



ANALYSING THE BENEFIT AND EFFECT OF PHYSICAL ACTIVITY DURING MENOPAUSE

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ABSTRACT

Purpose: The increasing prevalence of menopause-related discomforts, coupled with the potential for non-pharmacological interventions, underscores the need to explore lifestyle modifications such as physical activity (PA). This study aimed to evaluate the effects of pre-existing PA on the quality of life (QoL) in menopausal women.

Method: Conducted between September 2022 and January 2023, the cross-sectional study utilized IBM SPSS Statistics (version 23) and included 138 women. Standardized QoL questionnaires (MENQOL and SF-36) and the Global Physical Activity Questionnaire (GPAQ) to assess their PA levels and QoL outcomes.

Result: Among participants, 64% engaged in moderate-intensity PA, averaging 90 minutes per week in recreational activities, while spending 75 minutes per day sedentary. A significant inverse relationship was observed between total PA and menopause-related symptoms, with strong negative correlations in the Psychosocial ($r = -0.398, p < 0.001$) and Vasomotor ($r = -0.284, p < 0.001$) domains of MENQOL. Women who met the 150 minutes/week recommendation for moderate-to-vigorous physical activity (MVPA) reported significantly better psychological QoL ($p = 0.025$) as measured by SF-36. Furthermore, positive associations were noted between work-related PA and general health outcomes, suggesting that PA benefits extend across various health dimensions.

Conclusions: *These findings highlight the role of PA in improving menopausal QoL and emphasize the importance of incorporating personalized PA recommendations into menopausal care. Further research using objective PA measurements and a larger, more diverse cohort is recommended to confirm these results and provide deeper insights.*

Keywords: *women, menopause, menopausal symptoms, physical activity, MENQOL, SF-36*

ANALIZA KORISTI IN UČINKOV TELESNE DEJAVNOSTI MED MENOPAVZO

IZVLEČEK

Namen: *Vedno večja razširjenost neprijetnih simptomov, povezanih z menopavzo, skupaj z možnostjo nefarmakoloških posegov poudarja potrebo po raziskovanju sprememb življenjskega sloga, kot je telesna dejavnost. Namen te študije je bil oceniti učinke redne telesne dejavnosti na kakovost življenja žensk v menopavzi.*

Metode: *Presečna študija je bila izvedena med septembrom 2022 in januarjem 2023 s pomočjo programa IBM SPSS Statistics (različica 23) in je vključevala 138 žensk. Standardizirani vprašalniki o kakovosti življenja (MENQOL in SF-36) ter svetovni vprašalnik o telesni dejavnosti (GPAQ) so bili uporabljeni za oceno njihove telesne dejavnosti in kakovosti življenja.*

Rezultati: *64 % udeleženk je bilo zmerno telesno dejavnih: v povprečju so 90 minut na teden izvajale rekreativne telesne dejavnosti, medtem ko so 75 minut na dan preživele sede. Opazili smo pomembno obratno sorazmerje med skupno telesno dejavnostjo in z menopavzo povezanimi simptomi z močnimi negativnimi korelacijami na psihosocialnem ($r = -0,398$, $p < 0,001$) in vazomotoričnem ($r = -0,284$, $p < 0,001$) področju MENQOL. Ženske, ki so izpolnile priporočilo 150 minut/teden zmerne do intenzivne telesne dejavnosti (MVPa), so poročale o znatno boljši psihološki kakovosti življenja ($p = 0,025$), merjeni s SF-36. Poleg tega so bile ugotovljene pozitivne povezave med telesno dejavnostjo, povezano z delom, in splošnimi zdravstvenimi rezultati, kar kaže, da imajo koristi telesne dejavnosti različne zdravstvene dimenzije.*

Sklepne ugotovitve: *Ti izsledki poudarjajo vlogo telesne dejavnosti pri izboljšanju kakovosti življenja v menopavzi in poudarjajo pomen vključevanja prilagojenih priporočil za telesno dejavnost v tem obdobju. Za potrditev rezultatov in pridobitev globljih spoznanj priporočamo nadaljnje raziskave z objektivnimi meritvami telesne dejavnosti in večjo, bolj raznoliko kohorto.*

Ključne besede: *ženske, menopavza, simptomi menopavze, telesna dejavnost, MENQOL, SF-36*

INTRODUCTION

Menopause marks a significant transition in a woman's life, characterized by the natural cessation of reproductive function. This stage, typically occurring in the mid-40s to 50s, involves a decline in ovarian function and hormonal changes, primarily a decrease in estrogen and an increase in follicle-stimulating hormone (FSH) (El Hajj et al., 2020). These hormonal shifts result in various physical and psychological symptoms that can adversely affect women's quality of life (QOL) during this period. Symptoms include hot flashes, night sweats, mood fluctuations, sleep disturbances, and an increased risk of metabolic and cardiovascular diseases, osteoporosis, and weight gain. The onset and intensity of these symptoms vary across individuals, with lifestyle, genetics, and socioeconomic factors playing significant roles (Kuck & Hogervorst, 2024; Mishra & Kuh, 2006; Nelson, 2008; Utian, 2005).

Menopause is a natural phase of ageing, and managing its symptoms is key to overall health. Physical activity (PA) plays a vital role in reducing menopause-related discomforts, including weight gain, anxiety, depression, and sleep disturbances. Studies show that regular exercise lessens symptom severity and improves quality of life (QOL), while also enhancing mental and physical health, lowering the risk of chronic conditions like cardiovascular disease and diabetes, and improving sleep quality (Dąbrowska-Galas, Dąbrowska, Ptaszkowski, & Plinta, 2019).

Although hormone replacement therapy (HRT) is a popular treatment option for alleviating menopausal symptoms, concerns about its potential adverse effects have led many women to explore alternative therapies (Kim, Cho, Ahn, Yim, & Park, 2014). PA stands out as a non-pharmacological intervention that can effectively improve both physical and mental well-being during menopause. Despite the known benefits of PA, many women remain unaware of its potential in managing menopausal symptoms. This highlights the need for healthcare professionals to actively promote PA and other healthy lifestyle habits as part of comprehensive menopausal care.

The purpose of this study is to evaluate the impact of PA, along with medical, sociodemographic, and lifestyle factors, on the quality of life of menopausal women. By examining the relationship between PA and menopausal symptoms, this research aims to provide insights into the role of PA as an essential component of personalized care during menopause.

METHODS

Study design

This research was a non-randomized, cross-sectional study conducted between September 2022 and January 2023. Participants were recruited online from diverse locations, including Nigeria and Hungary. The inclusion of participants from Nigeria and Hungary was intentional, designed to capture perspectives from distinct socioeconomic and cultural environments and thereby enrich understanding of the relationship between physical activity and menopausal quality of life. Nigeria represents a developing West African setting, where cultural beliefs, healthcare access, and lifestyle behaviours differ markedly from those in Hungary, a Central European country characterized by more established healthcare systems and differing activity norms. The ‘others’ category included respondents from Canada, Costa Rica, Côte d’Ivoire, Ghana, Malawi, Pakistan, Rwanda, Saudi Arabia, Senegal, Singapore, Switzerland, and the United Kingdom, who participated through shared online recruitment links. Although these additional participants were few, their inclusion enhanced the heterogeneity and external validity of the sample.

The results were analysed collectively rather than by country to preserve statistical power and ensure consistency in interpretation. This approach reflects the exploratory nature of the study while recognizing that contextual differences may influence the observed relationships between physical activity and menopausal well-being.

Participants and sampling

A total of 180 women were invited to participate in the study using a convenience sampling technique. The inclusion criteria were women aged 45 years or older, who had experienced natural cessation of menstruation for at least 12 months (i.e. menopausal), and who did not have any physical limitations that would interfere with the assessment of daily physical activity (PA). Women who had undergone induced menopause due to hysterectomy, radiation therapy, or other medical procedures were excluded from the study, as well as those who were pregnant, breastfeeding, or had mental or cognitive impairments. After applying these criteria, 132 women were included in the final analysis. These women were further divided into two subgroups based on

the time since menopause: those who had experienced menopause 5 years or less ago were categorized as perimenopausal, while those who had experienced menopause more than 5 years ago were classified as postmenopausal. The classification of menopausal status into ≤ 5 years (perimenopausal) and >5 years (postmenopausal) was informed by previous research (El Hajj et al., 2020; Mishra & Kuh, 2006), which identifies the first five years following menopause as a critical period characterized by heightened symptom intensity and significant physiological adaptation.

Data collection

The sociodemographic section collected information on education level (grouped into primary, secondary, university, postgraduate diploma, and doctorate/PhD), marital status (categorized as single, married, divorced, or widowed), and parity (number of children). Smoking status was determined by the number of packs smoked daily, while alcohol consumption was categorized as never, monthly, weekly, daily, or other. Employment status was assessed with the question, “What do you do for a living?” Although participants answered an open-ended question (‘What do you do for a living?’), responses were subsequently coded as ‘employed’ or ‘unemployed’ to ensure uniformity in statistical analysis. The questionnaire also included questions on childbirth, pregnancy, medication, menstrual cycle, chronic diseases, height, weight (to calculate BMI), contraceptive use, menopausal hormone therapy, age, and country of birth.

The Menopause-Specific Quality of Life Questionnaire (MENQOL) questionnaire was used to assess menopause-related symptoms. Developed by Hilditch et al. (1996), the scale was designed to reflect women’s experiences of menopause. The Hungarian adaptation and validation of this scale was completed by Lewis, Hilditch, & Wong (2005). The MENQOL consists of 29 items across four domains: Vasomotor (items 1-3), Psychosocial (items 4-10), Physical (items 11-26), and Sexual (items 27-29). Participants indicated the presence of each symptom using a “yes” or “no” option and ranked the severity on a scale from 0 (not at all bothered) to 6 (extremely bothered).

The Global Physical Activity Questionnaire (GPAQ) was developed by the World Health Organization (WHO) in 2002 as part of the Stepwise Approach to Chronic Disease Risk Factor Surveillance (WHO, 2002). In their 2004 Global Strategy on Diet, Physical Activity, and Health, the WHO recommended its use for national physical activity surveillance (WHO, 2004). Bull, Maslin, and

Armstrong (2009) assessed the GPAQ's validity and reliability across nine countries. In this study, the English version of the GPAQ was used due to its appropriateness for the Nigerian context. The GPAQ was validated for use in Hungary by Ács et al. (2020) and has been adapted to various populations worldwide. The questionnaire consists of 16 questions evaluating physical activity across three domains: work, transportation, and leisure, as well as time spent sedentary. For this study, specific GPAQ items focused on daily physical activity: "How many days a week do you engage in moderate-to-vigorous level physical exercise?" and "How many hours a week do you typically spend engaging in moderate-to-strenuous physical activity?" Walking frequency was used as a measure of mild physical activity.

The 36-Item Short Form Survey (SF-36), developed by the Boston Health Research Institute, is widely used to assess general health status. The Hungarian validation of the SF-36 was carried out by Czimbalmos, Nagy, Varga, and Husztik (1999), providing a reference for the standard values in the local population. In this study, the original English version of the SF-36 was used to ensure compatibility with the Nigerian context. The SF-36 consists of eight dimensions, covering physical functioning, bodily pain, role limitations due to physical and emotional problems, social functioning, mental health, vitality, and general health perceptions. The scores for each dimension range from 0 (poorest health) to 100 (best health). (Brazier et al., 1992)

Statistical analysis

Data were analysed using IBM SPSS Statistics (version 23) and Microsoft Excel. Descriptive statistics, including frequencies, percentages, means, and standard deviations, summarized participant demographics and questionnaire responses. Spearman's rank correlation was used to examine the association between physical activity and menopausal symptoms, while the Chi-square test was applied to compare differences between groups. A significance level of $p < 0.05$ was considered for all analyses.

Ethical considerations

This study adhered to the principles outlined in the Declaration of Helsinki. All participants provided informed consent electronically before taking part in the study. Ethical approval for the study was obtained from the University of

Pécs Faculty of Health Sciences, Institute of Physiotherapy and Sport Sciences Ethics Committee.

RESULTS

Sociodemographic and health characteristics

The main sociodemographic and health characteristics of the participants are summarized in Table 1. A total of 138 women (57.1 ± 6.2 years) participated in the study. The majority of the participants (44.2%) were between 51 and 56 years of age. Educational achievement was varied, with 33.33% holding a university degree and 25.36% a postgraduate diploma. Employment was prevalent, with 75.36% of the participants employed at the time of the study.

Regarding menopausal status, 56.52% were perimenopausal, while 43.48% were postmenopausal. In terms of perceived health, 29.71% rated their health as good, while 30.43% described it as neither good nor bad. A smaller percentage (7.25%) reported excellent health. Almost all participants (99.28%) had never used menopausal hormone therapy, and none had ever used oral contraceptive pills.

The majority of the participants were from Nigeria (70.29%), with a smaller proportion from Hungary (20.29%). In terms of childbirth history, 73.19% had delivered via natural birth. The mean time since menopause was 6.01 ± 5.14 years, and the participants reported an average sleep quality score of 84.49 ± 20.08 . Overall, the sample represented a diverse group of middle-aged women with varying health and lifestyle characteristics.

Table 1. Sociodemographic and Health Characteristics of the Participants

Variable	Level	N	%
Age by group	45-50	14	10.14
	51-56	61	44.2
	57-62	43	31.16
	63-68	13	9.42
	69-74	3	2.17
	75-80	4	2.9
Educational level	Primary school	27	19.57
	Secondary school	23	16.67
	University	46	33.33
	Postgraduate diploma	35	25.36
	Doctorate (PhD/DBA)	7	5.07
Employment	Yes	104	75.36
	No	34	24.64
Menopausal status	Perimenopausal	78	56.52
	Postmenopausal	60	43.48
Perceived health status	Poor	7	5.07
	Fair	38	27.54
	Neither good nor bad	42	30.43
	Good	41	29.71
	Excellent	10	7.25
Marital status	Single	12	8.7
	Married	89	64.49
	Divorced	18	13.04
	Widow	19	13.77
Smoking	Yes	27	19.57
	No	111	80.43

Use of menopausal hormone therapy	Current users	0	0
	Past users	1	0.72
	Never used	137	99.28
Use of oral contraceptive pills	Used	0	0
	Never used	138	100
Home country	Nigeria	97	70.29
	Hungary	28	20.29
	Others	13	9.42
Child delivery	Natural birth	101	73.19
	Cesarean section	7	5.07
	Others	30	21.74
		Mean	SD
Time since menopause (years)		6.01	5.14
Age (years)		57.1	6.2
Self-evaluation of sleep quality		84.49	20.08

N = number of participants; SD = standard deviation; % = percentage.

Mean scores of MENQOL domains: Psychosocial, Physical, Vasomotor and Sexual domain

Table 2 presents the mean scores of the MENQOL domains, including Vasomotor, Psychosocial, Physical, and Sexual domains for pre/perimenopause and post-menopause groups. The table also includes the standard deviation (SD) and p value for the comparison of mean scores between the two groups. The results indicate that there were significant differences in the mean scores of the Vasomotor domain between pre/perimenopause and post-menopause groups ($p = 0.008$). Similarly, significant differences were found in the Psychosocial ($p = 0.0002$), Physical ($p < 0.001$), and Sexual ($p < 0.001$) domains. In most cases, pre/perimenopausal women reported slightly higher mean scores than postmenopausal women, indicating that they were more likely to experience symptoms in these areas.

Table 2. Mean scores of MENQOL domains: Psychosocial, Physical, Vasomotor and Sexual domain

MENQOL domains	Menopause Group	N	Mean	SD	P value
Vasomotor domain	Pre/peri- menopause	78	3.55	1.17	0.008
	Post- menopause	60	3.54	1.37	
Psychosocial domain	Pre/peri- menopause	78	3.59	1.24	0.0002
	Post- menopause	60	3.54	1.35	
Physical domain	Pre/peri- menopause	78	3.63	1.19	p<0.001
	Post- menopause	60	3.49	1.36	
Sexual domain	Pre/peri- menopause	78	3.54	1.05	p<0.001
	Post- menopause	60	3.35	1.3	

N = number of participants; SD = standard deviation;
MENQOL = Menopause-Specific Quality of Life. *p < 0.05

Physical activity level

Table 3 shows the descriptive statistics participants' engagement in physical activity. The participants engage in different types of physical activities, including work-related, transport-related, recreational, and sitting activities. Participants engaged in an average of 118.4±398.6 min/week of vigorous PA at work and 116.9±177.6 min/week of moderate PA at work. However, the mean values (0.0) indicate that vigorous PA at work is not common in this group.

For transportation-related activity, participants averaged 115.1±96.6 min/week, with a MET expenditure of 460.6±386.5. Recreational vigorous PA was low, averaging only 32.0±150.7 min/week, while moderate recreational activity was preferred, with participants averaging 90.3±107.5 min/week.

Participants spent an average of 75.3±45.8 min/day sitting, indicating a considerable amount of sedentary time. The total physical activity per week, combining all types and intensities, was around 472.8±931.0 min/week, with a corresponding total MET value of 2492.7±5921.1.

Table 3. Descriptive statistics showing participants' engagement in physical activity

Measure	Mean	SD	Median	IQR Lower	IQR Upper
PA by domains Work – vigorous PA					
min/week	118.41	398.579	0.00	0.00	0.00
MET	947.25	3188.629	0.00	0.00	0.00
Work – moderate PA					
min/week	116.88	177.617	30.00	0.00	152.50
MET	467.54	710.469	120.00	0.00	610.00
Transport					
min/week	115.14	96.613	90.00	50.00	200.00
MET	460.55	386.454	360.00	200.00	800.00
Recreation – vigorous PA					
min/week	32.03	150.691	0.00	0.00	0.00
MET	256.23	1205.531	0.00	0.00	0.00
Recreation – moderate PA					
min/week	90.29	107.508	60.00	0.00	180.00
MET	361.16	430.032	240.00	0.00	720.00
Sitting					
min/day	75.29	45.845	60.00	40.00	90.00
Total PA min/week	472.75	931.009	180.00	50.00	532.50
Total MET	2492.72	5921.115	720.00	200.00	2130.00

SD = standard deviation; PA = Physical Activity; IQR Lower = lower quartile; IQR Upper = Upper quartile; MET = Metabolic Equivalent of Task.

Relationship between GPAQ questionnaire and the SF-36 questionnaire

Table 4 presents the correlation coefficients and significance levels between different types of physical activity and various health-related outcomes, including physical functioning, emotional problems, energy, well-being, social functioning, pain, and general health.

Moderate positive correlations were observed between moderate work activity and various health-related outcomes, including physical health ($r = 0.234$, $p = 0.006$), emotional problems ($r = 0.202$, $p = 0.018$), well-being ($r = 0.308$, $p = 0.000$), pain ($r = 0.228$, $p = 0.007$), and general health ($r = 0.222$, $p = 0.009$). Additionally, active transportation was positively correlated with energy ($r = 0.249$, $p = 0.003$).

Recreational vigorous activity showed a positive correlation with social functioning ($r = 0.193$, $p = 0.023$). In contrast, recreational moderate activity demonstrated a negative correlation with social functioning ($r = -0.302$, $p = 0.000$) and pain ($r = -0.180$, $p = 0.034$). For daily average sitting time, negative correlations were found with emotional problems ($r = -0.175$, $p = 0.041$) and energy ($r = -0.218$, $p = 0.010$).

Finally, total physical activity was positively correlated with physical health ($r = 0.227$, $p = 0.007$), well-being ($r = 0.260$, $p = 0.002$), and general health ($r = 0.292$, $p = 0.001$).

Relationship between of physical activity and menopausal status

Table 5 shows the correlation coefficients representing the relationship between different types of physical activity, as measured by the GPAQ, and the various domains of menopause-related quality of life (MENQOL), including the Vasomotor, Psychosocial, Physical, and Sexual domains. Significant correlations were found between MENQOL domains and different physical activity types measured by GPAQ. For vigorous work, weak negative correlations were observed with the Vasomotor domain ($r = -0.218$, $p = 0.010$), Psychosocial domain ($r = -0.191$, $p = 0.025$), Physical domain ($r = -0.176$, $p = 0.039$), and Sexual domain ($r = -0.183$, $p = 0.032$).

Similarly, recreational vigorous activity showed moderate negative correlations with the Vasomotor domain ($R = -0.276$, $p = 0.001$), Psychosocial domain ($R = -0.241$, $p = 0.004$), Physical Domain ($R = -0.244$, $p = 0.004$), and Sexual domain ($R = -0.182$, $p = 0.032$).

Table 4. Correlation analysis showing the relationship between physical activity and quality of life

SF - 36									
GPAQ		Physical Functioning	Physical Health	Emotional Problems	Energy	Well-Being	Social Functioning	Pain	General Health
Vigorous Work	r (p)	-0.065 (0.449)	-0.078 (0.363)	-0.008 (0.922)	-0.143 (0.094)	-0.078 (0.36)	-0.127 (0.136)	-0.147 (0.085)	0.066 (0.439)
Moderate Work	r (p)	0.149 (0.08)	.234** (0.006)	.202* (0.018)	0.112 (0.191)	.308** (0)	0.127 (0.136)	.228** (0.007)	.222** (0.009)
Active Transportation	r (p)	0.041 (0.635)	0.139 (0.103)	-0.07 (0.415)	.249** (0.003)	0.118 (0.169)	-0.038 (0.656)	0.127 (0.139)	0.163 (0.056)
Recreational Vigorous	r (p)	0.007 (0.937)	0.027 (0.758)	-0.159 (0.062)	0.047 (0.584)	-0.001 (0.991)	.193* (0.023)	0.098 (0.253)	0.134 (0.117)
Recreational Moderate	r (p)	0.004 (0.967)	0.024 (0.783)	0.09 (0.295)	-0.013 (0.881)	0.093 (0.277)	-.302** (0)	-.180* (0.034)	0.112 (0.19)
Daily Sitting	r (p)	0.153 (0.073)	0.011 (0.894)	-.175* (0.041)	-0.018 (0.837)	-.218* (0.01)	-0.012 (0.886)	-0.118 (0.166)	-0.111 (0.193)
Total Physical Activity	r (p)	0.142 (0.097)	.227** (0.007)	0.006 (0.948)	0.133 (0.119)	.260** (0.002)	-0.077 (0.369)	0.05 (0.559)	.292** (0.001)

SF-36 = 36-Item Short Form Health Survey; GPAQ = Global Physical Activity Questionnaire. *p < 0.05, ** = p < 0.01

In terms of total physical activity, stronger negative correlations were identified across all MENQOL domains, including the Vasomotor domain ($R = -0.284$, $p = 0.001$), Psychosocial domain ($R = -0.398$, $p = 0.000$), Physical domain ($R = -0.288$, $p = 0.001$), and Sexual domain ($R = -0.311$, $p = 0.000$).

Table 5. Correlation analysis showing the relationship between menopause and physical activity

MENQOL					
GPAQ		Vasomotor domain	Psychosocial domain	Physical domain	Sexual domain
Vigorous Work Activity	r (p)	-.218* (0.01)	-.191* (0.025)	-.176* (0.039)	-.183* (0.032)
Recreational Vigorous Activity	r (p)	-.276** (0.001)	-.241** (0.004)	-.244** (0.004)	-.182* (0.032)
Total Physical Activity	r (p)	-.284** (0.001)	-.398** (0)	-.288** (0.001)	-.311** (0)

MENQOL = Menopause-Specific Quality of Life Questionnaire; GPAQ = Global Physical Activity Questionnaire. * $p < 0.05$, ** = $p < 0.01$

Relationship between menopause, physical activities, sociodemographic factors, and quality of life

Table 6 presents the results of a correlation analysis that aimed to investigate the relationships between menopause, physical activity, sociodemographic factors, and quality of life. The analysis was based on a sample of 138 participants. Several significant correlations were observed. Total Physical Activity (Total PA) was significantly associated with various quality of life domains. Specifically, Physical Health showed a correlation with Total PA ($R = 0.227$, $p = 0.007$). Well-being was also significantly correlated with Total PA ($R = 0.260$, $p = 0.002$), along with General Health ($R = 0.292$, $p = 0.001$).

Negative correlations were found between Total PA and certain menopause-related domains, including Vasomotor domain ($R = -0.284$, $p = 0.001$) and Psychosocial domain ($R = -0.398$, $p = 0.000$). Additionally, Physical domain

Table 6. Correlation analysis showing the essential relationship between menopause, physical activity, and quality of life

MENQOL + SF-36 + Sociodemographic											
GPAQ		Physical Health	Well-Being	General Health	Vaso-motor Domain	Psycho-social domain	Physical Domian	Sexual Domian	Edu-cation	Age	Years since meno-pause
Total PA	r (p)	0.227 (0.007)	0.260 (0.002)	0.292 (0.001)	-0.284 (0.001)	-0.398 (0.000)	-0.288 (0.001)	-0.311 (0.000)	-0.238 (0.005)	0.34 (0.000)	-0.197 (0.020)

MENQOL = Menopause-Specific Quality of Life Questionnaire; SF-36 = 36-Item Short Form Health Survey; GPAQ = Global Physical Activity Questionnaire. *p < 0.05

($R = -0.288$, $p = 0.001$) and Sexual domain ($R = -0.311$, $p = 0.000$) were negatively correlated with Total PA.

Among sociodemographic factors, Age was positively correlated with Total PA ($R = 0.340$, $p = 0.000$), while Years Since Menopause showed a negative correlation with Total PA ($R = -0.197$, $p = 0.020$). Education also showed a significant negative correlation with Total PA ($R = -0.238$, $p = 0.005$).

DISCUSSION

The findings of this study support the hypothesis that physical activity (PA) has a positive influence on the quality of life (QOL) in menopausal women. Consistent with previous research, our results demonstrate that women who engage in regular physical activity report better outcomes across various domains of menopausal symptoms, including vasomotor, psychosocial, physical, and sexual aspects.

One of the most significant findings of this study is the negative correlation between total physical activity and menopausal symptoms across all MENQOL domains, indicating that higher levels of physical activity are associated with fewer menopausal symptoms. Specifically, total physical activity was strongly negatively correlated with the Psychosocial domain ($r = -0.398$, $p < 0.001$), suggesting that regular physical exercise may play a vital role in mitigating psychological symptoms such as mood swings, anxiety, and depression, which are common during menopause. These findings are consistent with Sternfeld and Dugan's conclusions, which emphasize the role of exercise in improving both psychological and physical well-being during the menopausal transition. Furthermore, reviews underscore the significant psychosocial burden of vasomotor symptoms, reinforcing the importance of physical activity in holistic menopausal care (Sternfeld & Dugan, 2011; Utian, 2005).

The positive correlations between physical activity and general health outcomes, as measured by the SF-36, further reinforce the argument for incorporating physical activity into menopausal healthcare. Total physical activity was positively correlated with overall well-being ($r = 0.260$, $p = 0.002$), general health ($r = 0.292$, $p = 0.001$), and physical health ($r = 0.227$, $p = 0.007$), suggesting that active lifestyles contribute to improved health perceptions and fewer limitations in daily activities.

Interestingly, the study also found a significant relationship between recreational vigorous physical activity and social functioning, as well as energy levels, highlighting the importance of including structured recreational

activities in post-menopausal care programmes. These findings are in line with previous studies, such as those by Liu, Chen, Mielke, McCarthy, & Bailey, (2022) which confirm the effectiveness of structured exercise in improving social engagement and reducing fatigue among menopausal women.

In contrast, sedentary behaviour, particularly prolonged sitting, has been shown to negatively impact emotional well-being and energy levels, exacerbating menopausal symptoms. Studies have associated sedentary lifestyles with increased risks of depression, fatigue, and poor sleep quality among menopausal women (Hallal et al., 2012; Segar, Eccles, & Richardson, 2008). These findings emphasize the need for targeted interventions to reduce sedentary time and promote active lifestyles. One promising approach is structured interventions such as yoga, which has demonstrated specific benefits for menopausal women. A randomized controlled trial revealed that yoga not only improves menopausal symptoms but also enhances sleep quality across various menopause statuses, reinforcing its value as an effective non-pharmacological option for managing these symptoms (Fara, Pujiastuti, & Hadisaputro, 2019).

It is also worth noting the sociodemographic factors associated with physical activity levels in this study. For instance, education was negatively correlated with total physical activity, indicating that more educated women may be less physically active. This may be due to the nature of their employment or lifestyle factors, suggesting that future interventions should consider tailored approaches to encourage physical activity across different educational backgrounds. Furthermore, age showed a positive correlation with total physical activity ($r = 0.340$, $p < 0.001$), suggesting that older women in our sample are more likely to engage in physical activity, potentially due to greater awareness of its benefits. This is highlighted in a study by Matthews et al. (2009) who noted the positive impact of socio-economic factors on menopausal health.

The low reported use of hormone replacement therapy (HRT) and contraceptives in our sample highlights a growing trend towards non-pharmacological interventions to manage menopause-related symptoms. This cautious approach is reflective of findings from the Women's Health Initiative (Rossouw et al., 2002), which raised concerns about the long-term risks associated with HRT. In light of these concerns, promoting physical activity as a safe and effective alternative is particularly important.

The diverse background of participants in this study, predominantly from Nigeria and Hungary, adds valuable insight into how sociocultural and geographic factors influence the impact of physical activity on menopause-related symptoms. Research indicates that cultural norms, access to healthcare, lifestyle habits, and climate can significantly shape how menopausal symptoms

are experienced and managed across populations. For instance, women in warmer climates like Nigeria may face heightened vasomotor symptoms, such as hot flashes, due to environmental heat stress. In contrast, Hungarian women, benefiting from greater access to healthcare resources, often have opportunities for more structured interventions, including physical activity counselling. Broader cross-cultural analyses, such as the DAMES study, further underscore the role of cultural and socioeconomic factors in shaping menopausal experiences, highlighting universal challenges in symptom management across different regions (Avis & Crawford, 2008; Greendale, Lee, & Arriola, 1999; Jones, Jurgenson, Katzenellenbogen, & Thompson, 2012; Nelson, 2008; Obermeyer, Reher, & Saliba, 2007).

This cultural diversity underscores the importance of personalized care approaches that account for regional differences in menopausal symptomatology and access to resources. Additionally, it reinforces the need for cross-cultural validation of tools like the MENQOL and GPAQ, which were used in this study. The fact that these tools have been validated in both Hungarian and Nigerian contexts strengthens (Ács et al., 2020; Lewis et al., 2005) the reliability of the findings but also highlights the importance of ensuring that interventions are culturally appropriate.

Including women from various countries highlights the universal benefits of physical activity for menopausal women while stressing the need to consider cultural and socioeconomic contexts in healthcare recommendations. For example, promoting exercise may require different strategies in places with limited access to gyms or safe outdoor spaces. Future research should explore these cultural differences to better support diverse populations of menopausal women.

CONCLUSIONS

In conclusion, this study underscores the critical role of physical activity in enhancing the quality of life among menopausal women. It emphasizes the need to integrate structured exercise programmes into healthcare strategies for this population, particularly those that focus on reducing sedentary behaviour and encouraging regular recreational activity.

Future research should continue to examine these associations through longitudinal designs capable of capturing the long-term impacts of physical activity on menopausal health outcomes. Moreover, expanding the participant base to include larger and more balanced samples from both Nigeria and Hungary

would enable meaningful cross-cultural comparisons. Such comparative investigations could elucidate how sociocultural norms, healthcare accessibility, and environmental conditions shape the relationship between physical activity and menopausal well-being. Insights from these multi-country approaches may ultimately guide the development of culturally responsive and context-specific health promotion strategies for women experiencing menopause worldwide.

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