

Relationship between physical activity and menopausal symptoms

Relação entre atividade física e sintomas da menopausa

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Resumo

O objetivo deste estudo transversal foi analisar a relação entre atividade física (AF) total diária e os sintomas da menopausa, uma vez que a influência da AF sobre os sintomas da menopausa, tem sido examinada principalmente através de uma das componentes da atividade física total, que é o exercício estruturado. Os sintomas da menopausa e a AF foram avaliados em 1011 mulheres peri (Peri-MM) e pós menopausadas (Pós-MM), utilizando o índice de Kupperman e o Questionário Internacional de Atividade Física - IPAQ. Após a divisão de cada grupo em subgrupos de acordo com a frequência de cada sintoma (A: ausência, B: baixa, C: moderada, D: elevada frequência), as Peri-MM que relataram elevada frequência de fogachos, problemas de memória e zumbidos nos ouvidos demonstraram uma menor atividade física total comparativamente às Peri-MM com menor frequência destes sintomas. As Pós-MM que reportaram elevada frequência de vertigem e zumbido nos ouvidos, apresentaram também menor AF total e/ou caminhada do que as Pós-MM com menor frequência destes sintomas. A AF diária não parece determinar a ocorrência dos sintomas da menopausa, mas parece diminuir a frequência de alguns deles, especificamente com um acúmulo de ~100 min de AF total e/ou ~50 min de caminhada, particularmente em Peri-MM.

Palavras Chave: menopausa. atividade motora. mulher.

Abstract

The purpose of this cross-sectional study was to analyze the relationship between total daily physical activity (PA) and menopausal symptoms, since the influence of PA on menopause related symptoms has mainly been examined through a component of total PA, namely, structured exercise. Menopausal symptoms and PA were evaluated in 1011 peri (Peri-MW) and postmenopausal women (Post-MW) using the Kupperman index and the International Physical Activity Questionnaire (IPAQ). After dividing each group into subgroups according to the frequency of each symptom (A-absence, B-low, C-moderate, D-high), Peri-MW who report high hot flashes, memory problems and humming ears, presented less total PA compared to those who reported less frequent symptoms. Also Post-MW reporting high vertigo and humming ears revealed less total PA or walking time than Post-MW with lower frequency of symptoms. Everyday PA does not seem to determine the occurrence of menopausal symptoms, but it does appear to lessen the frequency of some of them, specifically with a daily accumulation of ~100 min of total PA and/or ~50 min of walking, particularly in Peri-MW.

Key words: menopause. physical activity. women.

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INTRODUCTION

Menopause is a process of ovarian failure, which begins with the transition from the reproductive to the non-reproductive phase, occurring normally, after the age of 40 years. During this process, approximately 60 to 90% of women refer to some kind of symptomatology, attributing it mostly to the hypoestrogenism state¹. Women's complaints are commonly associated with vasomotor, psychological and urogenital symptoms, with an important effect on their sexual experiences².

The most specific and frequent symptoms of menopause are hot flashes, perceived in 86% of women. These occurrences tend to last one to five years, causing a sudden redness over the face and torso, followed by an intense body heat and transpiration. They might appear at anytime and interfere with daily activities. Frequent physical complaints such as fatigue, pain and discomfort, and lack of energy and working capacity affect 96% of women, while psychological symptoms such as depression, anxiety, sadness or irritability appear in 63% of the cases³.

Overall, the evidence regarding the influence of physical activity on menopausal symptoms comes from exercise intervention studies (formal physical activity). Programs with an aerobic component of at least moderate intensity, at 60 minutes per session with 2-3 sessions per week for 3 to 12 months, revealed a reduction in the frequency of general symptomatology^{4,7} and vasomotor symptoms and an increase in psychological health and quality of life⁸. In one study, yoga also appeared to help diminish vasomotor symptoms⁹. However, the effect of yoga on menopausal symptoms are inconclusive¹⁰.

A small number of investigations have been carried out concerning relationships between habitual physical activity (formal and informal physical activity) and menopausal symptoms. The results of these studies indicate that physically active women present lower frequencies and/or intensities of psychological and vasomotor symptoms^{11,12} compared to inactive women, with no physical activity intensity discrimination or duration quantification. Therefore, the objective of this study was to analyze relationships between intensity and duration of daily physical activity and menopausal symptoms in middle-aged women.

METHODOLOGY

The sample size, for convenience of women aged 45 to 59 years of the city of Florianópolis, Santa Catarina, Brazil, was estimated according to the latest census of the Brazilian Institute of Geography and Statistics (at least 1000 women for a confidence level of 95%). Thus, 1011 women were included in this cross-sectional study in with a mean age of 51.0 ± 4.2 years, divided into two groups according to reproductive function, namely, perimenopausal (N = 370) and postmenopausal (N = 641). In each of these groups, the women were also subdivided according to the frequency of menopausal symptoms, including the A (absence), B (low - occasionally), C (moderate - repeatedly) and D (high - all the time symptoms) subgroups. Since not all women answered all questions, the sample size ranged between 920-1011, according to response to each variable. Participants were invited and recruited in institutions with education, health, sports, religion or assurance providing services. All of the women were informed regarding the goals and procedures of the study and signed an informed consent. This cross-sectional

study was approved by the Research Ethics Committee of Santa Catarina University (protocol number 15/2007).

Women with serious illnesses, namely diabetes, liver disease, breast or endometrial cancer, current use of psychotropic drugs were excluded.

Menopausal status

Each participant was questioned about the length of time that had passed without a menstrual cycle. Women with 1 to 11 months of amenorrhea were considered perimenopausal, and postmenopausal women were those with 12 months or more of amenorrhea¹³. Additional information was gathered about the cause for the end of each woman's menstrual cycle (natural or surgical). From the entire sample, 18% of the women went through menopausal surgery, characterized by ovary excision due to tumors or local cysts, pelvic illness (chronic or serious) or endometriosis.

Menopausal symptoms

Menopausal symptoms were evaluated by the Kupperman index, that is a questionnaire composed by 11 symptoms or complaints (vasomotor symptoms, insomnia, paresthesy, nervousness, melancholy, vertigo, weakness, arthralgia/myalgia, headache, palpitation and noise). Six more questions were included to help obtain more complete information about the climacteric symptoms, namely, minor memory capacity, sexuality (diminished libido, sexual activity and satisfaction), urinary complaints (urinary difficulty and incontinence of effort), vaginal dryness (dryness sensation and difficult coitus), anxiety and weight gain¹⁴. The answers about occurrence frequency of each symptom were based on a Likert scale where 0 = absence, 1 = low (occasionally), 2 = moderate (repeatedly) and 3 = high (all the time). After adding the points for all symptoms, the participants were characterized as having an absence of symptoms, low symptoms (up to 19 points), moderate symptoms (from 20 to 35 points), or high symptoms (more than 35 points).

Physical Activity

Physical activity was assessed by the International Physical Activity Questionnaire (IPAQ - short version)¹⁵. Daily time spent in walking, moderate, and vigorous PA was estimated taking into account blocks of at least 10 minutes of continuous activity, in various environments, including work, domestic, leisure, recreation and sport. Total physical activity was calculated as the sum of these items.

Body Composition, Health Status, and Education Level

Information regarding body mass and height (self referred), education, specifically the years of school, the number of chronic illnesses, and treatment with hormone replacement therapy was obtained through questionnaires self-completed by participants.

Statistical Analyses

After verifying the normality through the Kolmogorov Smirnov test, a comparison of the variables related to age, body composition, years of school and physical activity between the peri- and postmenopausal women groups was carried out with the T Test for independent samples. For comparing menopausal symptoms between the two groups, the Chi-square homogeneity test was used. The association between

menopausal symptoms and physical activity was analyzed separately for each group of women through Spearman's linear correlation. Finally, each group was divided into four subgroups according to the frequency in each symptom (A= absence, B= low, C= moderate and D= high), with significant correlation to physical activity variables. Comparison of time spent in physical activity between these four subgroups was made by ANOVA and the Bonferroni Post-Hoc Test. The level of significance was set at a 95%. Statistical analyses were performed using SPSS Version 16.0 (SPSS Inc, Chicago, Illinois).

RESULTS

Table 1 presents the characterization of the sample. The postmenopausal women were older, shorter, had a greater prevalence of illnesses and used more hormonal replacement therapy than perimenopausal women. However, most peri and postmenopausal women reported not suffering any illnesses (58%) and not participating in hormonal replacement therapy (78.8%). Differences between the groups in the other variables were not detected. For the overall sample population, the average age of menarche was 12.8 years and of menopause was 45.3 years, with an average range between 32 and 57 years (45.6 years with an age range between 41 and 57 years, excluding surgical menopause). The average years of education reached 10.5, indicating that the majority of the women studied until high school. The average body mass index was 25.2 Kg/m², revealing that a large percentage of women, namely 45% were excess of body mass. Approximately 21% of the women used the hormone replacement therapy for about five years. The physical activity of the participants, including daily time spent in walking, moderate, vigorous, moderate plus vigorous or total physical activity, are also present in the Table 1. Differences in these variables between groups were not detected, except for vigorous physical activity, where postmenopausal women spent more time at this intensity level than perimenopausal women. Walking was the most frequent form of physical activity chosen by both peri and postmenopausal women. Total physical activity reported values (walking + moderate + vigorous) were above the current recommendations for the

adult population (~90 vs. 30 min/d).

The prevalence and intensity of menopausal symptoms are presented in Table 2. Only 4-5% of all women lacked any symptoms (5.1% and 3.9% of peri and postmenopausal women, respectively). Postmenopausal women presented with a higher percentage of symptom occurrences than perimenopausal women, excluding headaches, vertigo, and humming ears, for which there were no observed differences between groups. Considering the total sample, the most prevalent symptoms were muscle and articular pain, fatigue, anxiety, minor memory capacity, irritability, reduction of sexual interest, headaches and weight gain, occurring in 60-69% of all women. Concerning symptom intensity, the majority of the participants (69%) reported moderate intensity symptoms, including a higher number of postmenopausal (73.1%) than perimenopausal women (62.7%).

The associations between physical activity and menopausal symptoms in peri and postmenopausal women are presented in Tables 3 and 4, respectively. The results indicate a negative association between walking and palpitations, as well as between total physical activity and humming ears, in both peri and postmenopausal women. There were also negative associations between walking and memory problems in perimenopausal women and vertigo in postmenopausal women, and between total physical activity and hot flashes, muscle and articular pain, and fatigue in perimenopausal women.

When each group of peri and postmenopausal women was divided into four subgroups according to the frequency of each menopausal symptom significantly associated with a physical activity variable, it was observed a lower time spent in total physical activity in women who experienced a high occurrence frequency than in women with low to moderate symptoms of hot flashes, memory problems (in perimenopausal) and humming ear (in peri and postmenopausal). Furthermore, in postmenopausal women, walking time was reduced in those who also reported a high frequency of vertigo in comparison to those without vertigo. Regarding palpitations, no difference was observed in walking time between the subgroups in either peri or

Table 1 Characteristics of the study participants

	n	Total	PeriM	PostM	P value
Chronological age (yrs)	1011	49.5±5.1	45.3±2.8	52.0±4.5	<0.001
Age at menarche (yrs)	986	12.8±1.7	12.7±1.5	12.9±1.8	0.051
Age at menopause (yrs)	634	-	-	45.4±3.5	-
Body mass (kg)	1011	65.2±11.0	65.3±10.8	65.2±11.1	0.812
Body height (m)	1011	1.60±0.06	1.61±0.06	1.60±0.06	0.032
Body mass index (kg/m ²)	1011	25.2±4.0	25.1±3.9	25.3±4.0	0.431
Walking (min/d)	994	48±43	46±40	50±45	0.284
Moderate PA (min/d)	995	28±40	29±40	27±39	0.420
Vigorous PA (min/d)	995	15±32	12±30	16±34	0.009
Mod+Vig PA (min/d)	995	43±56	41±52	44±58	0.941
Total PA (min/d)	994	90±75	87±68	93±78	0.508
Education (yrs)	1010	10.5±3.1	10.8±3.1	10.4±3.1	0.097
Illnesses (%)	1010				<0.001
No illness		58.2	67.3	53.0	
One illness		26.1	22.7	28.2	
Two illnesses		10.2	6.4	12.4	
Three or more illnesses		5.2	3.5	6.2	
Hormonal replacement (%)	1005	21.1	10.9	26.9	<0.001

PA, physical activity; PeriM, perimenopausal women; PostM, postmenopausal women.

Table 2

Comparison of menopausal symptoms prevalence between peri and postmenopausal women

	n	Total	PeriM	PostM	P value
Hot flashes (%)	947	53.4	42.0	60.0	<0.001
Palpitations (%)	936	35.7	30.1	39.1	0.025
Sleeping trouble (%)	941	55.8	47.6	60.7	<0.001
Muscle/art pain (%)	947	68.7	60.3	73.4	<0.001
Fatigue (%)	941	67.6	60.3	71.7	0.001
Headache (%)	940	59.8	55.4	62.3	0.111
Irritability (%)	937	63.3	57.2	66.8	0.013
Vertigo (%)	920	33.0	31.5	33.8	0.186
Anxiety (%)	946	64.8	58.6	68.4	0.002
Sadness (%)	933	58.7	51.6	62.6	0.003
Memory problem (%)	946	63.4	53.7	69.1	<0.001
Decreasing sex (%)	931	60.7	50.3	66.7	<0.001
Leaking urine (%)	921	26.8	21.4	30.0	0.016
Vaginal dryness (%)	926	39.5	24.2	48.4	<0.001
Weight gain (%)	931	59.8	51.0	65.0	<0.001
Skin alteration (%)	941	56.9	46.1	63.0	<0.001
Humming in the ear (%)	953	16.3	14.5	17.3	0.520
Symptoms (%)	1011				<0.001
Absence		4.3	5.1	3.9	
Light		21.1	27.8	17.3	
Moderate		69.3	62.7	73.1	
Intense		5.1	4.3	5.6	

PeriM, perimenopausal women; PostM, postmenopausal women.

Table 3

Correlation between menopausal symptoms and physical activity in perimenopausal women

	Walking	Mod PA	Vig PA	Mod+Vig	Total PA
Hot flashes	-0.091	-0.020	-0.011	-0.020	-0.103*
Palpitations	-0.109*	-0.029	0.039	-0.018	-0.096
Sleeping trouble	-0.029	-0.041	-0.065	-0.064	-0.070
Muscle pain	-0.069	-0.098	-0.042	-0.081	-0.104*
Fatigue	-0.046	-0.110*	-0.031	-0.107*	-0.170*
Headache	0.036	-0.049	-0.001	-0.039	0.014
Irritability	-0.013	-0.061	-0.001	-0.030	-0.047
Vertigo	-0.020	-0.065	-0.057	-0.104*	-0.076
Anxiety	-0.007	-0.061	0.008	-0.027	-0.037
Sadness	0.002	-0.072	-0.035	-0.080	-0.067
Memory problem	-0.134*	-0.107*	-0.081	-0.139**	-0.195**
Decreasing sex	0.045	-0.007	0.027	0.023	-0.011
Leaking urine	-0.000	-0.003	-0.007	-0.012	0.001
Vaginal dryness	-0.044	-0.042	0.061	-0.004	-0.032
Weight gain	-0.052	-0.028	-0.001	-0.014	-0.052
Skin alteration	-0.062	-0.050	-0.012	-0.028	-0.062
Humming in ear	-0.125*	-0.132*	-0.132*	-0.187**	-0.234**
All symptoms	-0.060	-0.078	0.014	-0.088	0.007

PA, physical activity; Mod, Moderate; Vig, Vigorous; Menopause symptoms: absence of symptoms = 0; light = 1; sometimes = 2; all the time = 3; *p<0.05; **p<0.01.

postmenopausal women. Finally, concerning muscular/articular pain and fatigue, no difference was demonstrated between the subgroups in perimenopausal women (Table 5).

DISCUSSION

The main purpose of this research was to analyze the relationship between every day physical activity and menopausal symptoms in middle-aged women. The results indicate that physical activity does not seem to determine the absence or occurrence of any menopausal symptom. Nevertheless, the frequency of some symptoms might be influenced by physical activity. A daily accumulation of total physical activity around 95 – 100 minutes (1h35min – 1h40min per day), appears to prevent a high frequency of hot flashes

and memory problems in perimenopausal women, and of humming ears, in both peri and postmenopausal women. After menopause, accumulating ~56 minutes of walking per day can prevent a high occurrence of vertigo. These values are two to three folds higher than the current health-enhancing physical activity recommendations for adult people to reduce the risk of cardiovascular disease and diabetes, colon and breast cancer, which stipulate 30 minutes per day on five or more days a week at a moderate intensity or 20 minutes per day on three days at a vigorous intensity¹⁶. However, similarly high values of physical activity were suggested as necessary to reduce cardiovascular risk (116min/d)¹⁷ and improve femoral neck bone mass distribution (92 min/d)¹⁸ in children.

Evidence shows that walking 30 – 60 minutes per day,

Table 4

Correlation between menopausal symptoms and physical activity in postmenopausal women

	Walking	Mod PA	Vig PA	Mod+Vig	Total PA
Hot flashes	-0.073	0.002	-0.043	0.016	-0.034
Palpitations	-0.097*	-0.105**	-0.051	-0.084*	-0.098*
Sleeping trouble	-0.021	0.030	-0.015	0.034	0.020
Muscle pain	-0.071	-0.036	-0.058	-0.041	-0.052
Fatigue	-0.045	0.035	-0.053	0.017	0.014
Headache	-0.077	-0.008	-0.022	-0.000	-0.015
Irritability	-0.044	-0.010	-0.027	-0.010	-0.021
Vertigo	-0.100*	-0.071	0.013	-0.024	-0.060
Anxiety	-0.039	0.046	0.004	0.056	0.023
Sadness	0.005	-0.006	0.004	0.015	0.041
Memory problem	-0.059	0.002	-0.025	0.009	-0.003
Decreasing sex	-0.028	0.018	-0.024	0.004	0.006
Leaking urine	-0.046	0.032	-0.016	0.020	-0.006
Vaginal dryness	-0.005	-0.042	-0.011	-0.032	-0.005
Weight gain	-0.030	0.027	0.017	0.041	0.023
Skin alterat.	0.011	0.066	-0.021	0.054	0.062
Humming in ear	-0.156**	-0.121**	-0.153**	-0.175**	-0.238**
All symptoms	0.030	-0.073	0.004	-0.076	-0.044

PA, physical activity; Mod, Moderate; Vig, Vigorous; Menopause symptoms: absence of symptoms = 0; light = 1; sometimes = 2; all the time = 3; *p<0.05; **p<0.01.

Table 5

Menopausal symptoms and physical activity in peri and postmenopausal women

	A	B	C	D	P value	Post-hoc
Perimenopause						
Walking (min/d)						
Palpitations	37±20	48±40	45±43	18±24	0.081	---
Total PA (min/d)						
Hot flashes	49±54	89±67	93±70	72±65	0.035	C>D
Muscle/articulation pain	76±67	93±71	87±67	75±64	0.374	---
Fatigue	71±61	92±70	88±68	78±67	0.381	---
Memory problem	59±60	98±72	85±63	58±58	0.006	B>D
Humming in the ear	50±51	94±71	62±37	46±17	0.001	B>D
Postmenopause						
Walking (min/d)						
Palpitations	48±45	51±45	46±44	34±40	0.152	---
Vertigo	56±54	53±45	41±40	42±45	0.019	A>D
Total PA (min/d)						
Humming in the ear	69±82	103±82	58±40	55±29	0.001	B>D

PA, physical activity; ANOVA was used to compare time spent (min/d) in walking and total physical activity, between 4 subgroups (A - absence of symptoms, B - low, C - moderate, D - high) according to the frequency of each menopause symptom occurrence.

can reduce vasomotor and psychological symptom intensity, specifically irritability, depression, anxiety and memory problems^{19,12}, if performed five times a week. This walking activity can also reduce general climacteric symptomology if practiced three times a week^{20,21}. In some other studies, there were no associations between physical activity and vasomotor symptoms^{4,12,22,23}. Nevertheless, physical activity seems to improve overall health^{12,22} and diminishes memory problems²³, suggesting that menopausal symptoms can be prevented and encouraging middle-aged women to acquire regular habits of physical activity^{24,25}. Other authors have reported an association between increased physical activity and reduced vasomotor symptoms. However, this relationship was only detected in women with a serious history of depression, or in those with concomitant body weight loss²⁶, or in those women between 35 and 40 years old, but not after this age⁷. Stretching exercises (compared to a moderate

aerobic effort), in overweight women, as well as respiratory exercises (compared to muscular relaxation) can also improve vasomotor symptoms⁷. Nevertheless, aerobic physical activity appears to be most effective in preventing climacteric symptoms, due to cardiovascular fitness improvement¹¹. In this context, aerobic exercise has been recommended in the treatment of women with climacteric symptoms, especially in relieving vasomotor and psychological (depression and anxiety) symptoms^{27,28}.

In the present study, no differences in physical activity were detected between the groups of women, according to the frequency of palpitations. However, it was observed in both groups of peri and postmenopausal women that participants who spent more time physically active, particularly by walking, had a lower occurrence of palpitations. Heart complaints are related to cardiovascular illnesses, which are the principal cause of death among women after menopause²⁹.

The majority of middle-aged women revealed a moderate prevalence of climacteric symptomatology and there were no differences in prevalence of symptoms between women with surgical and natural menopause or between women with and without hormone replacement therapy. Regardless of an increased prevalence compared to other studies with Brazilian women (69% vs. 41-52%), the more prevalent symptoms, namely muscular and articular pain, fatigue, anxiety, memory problems and irritability, were identical¹⁹. These symptoms may occur at a lower intensity in physically active middle-aged women¹¹. In the present study, also muscular and articular pain, fatigue and memory problems were symptoms for which a reduced frequency was associated with a greater time spent in physical activity, particularly in perimenopausal women.

The frequency of the more specific menopausal symptoms, hot flashes and vaginal dryness, were the most dramatically different between peri and post-menopause women (18 – 24% of difference). Concerning vaginal dryness, there is no evidence of any relationship with physical activity^{19,30}.

As in the majority of studies about climacteric symptomatology, physical activity was also evaluated by a questionnaire, which represents a limitation of this study since this assessment method is associated with an over estimation of error (35-50%)³¹. Recommendations for health-enhancing physical activity are nonetheless, based on epidemiologic studies which used the same methodology, that is, with a similar error.

CONCLUSIONS

The results indicate that physical activity does not prevent the occurrence of climacteric symptoms, but it can lower the frequency of some symptoms, particularly, a high frequency either before (hot flashes, memory problems and humming ears) or after menopause (vertigo and humming ears). For that, it is necessary to accumulate around 100 minutes of total physical activity and/or walking half of this time. However, as a cross-sectional study, these results may demonstrate the effect of some intense symptoms on daily physical activity instead of reflecting the influence of physical activity on menopausal symptoms. Thus, an active lifestyle can be more easily adopted by middle-aged women who do not present a high frequency of symptoms, particularly during perimenopause, where there was a negative association of physical activity with a greater number of symptoms.

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