

Correlation of Menopausal Symptoms and Quality of Life with Physical Performance in Middle-Aged Women

Relação entre sintomas climatéricos e qualidade de vida no desempenho físico em mulheres de meia-idade

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Abstract

Introduction Some studies have investigated the influence of hormonal deficits and menopausal status in muscle disorders of women. However, it has not been investigated the relationship of both climacteric symptoms and the perception of quality of life with physical performance.

Objective To evaluate the correlation of menopausal symptoms and quality of life with physical performance in middle-aged women.

Methods This cross-sectional study was performed from April to November 2013 in the municipality of Parnamirim, in the Brazilian state, Rio Grande do Norte. The sample was composed of 497 women aged 40–65 years. The Menopause Rating Scale (MRS) and the Utian Quality of Life (UQOL) questionnaire were used to evaluate menopausal symptoms and quality of life respectively. Measures of physical performance included handgrip strength, knee extensor and flexor strengths (using an isometric dynamometer), gait speed, and chair stand test. The correlation between menopausal symptoms and quality of life with physical performance was assessed by Pearson's correlation coefficient with significance set at $p < 0.05$ and a confidence interval of 95%.

Results There was a significant negative correlation between handgrip strength and somatic MRS score ($p = 0.002$) and total MRS score ($p = 0.03$). There was a significant correlation between knee flexor strength and sit-to-stand time and all menopausal symptom areas ($p < 0.05$), except psychological symptoms. There was a positive correlation between physical performance of the knee flexors and quality of life items including occupational ($p = 0.001$), emotional ($p = 0.005$), and total UQOL ($p = 0.01$), but a negative correlation with sit-to-stand time and all quality of life domains ($p < 0.05$).

Keywords

- ▶ menopause
- ▶ quality of life
- ▶ muscle strength

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Conclusion A greater intensity of menopausal symptoms and worse quality of life were related with worse physical performance. Thus, preventive measures should be implemented to avoid adverse effects on physical performance at more advanced ages.

Resumo

Objetivo Avaliar a relação entre sintomatologia climatérica e qualidade de vida no desempenho físico em mulheres de meia-idade.

Métodos Estudo transversal, realizado de abril a novembro de 2013, no município de Parnamirim/RN. A amostra foi composta por 497 mulheres (40 a 65 anos). Menopause Rating Scale (MRS) foi utilizada para a avaliação dos sintomas climatéricos e Utian Quality of Life (UQOL) para a qualidade de vida. Medidas de desempenho físico foram compostas pela força de preensão manual, força de extensores e flexores de joelho (usando um dinamômetro isométrico), velocidade de marcha e tempo de sentar-levantar. A relação da sintomatologia climatérica e qualidade de vida com o desempenho físico foi avaliada pelo teste de correlação de Pearson, sendo considerado um $p < 0,05$ e intervalo de confiança de 95%.

Resultados Houve correlação significativa negativa da força de preensão quanto ao MRS somático ($p = 0,002$) e total ($p = 0,03$). Para força de flexores de joelho e tempo de sentar-levantar, houve correlação significativa para todos os domínios dos sintomas climatéricos ($p < 0,05$), exceto o psicológico. Entre qualidade de vida e desempenho físico, houve correlação positiva dos flexores de joelho quanto ao UQOL ocupacional ($p = 0,001$), emocional ($p = 0,005$) e total ($p = 0,01$), e negativa para o teste sentar-levantar quanto a todos os domínios ($p < 0,05$).

Conclusão A maior intensidade dos sintomas climatéricos e a pior qualidade de vida apresentaram relação com piores desempenhos. Dessa forma, medidas de prevenção devem ser implementadas a fim de evitar consequências negativas no desempenho físico em idades mais avançadas.

Palavras-chave

- ▶ climatério
- ▶ qualidade de vida
- ▶ força muscular

Introduction

The aging process features a natural decline of physiological functions, including loss of bone mass, muscle mass, and strength.¹ In Brazil as well as worldwide, population aging is marked by feminization, as women are achieving greater longevity than men.² Although they live longer than men, women present worse physical performance results at more advanced ages, suggesting the influence of sex-related factors in performance changes with aging.³

Muscle mass in women tends to decrease gradually after the third decade of age, and displays an accelerated decline after the fifth decade, the average period of the occurrence of menopause.⁴ Menopause represents a biological milestone in the female lifespan, signaling the passage from a reproductive to a non-reproductive phase⁵ that is primarily related to decreases in estradiol and symptoms from hormonal changes in this period.⁶ In addition to muscle mass loss, a significant muscular strength loss occurs during the menopausal period that reflects negatively on the functional capacity of these women.^{3,7}

Clinically, the hormonal changes typical of this phase are related to changes in the health status of women, such as negative implications on quality of life, emotional lability, interference in mood and sleep, and an increased risk of

depression and cognitive difficulties.^{6,8} Together with these changes, some menopausal symptoms are related to lower physical activity levels,⁹ which could contribute to the worse physical performance levels found among women from middle age onward.

These changes during the menopause phase tend to impair quality of life and result from both hypoestrogenism-related biological factors and cultural and psychosocial factors.^{6,10} In addition, the ways women perceive such changes are distinct, as are the manifestations of menopausal symptoms and the way they interfere with quality of life and daily functioning.¹¹ Thus, it is assumed that menopausal symptoms and quality of life perceptions are related to women's ability to perform daily living activities¹²; also, the former may exacerbate the harmful effects of muscle mass and strength losses that occur during this period.¹³

Although some studies have investigated the influence of hormonal deficits and menopausal status on muscle changes in women,^{3,7,14} the correlation between menopausal symptoms and quality of life and physical performance have not received proper attention; therefore, the objective of this study is to evaluate the correlation between menopausal symptoms and quality of life and the physical performance of middle-aged women.

Methods

The present study was conducted in the municipality of Parnamirim, located in the metropolitan region of Natal, capital of Rio Grande do Norte. This municipality is 100% urbanized and has ~ 200,000 inhabitants. This was a cross-sectional study. Data from this study were collected from April to November 2013 in the Integrated Center for Teaching, Research and Extension (Nipec) of Parnamirim by trained interviewers using standardized protocols.

The study population consisted of women between 40 and 65 years of age residing in the Parnamirim municipality. A convenience sample of 500 women was assembled after project disclosure at the basic health units in the municipality. In order to participate in the study, women had to meet the following inclusion criteria: have between 40 and 65 years of age; no history of bilateral oophorectomy; no neurological or degenerative diseases, limb fractures, painful processes, or other conditions that could compromise the measurement of physical performance; and provide informed consent to participate in the study. Three women did not complete the evaluation and were excluded from the analysis for a final sample of 497 women.

This study followed the principles of the Declaration of Helsinki, and was approved by the Research Ethics Committee of the Universidade Federal do Rio Grande do Norte (opinion number 387.737). All volunteers signed a Free and Informed Consent Form in agreement with resolution 466/12 of the Brazilian National Health Council.

Procedures

Physical performance was assessed using the following variables: handgrip strength, knee flexor and extensor strength, gait speed, and chair stand test. The handgrip strength was assessed in the dominant hand in kilogram-force (kgf) using a Jamar® dynamometer (Jamar, Irvington, NY, USA). The volunteer was positioned as recommended by the American Society of Hand Therapists:¹⁵ in a seated position with the shoulder adducted and in neutral rotation, the elbow positioned at 90° flexion, and the forearm and wrist in neutral positions. Each participant was requested to perform three 5-second sustained contractions, with a 1-minute interval between the measurements. The mean of three measurements was included in the analysis.

A portable MicroFET2® dynamometer (Hoggan, West Jordan, UT, USA) was used to measure the dominant knee flexor and extensor strength. Knee extension was assessed with the volunteer positioned in ventral decubitus on a stretcher with the knee flexed at 90°, and the thigh fixed to the stretcher by an inelastic band. The dynamometer was fixed by the examiner to the anterior surface of the lower end of the limb in a line immediately proximal to the malleolus. During the knee flexion strength assessment, the volunteer remained in the same position, but with the knee extended. The dynamometer was positioned on the posterior surface of the lower end of the limb immediately above the line of the malleolus. Measurements of three maximum isometric con-

tractions of knee extension and flexion of 5 seconds each, with a 1-minute interval between them, were conducted, and the arithmetic mean of three measurements was calculated.¹⁶

For the assessment of gait speed and chair stand test, the time to walk in the usual step for a distance of 4 m was measured in 2 attempts, and the slower time was used to calculate the gait speed in meters per second. For the chair stand test, the volunteer was asked to sit down and fully stand five times as fast as possible with their arms crossed over the chest. The time to carry out the task was used in the analysis. More details about these tests are available in the original article.¹⁷

Menopause symptoms were assessed by the Menopause Rating Scale (MRS), which is composed of eleven items divided into three areas: somatic, psychological, and urogenital. The symptoms are classified according to the intensity of involvement reported by the women, where the value for each question can be 0–4; the higher the score, the higher the perception of the symptom. This scale was initially standardized in German and subsequently validated for other languages, including Portuguese.¹⁸

Quality of life was assessed using the Utian Quality of Life (UQOL) scale, which was also validated for the Brazilian population.^{19,20} This instrument consists of 23 questions subdivided into occupational, health, emotional, and sexual areas. For each question, the volunteer should respond if the statement is very false (1), false (2), moderately true (3), true (4) or very true (5). At the end, the scores were added; the higher the score, the better the quality of life.

The volunteers' sociodemographic data and socioeconomic factors, such as age, years of schooling, stable union, and family income were collected. The latter was categorized into less than 3 times the minimum wages (MW), or 3 times the MW or higher.³ Weight (kg) and height (m) were also measured.

Physical activity habits were self-reported and defined as the regular practice of physical exercise at least three times a week for at least 30 minutes per session. Other data on life habits were also collected, such as walk per week and sitting time per day according to the guidelines of the short version of the International Physical Activity Questionnaire validated for Brazil.²¹ For the variable walk per week, the women were instructed to report how many days and how much time per day they walked for more than 10 minutes without stopping during the last week, either as a way to get from one place to another or as physical exercise. Subsequently, the volunteers were allocated into one of two categories: < 90 minute/week and ≥ 90 minute/week.³ For the sitting time per day, women were requested to report how much time in a normal day they spent sitting at home or at work, relaxing, watching television or reading, and the variable was dichotomized in ≤ 4 hour/day or > 4 hour/day.³

Data Analysis

The data were analyzed using SPSS version 20.0 (SPSS, Chicago, IL, USA). A descriptive analysis was initially performed using the measures of central tendency (arithmetic

Table 1 Characterization of the sample ($N = 497$)

Variable	Mean \pm SD	N	%
Age (years)	49.9 \pm 5.6		
Schooling (years)	8.1 \pm 4.2		
Family income			
≥ 3 MW		148	29.8
< 3 MW		349	70.2
Stable union			
Yes		357	71.8
No		140	28.2
Physical activity			
Yes		131	26.4
No		366	73.6
Walking time per week			
< 90 minutes		266	53.5
≥ 90 minutes		231	46.5
Sitting time			
< 4 hours per day		326	65.4
≥ 4 hours per day		171	34.4
Occupational UQOL	26.03 \pm 4.2		
Health UQOL	18.3 \pm 4.9		
Emotional UQOL	20.3 \pm 4.0		
Sexual UQOL	8.7 \pm 3.1		
Total UQOL	73.4 \pm 10.9		
Somatic MRS	7.1 \pm 3.7		
Psychological MRS	8.0 \pm 4.4		

Abbreviations: MW, minimum wage; MRS, Menopause Rating Scale; N, number; SD, standard variation; UQOL, Utian Quality of Life.

mean) and dispersion (standard deviation) for quantitative variables and absolute and relative frequencies for categorical variables. The correlation of menopausal symptoms and quality of life (both by the total score of the scales used and by the scores of the different areas) with the outcomes (muscular strength, gait speed, and sit-to-stand time) for normally distributed data was assessed by Pearson's correla-

tion test. Significance of $p < 0.05$ and a confidence interval of 95% were set for all tests.

Results

► **Table 1** shows the characteristics of the sample in terms of independent and dependent variables. The women had a mean age of 49.9 \pm 5.6 years. The study sample showed a low level of schooling (8.1 \pm 4.2 years) and a low family income (70.2% reported having a family income < 3 times the MW). Regarding physical activity, 73.6% of the women reported not exercising regularly.

► **Table 2** shows the results of the correlation analysis between menopausal symptoms and the physical performance measures. There was a weakly significant negative correlation between handgrip strength and somatic MRS ($p = 0.002$) and total MRS ($p = 0.03$). Regarding knee flexor strength and sit-to-stand time, there was a weakly significant correlation with all items of the MRS ($p < 0.05$), except the psychological domain. The higher the symptom intensity, the worse the physical performance, that is, the lower the strength and more time required to perform the chair stand test.

► **Table 3** shows the results of the correlation analysis between the variables of quality of life and physical performance. Regarding knee flexor strength, a weakly significant correlation was found with occupational ($p = 0.001$), emotional ($p = 0.005$) and total UQOL scores ($p = 0.01$). In addition, a significant negative correlation was observed between sit-to-stand time and all areas of the UQOL and total score ($p < 0.05$); the lower the perceived quality of life, the worse the physical performance.

Discussion

The objective of this study was to verify the correlation between menopausal symptoms and quality of life in the physical performance of middle-aged women. Significant correlations were found between the variables. Worse physical performance was associated with a higher perception of the intensity of menopausal symptoms and worse perception of quality of life. The correlation between menopausal stage and physical performance has already been the subject of previous studies,^{3,7,14} but the specific correlation between

Table 2 Correlation between physical performance and menopausal symptoms ($N = 497$)

Menopause Symptoms (MRS scores)	Measures of physical performance									
	Handgrip strength (kgf)		Knee flexors strength (kgf)		Knee extensor strength (kgf)		Sit-and-stand time (s)		Gait speed (m/s)	
	r	p	r	p	r	p	r	p	r	p
Somatic	-0.14	0.002	-0.10	0.01	-0.08	0.05	0.11	0.01	-0.07	0.11
Psychological	-0.03	0.42	-0.03	0.48	-0.03	0.52	0.06	0.15	-0.02	0.53
Urogenital	-0.06	0.12	-0.10	0.02	-0.06	0.17	0.15	0.001	-0.08	0.07
Total	-0.09	0.03	-0.09	0.04	-0.07	0.12	0.12	0.005	-0.06	0.13

Abbreviations: kgf, kilogram-force; m/s, meters per second; MRS, Menopause Rating Scale; r, Pearson correlation coefficient; s, seconds.

Table 3 Correlation between physical performance and quality of life ($N = 497$)

Variables	Measures of physical performance									
	Handgrip (kgf)		Knee flexion (kgf)		Knee extension (kgf)		Sit-to-stand (s)		Gait speed (m/s)	
Quality of Life (UQOL)	r	p	r	p	r	p	r	p	r	p
Occupational UQOL	0.01	0.83	0.15	0.001	0.06	0.12	-0.12	0.008	0.01	0.76
Health UQOL	0.01	0.91	-0.02	0.65	-0.01	0.91	-0.15	0.001	-0.02	0.58
Emotional UQOL	0.06	0.17	0.12	0.005	0.07	0.09	-0.09	0.03	0.07	0.12
Sexual UQOL	0.09	0.05	0.07	0.10	0.02	0.66	-0.09	0.04	-0.02	0.56
Total UQOL	0.05	0.22	0.11	0.01	0.05	0.20	-0.17	<0.001	0.01	0.78

Abbreviations: kgf, kilogram-force; m/s, meters per second; r, Pearson correlation coefficient; s, seconds; UQOL, Utian Quality of Life.

menopausal symptoms and physical performance has not been sufficiently investigated.

In a study that evaluated 1,011 women in different menopausal phases, a correlation was observed between menopausal symptoms and physical activity level. The authors observed that women with a lower physical activity level had higher menopausal symptom scores, both in frequency and intensity.⁹ The fact that women who present more intense symptoms are physically less active may explain the fact that they also have worse physical performance, since the practice of physical activity was a predictor of muscle strength loss in a longitudinal study of young postmenopausal women.²² Moreover, Gonçalves et al²³ claimed that women who reported less severe menopausal symptoms presented better quality of life and physical performance results, probably due to the practice of physical activity.²³ Thus, it is possible that physical activity improves quality of life, decrease the climacteric symptoms, increase the willingness to exercise and, consequently, avoid further loss of strength and muscle mass resulting from menopause, leading to a better physical performance.^{7,23,24} In the present study, 73.6% of participants reported not being physically active on a regular basis, which may have contributed to the presence of more intense symptoms, lower quality of life, and worse physical performance.

A normal phenomenon in a woman's lifetime, menopause is also a critical period of personal, social, and psychological development that is frequently faced with apprehension due to the changes that occur, which can negatively impact quality of life.²⁵ Women must adapt to the multiple physical, psycho-affective, and sociocultural changes inherent to this process that can have repercussions on health status and quality of life.²⁶ Both depression and fatigue are related to menopausal symptoms,²⁷ while depressive symptoms are related to worse physical performance.²⁸ Therefore, there may be a cycle in which menopausal symptoms discourage women and trigger depressive feelings, fatigue, and other effects.²⁷ This leads these women to avoid physical activity or reduce their activities, which has the effect of reducing their physical performance. This reduction can induce negative feedback feelings and intensify this deficit.

Therefore, in this phase of female aging, menopausal symptoms also seem to correlate with worse physical performance, which is observed in the present study in terms of handgrip strength, knee flexor strength, and sit-and-stand test time, in which the worst physical performances were observed in women who reported a higher intensity of menopausal symptoms. Confirming such results, a recent study showed that as menopausal symptoms worsen, strength gradually decreases, displaying a negative correlation between menopausal symptoms and strength.²⁹

Physical performance, evaluated by both muscle strength tests and sit-and-stand test time, may be influenced by clinical and physiological characteristics as well as social environment.³ Moreover, during aging, hormonal changes, with the consequent onset of symptoms, could be related to muscle strength and mass losses that usually occur during menopause in women. Therefore, these factors may explain the correlation found in this study between greater intensity of menopausal symptoms and lower muscle strength level.³

The World Health Organization defined the phrase "quality of life" as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards, and concerns.³⁰ The expression "health-related quality of life" refers to an individual's perception of the correlation between their physical (ability to perform physical activities), psychological (emotional stress, anxiety and depression), and social (family interaction, time for friends and leisure activities) limitations.³¹

A study of 4,261 individuals aged 20–79 years revealed that self-perceived quality of life could predict mortality risk.³² It is also known that physical performance reductions are independently associated with subsequent disability, fracture, falls, hospitalization and mortality.^{33,34} However, the correlation between perceived quality of life and physical performance has not been analyzed to date. It is believed that a negative quality of life perception is also correlated with worse physical performance of these women during menopause, which was verified by the significant results in the present study between occupational, emotional, and total UQOL and knee flexion strength as well as between all items

of the UQOL and total score with the sit-to-stand time. Women with lower quality of life scores had the worst physical performance levels. The finding noted in the present study can be one of the factors that explain the correlation between self-perceived quality of life and mortality.

The quality of these women's physical and psychological lives can be positively influenced by the daily practice of physical activity, leading to better body-mind harmony.^{7,24} Therefore, the decrease in menopausal symptoms resulting from the practice of physical activity seems to improve quality of life,²³ which in turn seems to contribute to improved physical performance. Schooling is another factor that may be correlated with menopausal symptom severity.⁶ De Lorenzi et al⁶ reported that menopausal symptoms seemed less intense among more highly educated women. Although schooling level was not evaluated in the present study, it can change the perception of menopausal symptoms⁶ and interfere with physical performance.³⁵

One of the limitations of the present study is the lack of establishment of a causal relationship due to its transversal design. In addition, it is necessary to consider that our participants were middle-aged women in Northeast Brazil; therefore, one should be cautious about generalizing these results to other populations. These evaluations of menopausal symptoms and quality of life were based on the participants' self-reports, which can generate bias. However, validated questionnaires that are easy to apply and widely used in the literature, primarily in the context of epidemiological research, were applied here. Unlike independent variables, physical performance could be evaluated objectively using five measures, three of force and two that are also related to muscle power, an important point to be highlighted in this study.

Conflict of Interest

The authors declare no conflicts of interest.

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