Association of anxiety, balance, and walking speed among post-menopausal women with the degenerative joint disease of the knee: a cross-sectional study

Associação de ansiedade, equilíbrio e velocidade de caminhada entre mulheres na pós-menopausa com doença articular degenerativa do joelho: um estudo transversal

Kanimozhiselvi Sounderrajan Jamunarani[1] (iD)
Radhika Krishnan Jayaraman[2] (iD)
Hariharasudhan Ravichandran[3] (iD)

Antony Leo Aseer[4] (iD)
Balamurugan Janakiraman[5] (iD)
Senthil Purushothaman[6] (iD)

[1]Corresponding author. SRM Institute of Science and Technology (Chennai). Tamil Nadu, India. kaniroop@gmail.com
[2,5]SRM Institute of Science and Technology (Chennai). Tamil Nadu, India.
[3]Alva's College of Physiotherapy and Research Centre (Moodubidire). Karnataka, India.
[4]Sri Ramachandra Institute of Higher Education and Research (Chennai). Tamil Nadu, India.
[6]Chettinad Academy of Research and Education (Chennai). Tamil Nadu, India.

ABSTRACT | BACKGROUND: Menopause is often associated with musculoskeletal complications like demineralization of bone, loss of muscle mass, and degenerative joint diseases. Osteoarthritis of the knee is the most common degenerative joint disorder among post-menopausal women. There is a complex interaction between perceived anxiety, experience of pain, and limitations of function among post-menopausal women. **AIM:** To determine the association of anxiety levels in postmenopausal women with osteoarthritis in worsening balance and walking speed. **METHODS:** This cross-sectional study design was conducted between May and July 2023, according to STROBE guidelines. Post-menopausal females with knee osteoarthritis were recruited from a private hospital, in Chennai, India. Based on the pain anxiety symptom scale (PASS-20) score they were categorized into women with and without anxiety. All participants underwent the Timed Up and Go test (TUG), and 4-meter walk test to identify their balance and walking speed. The collected data were analyzed appropriately using Chi-square statistics and regression methods. **RESULTS:** The mean age of 100 participants recruited in this study was 49.66 ± 6.3 years. The average time of onset of osteoarthritis in the participants was 49.28 months. The study identified that 49% of post-menopausal women with osteoarthritis had anxiety symptoms. Anxiety was significantly associated with an increase in age (P = 0.017) and duration from attaining menopause (P = 0.005). TUG test performance was significantly poor (P = 0.005) in individuals with anxiety. Unadjusted and adjusted linear regression demonstrated that anxiety is not associated with balance and walking speed in postmenopausal women with knee osteoarthritis. **CONCLUSION:** The presence of anxiety in post-menopausal women with osteoarthritis did not affect balance and walking speed outcomes. Age, duration of menopause, and body weight were found to be significantly associated.

KEYWORDS: Walking Speed. Knee Osteoarthritis. Anxiety Disorders. Postmenopause.

RESUMO | INTRODUÇÃO: A menopausa está frequentemente associada a complicações músculo-esqueléticas, como desmineralização óssea, perda de massa muscular e doenças articulares degenerativas. A osteoartrite do joelho é a doença articular degenerativa mais comum entre mulheres na pós-menopausa. Existe uma interação complexa entre ansiedade percebida, experiência de dor e limitações funcionais entre mulheres na pós-menopausa. **OBJETIVO:** Determinar a associação dos níveis de ansiedade em mulheres pós-menopáusicas com osteoartrite no agravamento do equilíbrio e da velocidade de marcha. **MÉTODOS:** Este desenho de estudo transversal foi realizado entre maio e julho de 2023, de acordo com as guidelines STROBE. Mulheres na pós-menopausa com osteoartrose do joelho foram recrutadas num hospital privado, em Chennai, Índia. Com base na pontuação da escala de sintomas de ansiedade e dor (PASS-20), foram categorizadas em mulheres com e sem ansiedade. Todas as participantes foram submetidos ao teste Timed Up and Go (TUG) e ao teste de marcha de 4 metros para identificar o equilíbrio e a velocidade de marcha. Os dados recolhidos foram analisados adequadamente através de estatística qui-quadrado e métodos de regressão. **RESULTADOS:** A idade média das 100 participantes recrutados neste estudo foi de 49,66 ± 6,3 anos. O tempo médio de início da osteoartrite nas participantes foi de 49,28 meses. O estudo identificou que 49% das mulheres na pós-menopausa com osteoartrite apresentavam sintomas de ansiedade. A ansiedade esteve significativamente associada ao aumento da idade (P = 0,017) e à duração da menopausa (P = 0,005). O desempenho no teste TUG foi significativamente fraco (P = 0,005) nos indivíduos com ansiedade. A regressão linear não ajustada e ajustada demonstrou que a ansiedade não está associada ao equilíbrio e à velocidade de marcha em mulheres pós-menopáusicas com osteoartrose do joelho. **CONCLUSÃO:** A presença de ansiedade em mulheres na pós-menopausa com osteoartrite não afetou os resultados de equilíbrio e velocidade de marcha. A idade, a duração da menopausa e o peso corporal estiveram significativamente associados.

PALAVRAS-CHAVE: Velocidade de Caminhada. Osteoartrite do Joelho. Transtornos de Ansiedade. Pós-Menopausa.

1. Introduction

India has a higher prevalence of osteoarthritis (OA), a degenerative joint condition. Globally, it is one of the factors contributing to pain and disability. The literature demonstrates that knee OA is highly prevalent and frequent in women who are suffering from menopause. It not only affects physical health but also mental well-being, and increases the risk of disease progression. About 13% of women and 10% of men aged 60 years and older have symptomatic knee OA.[1] Postmenopausal women are affected more than premenopausal women. High body mass index, hypertension, diabetes mellitus, and osteoporosis were the common comorbid conditions.

The prevalence of knee osteoarthritis is increasing worldwide as people live longer and experience more age-related problems. Research indicates that women going through menopause have a significant incidence and prevalence of osteoarthritis. Comorbidities such as anxiety and other emotional responses are often reported by patients with chronic painful and debilitating diseases.[2] Given that anxiety has been shown to modify pain threshold levels, this may predispose patients to experiencing pain more frequently.[3] Given that anxiety and sadness can be exacerbated or caused by chronic pain alone.[4]

In addition to having an adverse effect on physical health, osteoarthritis raises the possibility of the condition worsening mentally. Most post-menopausal women than pre-menopausal women are impacted. In 1990, approximately 23.46 million individuals in India suffered from osteoarthritis; by 2019 that number has increased to 62.35 million. From 4,895 in 1990 to 5313 in 2019, the age-standardized prevalence of OA increased per 100,000 individuals. Females were consistently more likely than males to have osteoarthritis of the knee.[5] It affects women more frequently than males, and its frequency, incidence, and severity are increasing, with a propensity for involvement in numerous joints, as well as a higher occurrence of hand and knee osteoarthritis after menopause. The impact of age on the risk of osteoarthritis in the hips and knees in women exhibits comparable tendencies, with a rapid increase between the ages of 50 and 75 years.[6]

Menopause is a physiological process that occurs in the women of middle ages. During the menopausal transition, significant changes or fluctuations in physiological and hormonal functions tend to occur which further affects the vasomotor function, sleeping patterns, sexual functioning, and cognitive functions.[7] These changes are common in postmenopausal women and they could negatively impact their emotional aspects and result in anxiety disorders. Combined with anxiety and other emotional dysfunctions, fluctuations in the estrogen hormone trigger a variety of musculoskeletal symptoms in the postmenopausal phase.[8] Estrogen deficiency occurs immediately following the postmenopausal phase and it steadily declines further as the age advances. Due to this, the protective role of estrogen in maintaining joint homeostasis is lost.[9]

Estrogen deficiency results in cartilage destruction, subchondral bone lesions, osteoporosis, sarcopenia, and ligament rupture. Thus estrogen is essential for maintaining the integrity of the synovial joints. Postmenopausal decrease in estrogen combined with a deficiency in anti-mullerian hormone (marker associated with ovarian function) increases the risk of osteoarthritis in women in that phase.[10] Pain and dysfunctions due to postmenopausal osteoarthritis generate arousal, and a hazy focus on the perceived threat (i.e., anxiety).[11] Thus anxiety and knee osteoarthritis in postmenopause worsens the motor functions such as balance and mobility. Walking represents the predominant mode of mobility and is severely compromised in knee osteoarthritis populations. Balance and the velocity of walking reflect the individual's functional potential in walking. Procession of spatial information is a pre-requisite for maintaining the ability to control balance and the velocity of walking is dependent on the executive function of spatial information and motor functions.[12-14]

Studies investigating the relationship between anxiety, slowed walking speed and fear of falling[15] confirmed the association of anxiety in patients with high-grade knee synovitis (early OA).[16] Researchers do agree with the statement that anxiety, improper balance control, and walking speed are interconnected.[17] Anxiety-inducing circumstances and events seem to affect how

well people in the healthy population regulate and manage their gait and balance.[18,19] To our knowledge, no research has looked at the potential interactions between anxiety and physical function, such as gait and balance, in postmenopausal women with knee osteoarthritis. The objective of this study design is to investigate the association of anxiety in balance and walking speed performances in postmenopausal women with knee osteoarthritis.

2. Methods

2.1 Protocol

The study proposal was approved by the Institutional Ethical Committee (Ethical clearance Number – 8501/IEC/2023), further, this study was prospectively registered at the Indian Clinical Trial Registry (CTRI/2023/04/051550). This paper reports the findings of phase 1 of the project Treat yoUr Core Kinetics (TUCK), an initiative to improve function among women with osteoarthritis.

2.2 Study design, settings, and population

An institutional-based cross-sectional design was used and the study adhered to the (STROBE) reporting guidelines. This study was conducted at SRM Medical College Hospitals and Research Centre (SRMMCH&RC), Kattankulathur, from May 2023 to July 2023. The SRMMCH&RC has an attached 1500+ bedded super-specialty hospital which has served the healthcare needs of over 1 crore patients since 2005 and also provides a hygienic environment along with quality treatment at low cost, which makes low and middle strata people from in and around the Chengalpet district to avail the medical services. The Chengalpet district has 4 municipals and 16 district panchayat wards. It has a population of 2,725,530 inhabitants We used pamphlets to invite post-menopausal women attending the Department of Obstetrics and Gynaecology, Physical Medicine and Rehabilitation, Department of Orthopaedics, SRMMCH&RC drug dispensary, and Outpatient Physiotherapy Department at the SRM Institute of Science and Technology (SRMIST). The screening was done 3 days a week. They were explained about the study and we offered oral and written information with their signature in the informed consent before the commencement of the study.

2.3 Participants

Postmenopause women with knee osteoarthritis were the study participants. Postmenopause is confirmed retrospectively after 12 consecutive months of amenorrhea.[20] The age requirements for inclusion in the study were above 40 years of age, meeting the clinical criteria of knee OA established by the American College of Rheumatology in 1986, and having radiographic alterations of grade II or above in Kellgren and Lawrence. If an individual met the following requirements, they were included. 1) Patients with knee OA according to Kellgren and Lawrence score, age over 40 years female who are in the post-menopausal stage, morning stiffness of less than 30 minutes, or crepitus with active knee motion of the knee. Participants were excluded from the study if they had conditions that would put them at risk for injury during testing programs, total knee replacement, uncontrolled hypertension, a history of musculoskeletal dysfunctions and related pain or cardiovascular disease, or any neurological or cognitive (higher mental function) disorders. Before their involvement in the study, every participant signed an informed consent form.

2.4 Sample size determination

A two-tailed sample calculation using the z-test for a required power-calculated sample for this correlation cross-sectional study was used. The following assumptions were used to estimate the required sample; margin of error 0.05%, confidence interval 95%, 80% (1 - β) power, and expected correlation (Ha) is p = 0.30 based on medium effect size convention. Further, a 5% attrition rate was added to the derived sample size to account for the possible non-responses. The derived estimated sample was 127, and we added an attrition of 5%. The final sample size was estimated to be 140. The sample size was calculated using G power version 3.1.9.4.

2.5 Data collection tool and procedure

The physiotherapist conducted a face-to-face interview to collect data. An organized questionnaire was used which contained questions related to socio-demographic status like age, sex, marital status, residence, and occupation. Most importantly the duration of length of menopause was recorded. The pain Anxiety Symptom Scale (PASS-20) was calculated using a score of 0 -100, on which 30 to 100 indicates the presence of anxiety, and below 30 indicates no anxiety[21], was utilized in this study. The participants were categorized into post-menopausal osteoarthritis women with and without anxiety and their walking speed evaluation and physical performance scoring (TUG test) were performed on them.

2.6 PASS-20 to measure anxiety score

A 20-item self-reported tool called PASS-20 is used to quantify anxiety associated with pain. The measure is divided into four subcategories: pain phobia, escape actions, cognitive anxiety, and physiological signs of anxiety. Every item has a rating of zero (never) to five (always) on a six-point scale. Increased total scores are an indication of increased levels of anxiety associated with pain, and the scores range from 0 to 100. There is evidence that the PASS-20 has a strong internal consistency, validity, and reliability.[22,23] Assessors can better grasp the factors influencing patients by using this measure.

2.7 Timed Up and Go test outcome

TUG is a physical performance tool used for static and dynamic balance.[24] The study participants are instructed to get up from their chairs, take a walk for 3m, and then return to the starting point to sit back. The duration of each session was recorded and was repeated three times to obtain an average recording. It is recognized as a valid and dependable tool for evaluating elderly individuals' balance (sit to stand, turning and stand to sit) and fall risk. For individuals aged 60 to 69, the typical TUG score is 8.1 (7.1-9.0) seconds, for those aged 70 to 79, it is 9.2 (8.2-10.2) seconds and for those aged 80 – 99 it is 11.3 (10.0-12.7) seconds.

2.8 Walking speed outcome

Walking speed (< 1.0m/s) could predict mortality and functional limitations in individuals with knee osteoarthritis.[25] The walking speed was computed from the 4-meter walk test using the formula: Distance (d) / Time taken (t). The results of the 4-meter Walk Test demonstrated good test-retest reliability (ICC values ranging from 0.96 to 0.98). In this investigation, the 4-meter Walk Test was employed. Participants were asked to walk along the measured pathway which helps to reduce gait variability.[26,27] Each participant did three sets of trials. They were asked to walk at their comfortable pace until they reached the end of the designated path.

2.9 Measurements

Since TUG does not need any specialist equipment, it can be carried out anywhere in the community or at the designated locations. It needs a regular chair with armrests (46cm for the seat height and 63-65cm for the armrest height), a stopwatch, a measuring tape, and a marking tape to indicate the distance in meters (3m) that is clear of obstructions. Placing the chair in the open area where there is a marked measurement of about 3 meters (10 feet) straight line, and explain the participants about the procedure in detail. Instructions are given to them to do normal-paced walking to avoid bias. The stopwatch is used to calculate the time taken for the patient to get up from the chair, walk through the line marked, and come back and sit in the chair. The readings are marked in seconds. The subject is made to walk three times to avoid bias with adequate rest intervals between the sets. Record the whole task from start to finish.

For measuring walking speed test we need a stopwatch and a marked pathway. Participants are instructed to walk on the marked pathway of 4 meters as soon as the assessor gives the instruction. They were instructed to do normal-paced walking. As soon as the patient crosses the 4-meter line stop the watch and mark the readings. The procedure was repeated 3 times with adequate rest periods in between the sets to get the average reading. The walking speed is calculated by dividing the distance walked by the average time taken. TUG test and walking speed test differ in their components. TUG test includes sit-to-stand, walking, turning, and finally involves

stand-to-sit tasks, whereas the walking speed test commences in standing posture and the participants are instructed to walk in a linear direction and thus differs from balance-related components such as sit-to-stand or turning included in the TUG test. Linear walking speed test optimally predicts the velocity at which an individual walks.

2.10 Data Collection

2.10.1 Informed Consent

Participants gave their informed consent after being informed about the nature and goals of the study. Before participation, written informed consent was obtained from all the participants. The demographic, TUG test, and walking speed data were collected in the Physiotherapy department of the institution. The face-to-face interview method was conducted employing a standardized questionnaire, and sociodemographic data was gathered. The authors involved in this study were assigned accordingly to two groups; 3 authors (KSJ, HR, and BJ) with more than 10 years' experience in examining and rehabilitating musculoskeletal conditions evaluated walking speed and 2 authors (SP and ALA) with more than 10 years' experience in neurological rehabilitation conducted TUG test and interpreted the results. The score sheet is submitted to one of the authors (RKJ) for data entry. Participants were not informed about their performance scores and the authors performing the TUG test and walking speed were appropriately blinded from the scores of the other measures in which they were not involved.

2.11 Data analysis

Data was cleaned, coded, and entered into the Sigma plot to get the results. The independent variables such as age, height, weight, BMI, occupation, duration since attaining menopause, and duration of osteoarthritis following menopause were collected. Based on the PASS-20 score, the dependent variable data such as TUG and walking speed evaluation were collected. Group-wise (women with and without anxiety) chi-square test was performed for both dependent and independent (categorical) variables. According to the normality results, parametric or non-parametric statistical analysis will be performed. The unadjusted and adjusted odds ratio was performed for all the independent variables against the PASS-20 scores (women with and without anxiety).

3. Results

A total of 100 participants out of 140 approached responded. The overall response rate was 71.4%, which is also 78.7% of the power-calculated sample size of 127. The most common reasons for non-response were no time, and not interested. An x-y plot of sample size to power (β) showed a decrease in the power (1 -β) from the assumed 0.80 to 0.70. The overall mean age of the post-menopausal women participants was 49.66 ± 6.371 out of which 35% of them were working women, 35% were housewives, 22% were professionals and the remaining were self-employed or were working in a private concern. Their average BMI is found to be 27.0075 ± 4.106, among them 37% of them were under the category of normal weight and 63% of them were under the overweight or obese category. The mean TUG score is said to be 16.41±8.266 which indicates the results have encountered a low physical performance and this when compared with their occupation the housewives had a lowest physical performance of 19.5 seconds. The average walking speed noted in the results was 1.204 ±0.158. The average PASS-20 score is 49.89±17.94.

The majority, 54% of the females who participated were between 40 to 49 years old, age group with 64% of them being overweight/obese in the BMI category. The frequency of employed women (n = 65) was more compared to housewives (n = 35). Almost all the participants, 84% of them attained their menopause within the last 10 years. The chi-square distribution showed no significant difference between women with and without anxiety (Table 1).

Table 1. Chi square distribution for demographic characteristics in individuals with and without anxiety

Variables	Category	Frequency (Percentage %)	PASS No Anxiety	PASS Anxiety	Chi square (χ^2)	Significance (p value)
Age	40 – 49	54 (54%)	29	25	0.88	0.64
	50 – 59	31 (31%)	16	15		
	60 – 69	15 (15%)	6	9		
Weight	45 – 59	26 (26%)	13	13	0.10	0.99
	60 – 74	44 (44%)	22	22		
	75 – 89	28 (28%)	15	13		
	90 – 105	2 (2%)	1	1		
Height	150 – 159	66 (66%)	33	33	0.14	0.93
	160 - 169	27 (27%)	14	13		
	170 – 179	7 (7%)	4	3		
BMI	Normal Weight	36 (36%)	22	14	2.85	0.24
	Overweight	41 (41%)	20	21		
	Obese	23 (23%)	9	14		
Occupation	Housewife	35 (35%)	18	17	0.004	0.95
	Employed	65 (65%)	33	32		
Duration of years from attaining Menopause	1 – 10 years	84 (84%)	45	39	1.38	0.23
	11 – 20 years	16 (16%)	6	10		

Significant if P < 0.05.
Source: the authors (2024).

The independent t-test analysis performed for demographic factors, TUG, and walking speed for post-menopausal women with and without anxiety showed that age (P = 0.017), TUG score (P = 0.005) and years since attaining menopause (P = 0.005) are statistically significant between the groups (Table 2).

Table 2. Independent t test analysis for post-menopausal osteoarthritis women with and without Anxiety

Variables	NO ANXIETY Mean	NO ANXIETY SD	ANXIETY Mean	ANXIETY SD	Significance
Age	48.17	5.4	51.20	6.9	0.017*
Height	158.05	5.8	158.83	6.1	0.51
Weight	66.80	10.0	68.89	11.9	0.34
BMI	26.73	2.7	27.28	4.4	0.50
TUG	19.90	8.4	23.95	5.1	0.005*
Gait speed	0.97	0.1	0.96	0.1	0.577
Duration of attaining menopause	50.74	38.6	77.06	51.8	0.005*
Duration of OA knee	51.33	170.8	47.24	46.9	0.87

Significant if P < 0.05.
Source: the authors (2024).

The unadjusted and adjusted multiple linear regression was performed using the continuous scores of all variables. Age, height, BMI, duration since menopause, and duration of OA knee were found to be not associated with anxiety. Though body weight is associated with anxiety in the unadjusted odds ratio estimate, it has failed to demonstrate its association with anxiety in the adjusted odds ratio estimation. TUG score and walking speed were significant in both groups which indicates that anxiety has no impact in the worsening of osteoarthritis symptoms (Table 3).

Table 3. Unadjusted and adjusted multiple linear regression for all independent variables with TUG and Gait speed outcomes

	No Anxiety				Anxiety			
	Unadjusted		Adjusted		Unadjusted		Adjusted	
	β (95% CI)	Significance	β (95% CI)	Significance	β (95% CI)	Significance	β (95% CI)	Significance
Age	0.016 (- 0.919 to 1.024)	0.91	- 0.264 (-2.265 to 0.477)	0.190	0.224(-0.156 to 1.275)	0.12	0.270 (-0.249 to 1.599)	0.14
Height	-0.208 (-1.533 to 0.227)	0.14	0.210 (- 7.309 to 8.626)	0.86	0.228 (-0.164 to 1.461)	0.11	- 0.343 (-5.956 to 4.003)	0.69
Weight	0.081 (- 0.373 to 0.670)	0.57	- 0.766 (-10.781 to 7.988)	0.76	0.292 (0.017 t0 0.837)	0.04	1.362 (-3.807 to 7.786)	0.49
BMI	0.190 (- 0.445 to 2.271)	0.183	0.699 (- 19.452 to 26.184)	0.76	0.207 (-0.317 to 1.943)	0.154	-1.012 (-18.441 to 10.472)	0.58
Duration from menopause	0.198 (- 0.040 to 0.226)	0.16	0.275 (- 0.066 to 0.326)	0.18	0.162 (-0.043 to 0.152)	0.26	- 0.085 (- 0.155 to 0.097)	0.64
Duration of OA knee	- 0.087 (- 0.040 to 0.021)	0.54	- 0.065 (- 0.034 to 0.021)	0.61	0.192 (-0.036 to 0.178)	0.18	0.183 (-0.034 to 0.169)	0.18
Balance	0.333 (0.135 to 1.312)	0.01	0.348 (0.081 to 1.430)	0.02	0.366 (0.312 to2.155)	0.01	0.344 (0.303 to 2.017)	0.09
Gait speed	- 0.415 (-88.99 to – 20.22)	0.02	- 3.62 (-82.561 to – 12.623)	0.009	-0.282 (-59.901 to -0.001)	0.05	-0.252 (-55.343 to 1.584)	0.06

Significant if P < 0.05
Source: the authors (2024).

4. Discussion

The primary objective of this study was to determine the impact of anxiety among post-menopausal osteoarthritis women in worsening TUG scores and walking speed. In addition to this, we also looked into the demographic characteristics (of women with and without anxiety) that are associated with the TUG, and the walking speed. There was approximately fifty percent of patients were affected by anxiety, the majority of whom were in the age category of 40 - 49 years, and had a mean body mass index (BMI) of twenty-seven, which is considered to be overweight according to the WHO survey category on obesity 2024.

Around 51% of the participants in this study had no anxiety and the remaining 49% of them had anxiety according to PASS-20 score. When compared to Uritani et al.[26], who stated that anxiety and OA knee are significantly associated with each other[9,28], our cross-sectional study identified that nearly half, 49% of post-menopausal OA knee women from anxiety. The presence of anxiety could contribute to the worsening of the osteoarthritis symptoms, especially balance and walking speed. A significant reduction in walking speed could restrict the functions and activities of daily living.[22,27]

The results of this study showed that anxiety scores were significantly higher in the elderly women which indicates that age was directly proportional to anxiety. The mean age (49.66 years) of participants in the present study was lower than the mean age (58.88 years) of participants with anxiety in a study reported by Huang et al.[23] Factors such as lifestyle, education, life events, family responsibilities, and perception of health risks specific to menopause such as metabolic, endocrine, and other systemic dysfunctions could contribute to anxiety symptoms in post-menopausal women.

In this study balance and walking speed were compared among post-menopausal osteoarthritis women with and without anxiety. Poor balance and reduction in walking speed could limit the amount of daily activity the individual engages in overall.[29] The TUG score mean was higher (> 20) in post-menopause and osteoarthritis women with anxiety. Though it is evident that the TUG score is directly proportional to age and osteoarthritis symptoms, the TUG score in the present study was significant and similar in postmenopausal women with and without anxiety. TUG score component includes both static and dynamic balance and its performance relies on planning, interpretation, and execution from the central nervous system. In this study, TUG performance is unaffected by the anxiety component. It is also understood that anxiety alone is not responsible for worsening outcomes in TUG performance. The presence of other emotional or psychological factors in post-menopausal osteoarthritis women could potentially interfere with cognitive function and result in the worsening of TUG outcomes.[30-33]

Anxiety is an emotional reaction associated with arousal and anticipation of a threatening stimulus. According to a recent study[34], it is evident that osteoarthritis individuals with symptoms of anxiety demonstrated poor quality of life. In the present study, regression analysis results identified that the presence of anxiety has no impact on TUG and walking speed scores. This finding contrasts with the findings reported in the literature[34,35] regarding the influence of anxiety on physical performance among the general population with osteoarthritis. The presence of other psychological distress and symptoms related to vasomotor dysfunction such as sleep deprivation and fatigue which is common in post-menopausal women might contributed to similar outcomes in both groups.

Duration from menopause and age could been major contributing factors in post-menopausal osteoarthritis women resulting in anxiety and poor physical performance such as balance and walking speed.[36]

A few limitations should be mentioned to caution readers and help future researchers interpret the findings. First, other psychological distress could have affected the outcomes in TUG and walking speed. Second, not able to include participants according to the pre-determined sample size. Third, systemic organs (renal, liver, respiratory, pancreas, etc.,) and related pain or vasomotor symptoms in the body were not considered in the exclusion criteria. Fourth, the extraneous variables such as body mass index, level of physical activity, and so on may limit the applicability of the present study findings in postmenopausal women. Finally, generalizing the present study findings without further validation could be misleading (extrapolation). The study's strength is its use of performance-based objective measures to evaluate the impact of anxiety, which allowed us to conclude.

From the above discussion, it is suggested that the presence of anxiety has no impact on the physical performance of post-menopause women with osteoarthritis.

5. Conclusion

The findings conclude that the presence of anxiety in post-menopausal women living with OA knee had similar performances in TUG and walking speed. The presence of other psychological distress and symptoms related to vasomotor dysfunction such as sleep deprivation and fatigue which is common in post-menopausal women might contributed to similar outcomes in both groups. Future studies analyzing the impact of fear, depression, and other psychological/physiological variables in post-menopause women with osteoarthritis are required to validate the findings of the present study.

Authors contributions

The authors declared that they have made substancial contributions to the work in terms of the conception or design of the research; the acquisition, analysis or interpretation of data for the work; and the writing or critical review for relevant intellectual content. All authors approved the final version to be published and agreed to take public responsability for all aspects of the study.

Conflicts of interest

No financial, legal, or political conflicts involving third parties (government, private companies, and foundations, etc.) were declared for any aspect of the submitted work (including but not limited to grants and funding, advisory board participation, study design, manuscript preparation, statistical analysis, etc.).

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