

Variables		Physical Activity Level					
		L n(%)	M n(%)	H n(%)	Total n(%)	X^2	p-value
Sex	Female	93 (37.5)	47 (18.6)	15 (6.1)	154 (62.3)	3.644	0.162
	Male	60 (24.3)	30 (12.1)	3 (1.2)	93 (37.5)		
Age	18 – 39	13 (5.3)	4 (1.6)	3 (1.2)	20 (8.1)		
	40 – 59	51 (20.6)	27 (10.9)	10 (4.0)	88 (35.6)	7.461	0.113
	≥ 60	89 (36.0)	45 (18.2)	5 (2.0)	139 (56.3)		
Surgery	Yes	105 (42.5)	55 (22.3)	9 (3.6)	169 (68.4)	3.378	0.185
	No	48 (19.4)	21 (8.5)	9 (3.6)	78 (31.6)		
Cancer	Breast	43 (17.4)	30 (12.1)	7 (2.8)	80 (32.4)		
	Prostate	30 (12.1)	16 (6.5)	2 (0.8)	48 (19.4)		
	Hematological	17 (6.9)	9 (3.6)	5 (2.0)	31 (12.6)		
	Gastrointestinal	22 (8.9)	4 (1.6)	1 (0.4)	27 (10.9)	14.676	0.260
	Head and Neck	10 (4.0)	2 (0.8)	1 (0.4)	13 (5.3)		
	Ginecological	6 (2.4)	5 (2.0)	1 (0.4)	12 (4.9)		
	Others	25 (10.1)	10 (4.0)	1 (0.4)	36 (14.6)		
Treatment Phase	In treatment	67 (27.1)	22 (8.9)	6 (2.4)	95 (38.5)	4.943	0.084
	Post treatment	86 (34.8)	54 (21.9)	12 (4.9)	152 (61.5)		
Type of Treatment	Chemotherapy	36 (37.9)	12 (12.6)	4 (4.2)	52 (54.7)		
	Radiotherapy	14 (14.7)	9 (9.5)	1 (1.1)	24 (25.3)	6.782	0.341
	Chemo and Radio	9 (9.5)	0 (0.0)	0 (0.0)	9 (9.5)		
	Others	7 (7.4)	2 (2.1)	1 (1.1)	10 (10.5)		
Time since diagnosis	≤1	47 (19.0)	10 (4.0)	1 (0.4)	58 (23.5)		
	≤ 5 years	78 (31.6)	47 (19.0)	11 (4.5)	136 (55.1)	17.140	0.009*
	≤ 10 years	18 (7.3)	16 (6.5)	3 (1.2)	37 (15.0)		
	> 10 years	10 (4.0)	3 (1.2)	3 (1.2)	16 (6.5)		

Note. L=Low; M=Moderate; H=High; X^2=Chi-Square; P-Value= Significance values; *= $p<0.05$.

Regarding physical activity level (PA), measured according to the Ipaq-Bref, the vast majority of patients (61.9%) showed low level of PA. The mean total score found was 1231.55 ± 1818.22 Met's-minutes/week and the values ranged from zero to 10.542.00 Met's-minute/week. Table 2.

Table 2 – Mean, minimum and maximum values of Ipaq-Bref of all patients (n= 247)

Categorias (Ipaq-Bref)	n (%)	Mean (MET's)	Mínimum (MET's)	Maximum (MET's)
Low	153 (61.9%)	367.20 ± 655.73	0.00	5826.00
Moderate	75 (30.4%)	2015.02 ± 1569.01	351.00	8400.00
High	19 (7.7%)	5099.13 ± 2594.67	1680.00	10542.00

It was found an association just between the age and met's-minute/week (rho=-0.145; $p<0.05$). Patients undergoing treatment (38.5%) had low level of PA. Table 3.

Table 3 – Mean, minimum and maximum values of Ipaq-Bref of patients
in treatment (n= 95)

Categorias (Ipaq-Bref)	n (%)	Mean (MET's)	Mínimum (MET's)	Maximum (MET's)
Low	66 (69.5)	311.94 ± 485.07,	0.00	2019.00
Moderate	23 (24.2)	1572.80 ± 867.70	351.00	4053.00
High	6 (6.3)	3141.75 ± 1982.89	1680.00	6819.00

Regression analyses showed that the years of diagnosis were associated with the level of PA. Less than one year of diagnosis can be a significant predictor of low physical activity level, (OR= 28.457; 95% CI 1.706 – 474.589; p= 0.020) and for moderate physical activity level (OR= 29.578; 95% CI 1.409 – 620.746; p= 0.029), p<0.05.

Diagnosis received from one to five years, and more than 10 years, also can be a significant predictor of low physical activity level (OR= 9.792; 95% CI 1.283 – 74.744; p= 0.028 and OR= 14.004; 95% CI 1.282 – 152.993; p= 0.031, respectively). No significant association was found between the other variables. Table 4.

Table 4 – Logistic regression analysis between the sociodemographic profile and
the level of physical activity

Variables		OR	CI	p-value	OR	CI	p-value
			Light PA			Moderate PA	
Diagnosis time	≤ 1 year	28.457	1.706 – 474.589	0.020*	29.578	1.409 – 620.746	0.029*
	≤ 5 years	3.981	0.680 – 23.307	0.125	9.792	1.283 – 74.744	0.028*
	≤10 years	3.923	0.449 – 34.299	0.217	14.004	1.282 – 152.993	0.031*
Sex	Female	0.151	0.011 – 2.029	0.154	0.078	0.005 – 1.145	0.063
	Male	0[b]			0[b]		
Age	18 – 39	0.368	0.056 – 2.432	0.299	0.242	0.030 – 1.927	0.180
	40 – 59	0.180	0.041 – 0.791	0.023	0.200	0.044 – 0.912	0.038
	≥ 60	0[b]			0[b]		
Surgery	Yes	4.978	0.941 – 26.339	0.059	4.547	0.804 – 25.703	0.087
	No	0[b]			0[b]		
Cancer	Breast	0.290	0.031 – 2.755	0.281	0.561	0.055 – 5.778	0.627
	Prostate	0.129	0.003 – 5. 172	0.277	0.099	0.002 – 4.356	0.231
	Gastrointestinal	0.600	0.031 – 11.463	0.735	0.287	0.013 – 6.542	0.434
	Head and Neck	0.324	0.011 – 9.208	0.510	0.112	0.003 – 4.248	0.238
	Hematological	0.326	0.023 – 4.675	0.409	0.448	0.028 – 7.202	0.571
	Gynecological	0.255	0.012 – 5. 463	0.382	0.640	0.028 – 14.823	0.781
	Others	0[b]			0[b]		
Treatment Phase	Treatmente	0.818	0.234 – 2.862	0.753	0.621	0.168 – 2.295	0.475
	Post-treatment	0[b]			0[b]		

Note. *p<0.05; OR=*Odds Ratio*; CI=*Confidence Interval*; PA= Physical Activity. Vigorous PA= Categorical reference for the regression.

DISCUSSION

The present study sought to verify the levels of physical activity presented and possible associations of the sociodemographic and clinical profile of patients with cancer, between these levels. It was possible to verify that cancer patients both during and after treatment had low levels of physical activity.

In this study, most parte of patients showed low physical activity level (61.9%). Approximately 30.4% of patients showed moderate level of physical activity and only 7.7% showed high level. Among just those who were in the treatment phase, 54.7% were undergoing chemotherapy and most of them showed low physical activity levels (37.9%).

Evidences have shown that low physical activity levels can be accentuated by type or phase of treatment. Brown *et al*. (2014) found that aromatase inhibitors treatment and consequent musculoskeletal symptoms can be factors in the reduction of physical activity.

Some barriers that prevent adherence to physical activity have also been reported, such as those related to physical factors such as overweight, obesity (COLETTA *et al*., 2019), pain, fatigue, and low self-esteem, those related social factors, such as the lack of time and motivation, besides the lack of encouragement and support from the health team for referral to such activities (BROWALL *et al*., 2018).

In the present study was found a negative association between age and PA level, indicating that the older the patient is, the less time for physical activity will be spent. These findings corroborate with some evidences that older patients tend to have more sedentary behavior (SWEEGERS *et al*., 2019) and physical activity practice tends to reduce with age increases, which may have for each year a reduction in 1.3% (SCHRACK *et al*., 2014). Lack of energy, fatigue, circumstances of daily life, physical limitations, lack of knowledge of limbs or the ability of your own body to perform the exercises and existing comorbidities, are barriers reported by older patients (MIKKELSEN *et al*., 2019).

The regression analyses showed that receiving diagnosis less than a year may be a predictor of low physical activity level. These results corroborate those of Sweegers *et al*. (2019) where patients with less than 12 months of diagnosis were those who showed a higher level of sedentary behavior, and less time since diagnostic can be a significant barrier to engaging in physical activity (ROMERO *et al*., 2018).

Coletta *et al*. (2019) found that the set of surgery, chemotherapy and radiotherapy are significant factors for non-adherence to the appropriate level of physical activity in patients with breast cancer. During treatment patients are concerned with saving energy to handle the often invasive procedures, in addition can report fear of possible infections and injuries (BROWALL *et al*., 2018).

In the present study diagnosis from one to more than 10 years can be predictors of moderate PA. It is possible to verify that patients with cancer diagnosis tend to decline from vigorous PA. Cancer patients have reported a preference for moderate intensity activities (KABAK *et al*., 2020).

However, in addition to the barriers related to the patient's health condition, there are also other factors that may imply non-adherence. As exposed in a study by Browall *et al*. (2018), one of the barriers to non-adherence to the practice of physical activities is precisely the lack of information, and even conflicting information about this practice, on the part of the active health team, leading this patient to feel afraid of moving, both during and after treatment.

It is possible to observe the importance of disseminating information relevant to the practice of PA, mainly from the health team and qualified professionals to apply these practices to these patients. The practice of PA can be applied from the initial stages of disease decay, to palliative treatments or after the elimination of cancer (HOJMAN *et al.*, 2017).

Encourage the practice of PA in cancer patients during the entire treatment is important, considering that it has been observed that those patients who maintain an adequate level of this practice, from pre to post diagnosis, have a better quality of life related to the mental and physical aspect (FARRIS *et al*., 2017).

It was possible to verify that although there is a certain tendency for patients to increase their level of physical activity after a few years of diagnosis and most likely after the completion of invasive treatments, it appears that most of these patients still do not meet the ideal levels of physical activity practice so that benefits can be achieved.

Park *et al*. (2020) found that in patients after treatment the greater the physical activity of moderate to vigorous intensity, the greater the quality of life, the physical function, and the lower the levels of pain, fatigue and dyspnea. These correlations are not found in patients with low levels of physical activity.

The substitution of 30 minutes of sedentary behavior for 30 minutes of vigorous to moderate physical activity is capable of contributing to the patient's physical and functional well-being (WELCH *et al.*, 2019). Moderate to vigorous physical activity programs, which combine aerobic and resistance exercises, have also shown improvement in depressive conditions, cardiorespiratory capacity and muscle strength (DIELI-CONWRIGHT *et al.*, 2018).

In this case, it is necessary to disclose the benefits of moderate to vigorous PA for medical teams, as well as for patients, especially for the elderly and undergoing treatment, as the psychosocial burden of cancer for society can be greater than that cost of physical activity programs.

CONCLUSIONS

The literature showed that cancer diagnosis may result in some consequences for patients; long and invasive treatements can unleash side effects that can affect physical aspects, as well as general quality of life, while evidences showed that physical activity practice can help both during treatment and post treatment, increasing affect functions. Despite of this, the results of this study showed that patients tend to diminish the PA levels after diagnosis.

It was also found a tendency in physical activity decrease during the treatment and in post treatment phase, and this reduction can be more pronounced in elderly patients. Less than one year of diagnosis can be a significant predictor of low and moderate physical activity level. Diagnosis received from one to five years and more than 10 years also can be a significant predictor of moderate physical activity level.

Thus, the obtained data allow to observe the necessity of implementation of public polices to spread information and to offer PA programs to patients with cancer are needed, to all ages and all phases of treatment, especially in beginning of the treatment.

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