Health Problems of Civilization
eISSN: 2354-0265, ISSN: 2353-6942

ORIGINAL PAPER

PHYSICAL ACTIVITY IN MENOPAUSE AND SOCIODEMOGRAPHIC FACTORS: A PILOT STUDY

Adrianna Maria Kosior-Lara[1(A,B,D,E,F,G)], **Jacek Wąsik**[2(C,D,E,F)], **Małgorzata Kuchta**[3(B,C)], **Dorota Ortenburger**[2(E)]

[1]Department of Nursing, Jan Dlugosz University in Częstochowa, Poland
[2]Institute of Physical Culture Sciences, Jan Dlugosz University in Częstochowa, Poland
[3]Institute of Technology, State University of Applied Sciences in Racibórz, Poland

Kosior-Lara AM, Wąsik J, Kuchta M, Ortenburger D. Physical activity in menopause and sociodemographic factors: a pilot study. Health Prob Civil. https://doi.org/10.5114/hpc.2025.155552

Tables: 1
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References: 28
Submitted: 2025 Aug 12
Accepted: 2025 Oct 27

Address for correspondence: Jacek Wąsik, Institute of Physical Culture Sciences, Jan Dlugosz University in Częstochowa, Armii Krajowej 13/15, 42-217 Częstochowa, Poland, e-mail: j.wasik@ujd.edu.pl, phone: +48 348880111

ORCID: Adrianna Maria Kosior-Lara https://orcid.org/0000-0001-5777-294X, Jacek Wąsik https://orcid.org/0000-0002-6285-7283, Małgorzata Kuchta https://orcid.org/0009-0002-3878-2434, Dorota Ortenburger https://orcid.org/0000-0003-4878-0459

Summary

Background. The aim of this study was to assess the level of physical activity of women in the menopausal period in relation to selected sociodemographic variables, such as place of residence, marital status and age.

Material and methods. The study included 75 women (mean age: 53.11±5.38 years) in the pre- and postmenopausal period. A short version of the International Physical Activity Questionnaire (IPAQ-SF) was used to assess the level of activity (MET-min/week) and sedentary time. Group differences were analyzed using the Kruskal-Wallis test, and multiple regression examined the influence of sociodemographic factors.

Results. Median total physical activity ranged from 611 to 1,934 MET-min/week across marital status categories, from 132 to 1,474 across residential settings and was highest among women born between 1991-2000 (1,546 MET-min/week). Although these differences were not statistically significant ($p>0.05$), a trend toward higher activity among younger and rural women was observed. Regression analysis confirmed that age, marital status and place of residence were not significant predictors of total physical activity, explaining about 20% of the variance (R^2=0.201, Adj. R^2=0.064).

Conclusions. Physical activity among menopausal women was generally low to moderate and not significantly related to basic sociodemographic factors. Nevertheless, the results suggest higher activity in younger and rural participants. Given the small sample size and pilot nature of the study, the findings should be interpreted with caution.

Keywords: IPAQ, sociodemographic factors, menopause, physical activity, health

Introduction

The menopausal transition is accompanied by substantial physiological and metabolic alterations that increase the risk of cardiovascular disease, osteoporosis and metabolic disorders [1]. Moreover, this stage of life is characterized by vasomotor, psychological and sleep disturbances that may adversely affect well-being and functional capacity. Recent studies indicate that sleep quality, physical activity and mental health are interrelated and significantly associated with autonomic nervous system function, highlighting the importance of an integrated approach to the assessment of health in women during the menopausal transition [2].

Beyond conventional menopausal hormone therapy, increasing attention has been directed toward complementary and lifestyle-based approaches. Studies have shown that mind-body exercise-based interventions (e.g. yoga, tai chi, Pilates) can positively affect sleep quality, anxiety, depression and fatigue in perimenopausal and postmenopausal women, supporting the use of non-pharmacological strategies in the care of this group [3]. Regular physical activity also plays a key role in counteracting adverse effects by improving lipid profile, insulin sensitivity and bone mineral density [4-6]. In contrast, physical inactivity can lead to deterioration of fitness and metabolic health. During the COVID-19 pandemic, social restrictions substantially influenced the health behaviors of women in the menopausal period, particularly in terms of diet, stress management and physical activity. Studies have shown that fear of COVID-19 was a major factor modifying lifestyle behaviors in this group [7].

Despite the well-documented benefits, physical activity levels among menopausal women often remain insufficient [8], which may be influenced by both biological and socio-occupational factors [9]. Although research on physical activity among menopausal women is expanding, only a limited number of studies have simultaneously examined the influence of multiple sociodemographic factors – such as place of residence, marital status and age – on physical activity [10]. Many existing studies focus on single variables or homogeneous populations, which limits the generalizability of results [11]. Furthermore, the accuracy of self-reported instruments such as the International Physical Activity Questionnaire (IPAQ) in reflecting true physical activity among midlife women remains insufficiently explored [12]. This gap hinders the development of effective, precise and contextually appropriate preventive and intervention measures.

Physical activity is a key component of a healthy lifestyle, and its beneficial effects are well documented. Numerous studies indicate that even minimal recommended amounts of activity bring significant health benefits, including reduced obesity risk, improved cardiovascular function and a lower incidence of cancer [13,14]. Unfortunately, a growing trend toward sedentary behavior has been observed, particularly among peri- and postmenopausal women, who often spend substantial portions of their day in seated activities such as television viewing, computer use or other passive forms of leisure [15,16]. In the context of health promotion, late adulthood is particularly important, as health habits and activity levels at this age determine quality of life, functional independence and the risk of developing age-related chronic diseases such as cardiovascular disease, type 2 diabetes or

osteoporosis [11,17,18]. Therefore, identifying the determinants of physical activity among peri- and postmenopausal women is of particular importance from a public health perspective.

Aim of the work

The aim of this study was to assess the level and structure of physical activity among menopausal women using the IPAQ, with particular consideration of sociodemographic factors including place of residence, marital status and age.

The findings may provide valuable insights for shaping effective health promotion programmes and preventive strategies tailored to the needs of women during the menopausal transition, who are particularly vulnerable to reduced physical activity and related health risks [19].

Material and methods

Participants

The study included 75 women randomly selected from a larger population of female residents of Poland. The mean age of participants was 53.11±5.38 years (median: 51; interquartile range [IQR]: 48-55; range: 34-61), and the mean body mass index (BMI) was 31.32±11.80. Age, body mass and height were self-reported by participants as part of the demographic questionnaire. Body mass index (BMI) was calculated as weight (kg) divided by height squared (m^2) and was presented as median and interquartile range (IQR).

The cohort represented diverse geographic regions of the country. Most participants were married (67%) and had at least secondary education (85%). Regarding occupational status, 25% were employed in health care, 25% in administrative or office positions and 24% in education, 23% worked in other sectors, and 3% were unemployed. With respect to menopausal status, 45% of participants were postmenopausal (defined as no menstruation for more than three years), 38% were peri-menopausal (one to three years without menstruation), and 17% were in early perimenopause (less than 12 months without menstruation). Nearly all women (97%) reported at least one childbirth, while only two participants had never given birth.

Research tool

Physical activity was assessed using the International Physical Activity Questionnaire – Short Form (IPAQ-SF), administered as a self-report survey. The questionnaire evaluates vigorous, moderate and walking activities, as well as sedentary behavior over the previous seven days. The procedure followed the official Polish adaptation and scoring guidelines of the IPAQ Research Committee.

Participants reported the frequency and duration of activities, which were converted to MET-min/week using standard coefficients: 8.0 MET for vigorous activity, 4.0 MET for moderate activity and 3.3 MET for walking. According to the IPAQ scoring protocol, respondents were classified into three categories of physical activity: high – ≥1,500 MET-min/week or vigorous activity on ≥3 days/week, moderate – ≥600 MET-min/week or moderate activity on ≥5 days/week, low – insufficient activity or inactivity [20].

The IPAQ-SF has demonstrated acceptable reliability and validity in previous studies.

Recruitment procedure

Participants were recruited through local health centers between January and May 2025. Information about the study was distributed via posters and announcements in community health settings. Participation was voluntary, and all participants provided written informed consent prior to enrolment. A convenience sampling method was employed. Although this approach limits representativeness, it was appropriate for the exploratory nature of this pilot study.

Data collection and measurements

Sociodemographic data included age, marital status, place of residence, educational level and employment status. The menopausal stage was determined by self-assessment and categorized as perimenopausal or postmenopausal. Potential confounding variables, including BMI, presence of chronic diseases and smoking status, were recorded where possible. However, due to incomplete data, these variables were not included in the final regression analysis.

Statistical analysis

All statistical analyses were performed using Statistica version 13.3 (TIBCO Software Inc., Palo Alto, CA, USA). Descriptive statistics were calculated for all variables. The normality of the distribution of quantitative variables was assessed using the Shapiro-Wilk test. Since the distributions of most variables deviated from normal, descriptive statistics appropriate for nonparametric data were used – median (Me) and interquartile range (IQR).

Group comparisons were conducted using the Kruskal-Wallis test, which was applied to compare continuous variables between categories of marital status, place of residence and age group. The strength of the association (effect size) for the Kruskal-Wallis test was calculated as ε^2 (epsilon squared), interpreted according to the following criteria: 0.01 – small effect, 0.06 – medium effect, and 0.14 – large effect. The results were also visualized in box plots, with the H statistic, *p*-value and ε^2 displayed above each plot.

To explore the relationships between sociodemographic variables and physical activity, multiple linear regression analysis was performed. Standardized beta coefficients (β) and corresponding *p*-values were reported. Regression assumptions were verified prior to model estimation: linearity (scatterplots), normality of residuals (Shapiro-Wilk test), homoscedasticity (residual plots), independence of residuals (Durbin-Watson test) and multicollinearity (Variance Inflation Factor, VIF < 5).

Results with a *p*-value < 0.05 were considered statistically significant. In addition to *p*-values, effect sizes (ε^2 for nonparametric tests and standardized β coefficients for regression) were reported to provide information on the strength of the observed relationships.

A post-hoc power analysis was performed using G*Power version 3.1.9.7 to verify the adequacy of the sample size for multiple regression. Assuming a medium effect size (f^2=0.15), α=0.05 and statistical power (1–β)=0.80, the minimum required sample size was 55 participants, confirming that the analyzed group of 75 women provided sufficient power for the conducted analyses.

Results

Table 1 presents the descriptive statistics of total physical activity (total METS) among women according to marital status, place of residence and age group. The median total physical activity ranged from 611 MET-min/week in divorced women to 1,934 MET-

min/week in widowed women. Across places of residence, the median varied from 132 MET-min/week among residents of towns ≤50,000 to 1,474 MET-min/week among women living in rural areas. In terms of age, the highest total physical activity was observed among women born between 1991-2000 (1,546 MET-min/week), while the lowest was found among those born in 1971-1980 (834 MET-min/week). Although these differences did not reach statistical significance, the data shows a trend toward higher activity in younger age groups and rural residents.

Table 1. Descriptive statistics of total physical activity (MET-min/week)

Variable	Group	n	Median (MET-in/week)	Q1 (MET-in/week)	Q3 (MET-in/week)	Min (MET-in/week)	Max (MET-in/week)
Marital status	**Divorced**	47	834	201,5	1474	0	2754
	Married	5	1038	819	1074	0	1554
	Single	14	611,25	533,25	1263,75	0	2125,5
	Widowed	2	787,5	753,75	821,25	720	855
	Cohabiting	2	1934	1764	2104	1594	2274
Place of residence	**City >500k**	2	964,5	909,75	1019,25	855	1074
	City ≤100k	8	1290	688,5	1464	0	1794
	City ≤20k	14	1039	651,375	1404	0	2178
	City ≤500k	24	806,5	436	1536	0	2754
	City ≤50k	7	132	0	417	0	720
	Village	15	1474	533,25	1920	0	2754
Date of birth	**≤1970**	25	855	80	1314	0	2754
	1971-1980	39	834	594	1574	0	2754
	1981-1990	3	834	590,25	1695	346,5	2556
	1991-2000	2	1546,5	1182,75	1910,25	819	2274

Figure 1 illustrates the distribution of total, walking and sitting physical activity (total METS, walking METS, sitting METS) across marital status, place of residence and age groups. The box plots demonstrate substantial variability within categories, with no statistically significant group differences according to the Kruskal-Wallis test (p>0.05). Nonetheless, visual inspection revealed a tendency toward higher walking activity among women living in smaller towns (≤20,000) and younger cohorts, as well as greater sitting time among residents of large cities (>500,000).

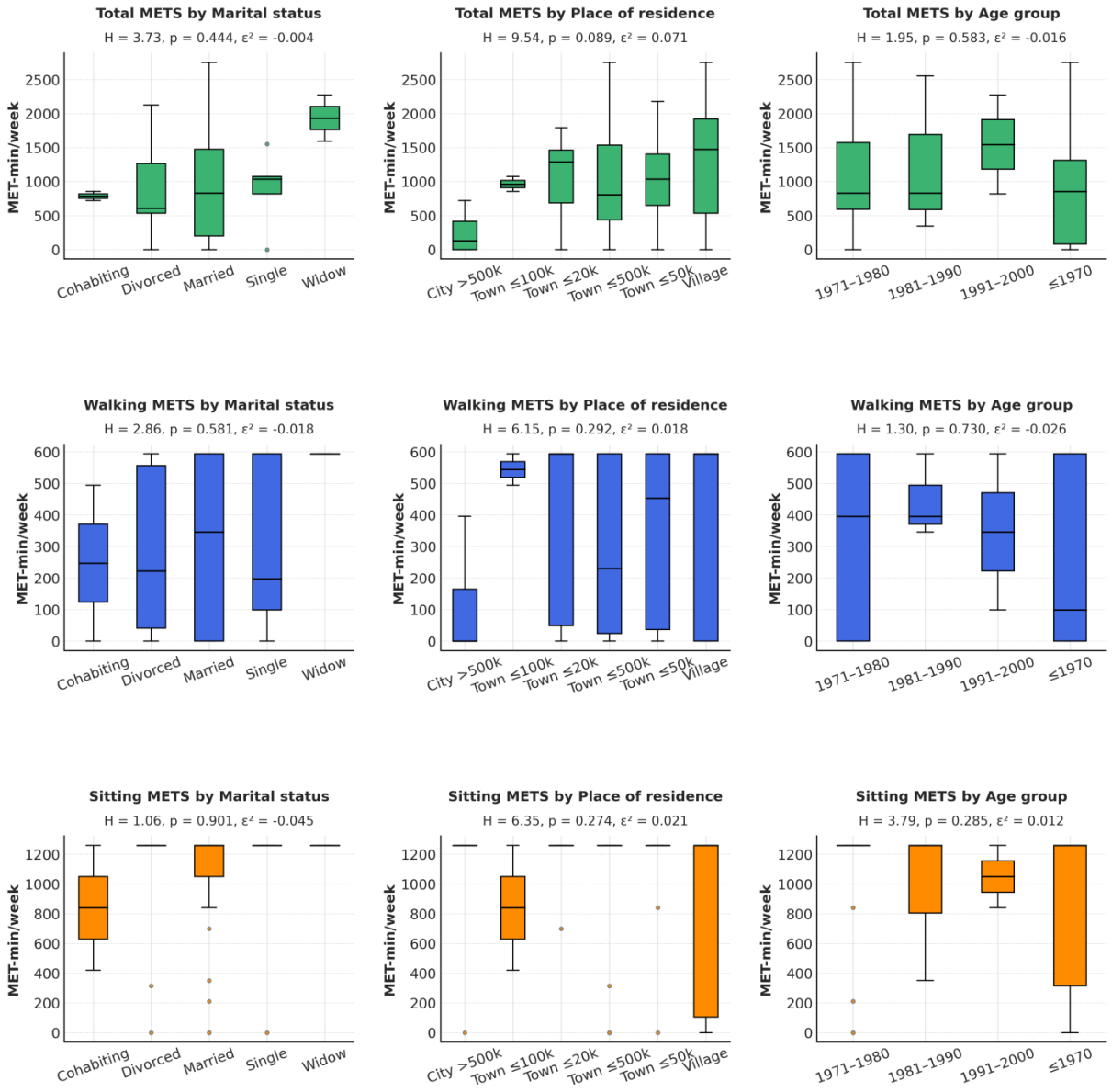

Figure 1. Distribution of total physical activity (total METS), walking activity (walking METS) and sitting activity (sitting METS) among women according to marital status, place of residence and age group

Notes: Box plots display the median, interquartile range (Q1-Q3), minimum and maximum values, as well as the Kruskal-Wallis test statistics (H, *p*) and effect size (ε^2) for each comparison.

Figure 2 presents the standardized beta coefficients (β) from the multiple regression model assessing the influence of sociodemographic factors on total physical activity. The model explained approximately 20.1% of the variance in total METS (R^2=0.201, Adj. R^2=0.064). None of the predictors reached statistical significance, but the strongest standardized effect was observed for birth year, indicating a weak positive association

between younger age and higher physical activity levels. The effects of marital status and place of residence were minimal and not significant.

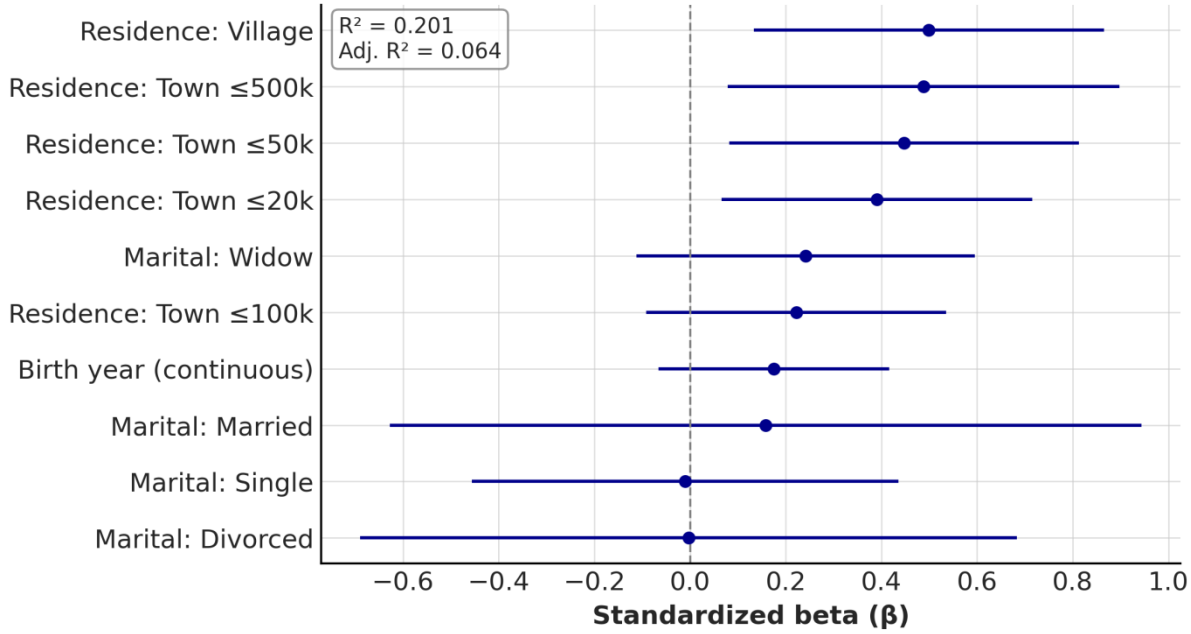

Figure 2. Standardized beta coefficients from a multiple regression model assessing the effect of sociodemographic factors on total physical activity

Together, these findings indicate that although minor tendencies were observed across sociodemographic subgroups, marital status, place of residence and age were not statistically significant determinants of physical activity in menopausal women.

Discussion

The present study aimed to evaluate the level of physical activity and its sociodemographic determinants among women during the menopausal period. The analysis revealed that total physical activity, expressed in MET-min/week, was generally low to moderate and did not differ significantly across marital status, place of residence or age group. Although certain trends were observed – such as higher activity levels among younger women and those residing in rural areas – these differences were not statistically significant and were accompanied by small effect sizes.

The multiple regression analysis further demonstrated that sociodemographic variables, including age (birth year), marital status and place of residence, accounted for only

a small proportion of the variance in total physical activity (R^2=0.201, Adj. R^2=0.064). This finding suggests that these variables alone are weak predictors of physical activity in midlife women. Comparable results have been reported in previous research, indicating that physical activity during menopause is influenced by a complex interplay of biological, psychological and social factors, rather than by sociodemographic characteristics alone [21].

The observed tendency toward higher total MET values among younger participants is consistent with prior studies demonstrating a decline in physical activity with advancing age [22]. In the present sample, women born after 1990 exhibited the highest levels of total activity, whereas those born before 1970 showed the lowest. This pattern may reflect not only physiological changes associated with aging but also generational differences in lifestyle, occupational demands and attitudes toward exercise.

The lack of significant differences across marital status and place of residence may be attributed to the relative homogeneity of the study sample and the multifactorial nature of physical activity behavior. Previous evidence suggests that although social support and family responsibilities may affect women's engagement in exercise, these relationships are often mediated by psychosocial factors such as motivation, self-efficacy and perceived barriers [23]. Similarly, while urban or rural settings may shape opportunities for physical activity, environmental accessibility alone is insufficient to drive behavior in the absence of internal motivation.

Beyond biological and sociodemographic influences, psychosocial factors play a critical role in shaping physical activity behavior among menopausal women. Previous research has demonstrated that emotional well-being, perceived control and self-efficacy are closely related to exercise participation during the menopausal transition [24]. Women who report higher self-efficacy and positive mood tend to engage more consistently in physical activity, which, in turn, contributes to improved psychological outcomes and quality of life [25]. Social support has also been identified as an important facilitator of physical activity during midlife. Both informal support from family and peers and structured group-based exercise programs enhance adherence and long-term engagement [26]. This finding aligns with behavioral models suggesting that social connectedness and encouragement can buffer motivational declines commonly observed during this life stage.

Taken together, the findings indicate that physical activity among menopausal women remains relatively low and only weakly associated with basic sociodemographic characteristics. These results underscore the need to examine additional determinants – such

as menopausal symptoms, psychological well-being and health beliefs – that may exert a stronger influence on physical activity patterns.

From a broader socioeconomic perspective, these findings may also reflect structural factors such as disparities in access to recreation facilities, time constraints associated with employment and caregiving and cultural norms regarding women's participation in physical activity. In Poland and similar Central European contexts, the transition through menopause often coincides with significant occupational and family responsibilities, which can limit time and motivation for exercise. Therefore, interventions should consider both individual and contextual determinants, addressing environmental barriers and strengthening psychosocial resources.

Literature consistently highlights the importance of psychosocial factors, including social support, in shaping health behaviors such as physical activity in menopausal populations [27,28]. Consequently, the results of this study indicate the need to design physical activity promotion programs that incorporate both the local urban context and elements of social support.

Limitations and future directions

Several limitations should be acknowledged. The relatively small and homogeneous sample limits the generalizability of the findings. The visual tendencies observed were not statistically confirmed, likely due to the limited statistical power. Furthermore, the use of self-reported measures (IPAQ-SF) rather than objective data (e.g. accelerometry) may have obscured actual associations. In addition, potential confounders such as menopausal symptoms, psychological status or socioeconomic level were not comprehensively assessed.

Future research should employ objective measures of physical activity, include more diverse populations, and examine the influence of infrastructure, occupational factors and social support on physical activity levels among women. Longitudinal designs would allow for a better understanding of causal relationships between menopausal transition, psychosocial changes and physical activity behaviors.

Practical implications

Despite these limitations, the study provides valuable insights for public health initiatives. Interventions promoting physical activity among menopausal women should focus on enhancing motivation, building self-efficacy and strengthening social networks that facilitate sustained engagement in exercise. Developing community-based programs that integrate accessible, flexible and socially supportive activities could improve adherence and overall well-being in this population.

This study contributes original evidence by analyzing the combined effects of multiple sociodemographic variables, rather than examining single factors in isolation. By integrating sociodemographic, psychosocial and contextual perspectives, the findings provide a foundation for designing targeted, multifaceted strategies to promote physical activity among women during the menopausal transition.

Conclusions

In the studied group of menopausal women, the overall level of physical activity was moderate and did not differ significantly across age, marital status or place of residence. Only minor tendencies were observed, indicating slightly higher activity among younger women and those living in rural areas; however, these differences were of limited practical significance.

Sociodemographic variables explained only a small proportion of the variance in total physical activity, suggesting that these factors are not the primary determinants of health-related behaviors during menopause.

These findings highlight the need for further research on additional predictors of physical activity, particularly psychological and health-related factors, as well as the development of interventions aimed at strengthening intrinsic motivation and supporting regular physical activity among middle-aged women.

Disclosures and acknowledgements

The authors declare no conflicts of interest with respect to the research, authorship, and/or publication of this article.

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Participation in the study was voluntary, and all the women provided written informed consent after receiving detailed information about the study protocol. The research was conducted in accordance with the principles of the Declaration of Helsinki.

During the preparation of this paper, the ChatGPT tool (GPT-5 model, OpenAI) was used to generate and aesthetically enhance graphs and data visualisations. After using this tool, the authors reviewed and edited the content as needed and bear full responsibility for the substantive content of the publication.

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