

The Relationship between Vasomotor Symptoms and Quality of Life in Premenopausal Women

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Abstract. Premenopause is a transitional phase preceding menopause characterized by hormonal changes, particularly declining estrogen levels. Vasomotor symptoms, including hot flashes and night sweats, are the most common complaints during this period and may adversely affect physical, psychological, and social well-being, resulting in reduced quality of life. However, evidence regarding the relationship between vasomotor symptoms and quality of life among premenopausal women in Indonesian primary healthcare settings remains limited. Objective: To examine the relationship between vasomotor symptoms and quality of life among premenopausal women at Jati Primary Health Center, Kudus Regency, Indonesia. Methods: This quantitative study employed an analytical observational design with a cross-sectional approach. A total of 50 premenopausal women aged 40–55 years were recruited using purposive sampling. Vasomotor symptoms were assessed using the vasomotor subscale of the Menopause Rating Scale (MRS), while quality of life was measured using the Menopause-Specific Quality of Life Questionnaire (MENQOL). Both variables were analyzed as continuous data. Normality was assessed using the Shapiro–Wilk test, which demonstrated non-normal data distribution ($p < 0.05$). Therefore, the relationship between variables was analyzed using Spearman's rank correlation test with a significance level of 5%. Results: The mean vasomotor symptom score was 2.84 ± 0.97 , with a median of 3, ranging from 0 to 4. The mean MENQOL score was 84.62 ± 20.31 , with a median of 83, ranging from 39 to 146. Spearman's rank correlation analysis demonstrated a statistically significant strong positive correlation between vasomotor symptoms and quality of life ($r = 0.612$; $p < 0.001$). Higher vasomotor symptom scores were associated with higher MENQOL scores, indicating poorer quality of life. Conclusion: There was a statistically significant strong positive relationship between vasomotor symptoms and quality of life among premenopausal women. Increasing severity of vasomotor symptoms was associated with poorer quality of life. Early identification, health education, and appropriate management of vasomotor symptoms in primary healthcare settings are recommended to improve women's quality of life during the menopausal transition.

Keywords: Premenopausal women; vasomotor symptoms; quality of life; Menopause Rating Scale; MENQOL

INTRODUCTION

The menopausal transition is a biological process that every woman experiences as part of reproductive aging. This period generally lasts 2–8 years before the last menstrual period and is characterized by a decline in ovarian follicle function, leading to fluctuations in estradiol levels, increased follicle-stimulating hormone (FSH) levels, and changes in menstrual cycle patterns. These hormonal changes affect various body systems, including metabolism, the cardiovascular system, and the central nervous system, resulting in a variety of physical and psychological symptoms during the menopausal transition (Manson, 2024).

Among the various clinical manifestations that occur during the menopausal transition, vasomotor symptoms such as hot flashes and night sweats are the most frequently reported and most disturbing complaints (Nappi *et al.*, 2021). These symptoms occur due to decreased estrogen levels that affect the thermoregulatory center in the hypothalamus through activation of kisspeptin–neurokinin B–dynorphin (KNDy) neurons, resulting in a narrowing of the body's temperature tolerance range thermoneutral zone (Depypere *et al.*, 2021). Consequently, small changes in core body temperature can trigger peripheral vasodilation, sudden sensations of heat, flushing of the face and neck, and excessive sweating. In addition to causing physical discomfort, vasomotor symptoms are also associated with sleep disturbances, decreased concentration, mood swings, and decreased productivity and daily functioning, making them a major determinant of women's quality of life during the menopausal transition (Hickey *et al.*, 2026; Geraci *et al.*, 2024).

Globally, vasomotor symptoms are a major health concern for women during the menopausal transition. The World Health Organization (WHO) projects that more than 1.1 billion women will be over 50 years old by 2025, with approximately 25 million women entering menopause each year (WHO, 2024a ; Achievements, 2021). This increase in the number of women entering menopause has led to a continued rise in the health burden of vasomotor symptoms in various countries. Various studies have shown that hot flashes and night sweats are the most common vasomotor symptoms experienced during the menopausal transition. A recent systematic review and meta-analysis reported that the prevalence

of vasomotor symptoms in middle-aged women remains high in various regions of the world and is associated with reduced quality of life, sleep disturbances, and impaired psychosocial functioning (Fang *et al.*, 2024 ; Gibson *et al.*, 2024).

In Asia, the prevalence of vasomotor symptoms is also quite high, although it varies across countries. These variations are influenced by genetic factors, diet, lifestyle, ethnic characteristics, and differences in measurement methods used in each study (Kingsberg *et al.*, 2023). Although the prevalence of vasomotor symptoms in Asian women tends to be lower than in Western women, the clinical impact on quality of life in women with moderate to severe symptoms is not significantly different. This condition indicates that vasomotor symptoms remain a health problem that requires attention in women's health care in the Asian region (Kingsberg *et al.*, 2023 ; Committee *et al.*, 2020).

In Indonesia, the increasing number of middle-aged women, coupled with increasing life expectancy, has led to more women entering the menopausal transition phase and experiencing postmenopausal life. Based on population data analysis by age and sex from the Central Statistics Agency (BPS), it is estimated that there are approximately 31.5 million women aged 40–55 years in Indonesia (BPS, 2024). This large population indicates that menopause has become a public health issue that requires greater attention, particularly through early detection efforts, health education, and services oriented towards improving women's quality of life (BPS, 2024 ; WHO, 2024b). However, menopause health services in Indonesia still require strengthening. Public awareness of menopause and utilization of health services are not optimal, which is thought to be related to limited health literacy, the persistence of stigma against menopause, and the unequal readiness of health workers to provide evidence-based services. Therefore, the World Health Organization (WHO) and the National Institute for Health and Care Excellence (NICE) recommend strengthening the capacity of health workers, increasing public education, and integrating menopause services into primary health care so that women receive comprehensive care during the menopausal transition (WHO, 2024b ; NICE, 2024).

Vasomotor symptoms are a major contributing factor to a decline in women's quality of life during the menopausal transition. Daytime hot flashes can cause sudden feelings of heat, discomfort, impaired concentration, and decreased productivity in daily activities. Meanwhile, night sweats often result in sleep fragmentation, leading to fatigue, decreased energy, impaired cognitive function, and mood swings. The decline in estrogen levels during the menopausal transition also affects neurotransmitter systems in the hypothalamus and limbic system, particularly the serotonin, norepinephrine, and neurokinin B pathways, disrupting the body's thermoregulatory mechanisms and increasing susceptibility to sleep disorders, anxiety, and depression. These findings suggest that vasomotor symptoms impact not only physical aspects but also women's psychological health and social functioning (Geraci *et al.*, 2024 ; Hickey *et al.*, 2026).

Recent studies have shown that the more severe the vasomotor symptoms experienced, the greater the decline in women's quality of life. A systematic review by Kingsberg *et al.* reported that vasomotor symptoms were consistently associated with reduced quality of life, particularly in the physical, psychosocial, and sleep domains (Kingsberg *et al.*, 2023). Furthermore, Gibson *et al.* concluded that women with moderate to severe vasomotor symptoms had a higher risk of sleep disturbances, decreased work productivity, increased healthcare utilization, and decreased overall well-being compared to women with mild or no symptoms (Gibson *et al.*, 2024). These findings emphasize that early identification of vasomotor symptoms and quality of life assessment are essential components of midlife women's healthcare, and further study of the relationship between these two variables is warranted in various populations, including premenopausal women at the community level.

A preliminary study conducted in the Jati Community Health Center (Puskesmas Jati) in Kudus Regency in February 2026 showed that vasomotor symptoms were still prevalent among women aged 40–55. Of the 15 women interviewed, 11 (73.3%) reported experiencing hot flashes, 9 (60.0%) experienced sleep disturbances due to night sweats, and all respondents stated they had never received education or counseling regarding changes that occur during premenopause. Furthermore, a review of the Jati Community Health Center visit register for the period January–December 2025 showed that there was no screening program or specific service focused on detecting and managing menopausal symptoms in primary health care. This situation indicates that vasomotor symptoms are still not optimally identified, potentially causing a decline in the quality of life of middle-aged women without adequate intervention. These findings are in line with the World Health Organization (2024) recommendations that emphasize the importance of integrating menopausal health services into primary

health care through improved education, early detection, and comprehensive symptom management.

Although various studies have reported that menopausal symptoms are associated with a decreased quality of life, several research gaps remain that require further study. Most studies in Indonesia assess menopausal syndrome in general without specifically examining vasomotor symptoms, the primary variable most frequently complained of by women during the menopausal transition. Furthermore, many studies have been conducted in hospital-based populations or referral health facilities, so the results do not fully reflect the condition of premenopausal women in the community. Studies using a combination of the Menopause Rating Scale (MRS) to measure the severity of vasomotor symptoms and the Menopause-Specific Quality of Life Questionnaire (MENQOL) to assess quality of life in premenopausal women at the primary health care level are also limited. Therefore, research on the relationship between vasomotor symptoms and quality of life in premenopausal women in the Jati Community Health Center (Puskesmas) in Kudus Regency is needed to provide scientific evidence that can support the development of promotive, preventive, and educational programs in women's health services at the community level.

Based on the above description, vasomotor symptoms are a health problem frequently experienced by women during the menopausal transition and have been shown to impact various aspects of quality of life, including physical, psychological, and social aspects. However, evidence regarding the relationship between vasomotor symptoms and quality of life in premenopausal women at the primary health care level in Indonesia is still limited, particularly studies that use the Menopause Rating Scale (MRS) and Menopause-Specific Quality of Life Questionnaire (MENQOL) simultaneously. Therefore, this study is important to obtain scientific evidence regarding the relationship between vasomotor symptoms and quality of life in premenopausal women in the Jati Community Health Center (Puskesmas) working area in Kudus Regency. The results of this study are expected to provide a basis for health workers, particularly midwives and nurses, in developing promotive, preventive, and educational efforts related to menopausal health, as well as providing input for the Puskesmas in developing early screening programs and more comprehensive health services for middle-aged women. The aim of this study was to analyze the relationship between vasomotor symptoms measured using the Menopause Rating Scale (MRS) and quality of life measured using the Menopause-Specific Quality of Life Questionnaire (MENQOL) in premenopausal women in the working area of the Jati Community Health Center, Kudus Regency.

METHODS

The study was conducted in the Jati Community Health Center, Jati District, Kudus Regency, Central Java, in February–March 2026. The study population was all women aged 40–55 years who were in the premenopausal or perimenopausal phase. Inclusion criteria included: (1) aged 40–55 years; (2) still menstruating even though the cycle was irregular or had stopped menstruating for less than 12 months; (3) willing to be respondents by signing an informed consent form; and (4) able to communicate well without cognitive impairment. The exclusion criteria included: (1) having a history of bilateral oophorectomy; (2) currently undergoing hormonal therapy; (3) suffering from chronic diseases that can independently affect quality of life, such as active cancer, kidney failure, or heart failure; and (4) not present at the time of data collection.

The sampling technique used purposive sampling with a sample size of 50 respondents who met the research criteria. Vasomotor symptoms were measured using the vasomotor subscale of the Menopause Rating Scale (MRS) developed by Heinemann et al. This subscale consists of a single item assessing hot flashes and sweating episodes as the main vasomotor symptoms. Each item on the MRS is rated on a Likert scale of 0–4, with a score of 0 = no complaints, 1 = mild, 2 = moderate, 3 = severe, and 4 = very severe. In this study, the vasomotor subscale score was used as continuous data, where higher scores indicate increasingly severe vasomotor symptoms. The use of continuous scores follows the original MRS guidelines, which do not specify standard categories for total scores or domain scores as mild, moderate, or severe. Quality of life was measured using the Menopause-Specific Quality of Life Questionnaire (MENQOL) developed by Hilditch et al. This instrument consists of 29 items covering four domains: vasomotor (3 items), psychosocial (7 items), physical (16 items), and sexual (3 items). Each item is scored on a Likert scale with a score range of 0–6, so that higher scores indicate a greater impact of menopausal symptoms on quality of life. In this study, MENQOL scores were analyzed as a

continuous variable, in accordance with the instrument developer's guidelines, which do not specify cut-off values or quality of life categories, such as good, moderate, or poor. Therefore, interpretation is based on the magnitude of the score, where a higher MENQOL score indicates a lower quality of life perceived by the respondent.

Data collection was conducted using a structured questionnaire completed independently by respondents. Prior to completion, the researcher provided an explanation of the research objectives, completion procedures, and how to answer each item on the questionnaire. During the completion process, the researcher assisted respondents to provide clarification if there were any questions related to the technical aspects of the questionnaire, without directing or influencing the respondents' answers. After all questionnaires were completed, the researcher checked the completeness of the answers to minimize the occurrence of incomplete data (missing data). Data analysis was performed using IBM SPSS Statistics version 26.0. Univariate analysis was used to describe the characteristics of respondents and the distribution of each research variable in the form of mean, standard deviation, median, range, frequency, and percentage according to the data type. Bivariate analysis was performed using the Spearman Rank correlation test (ρ) to analyze the relationship between vasomotor symptom scores and quality of life scores. The Spearman test was selected based on the results of the Shapiro–Wilk normality test, which showed that the data distribution of both variables was not normal ($p < 0.05$). All statistical tests used a significance level of $\alpha = 0.05$ with a 95% confidence interval.

RESULTS AND DISCUSSION

This study involved 50 premenopausal women who met the inclusion criteria. Respondent characteristics included age group, education level, occupation, and menstrual status, as presented in Table 4.1.

Table 1 Respondent Characteristics (n=50).

Characteristics	Frequency (n)	Percentage (%)
Age Group		
40-44 years	14	28,0
45-49 years	22	44,0
50-55 years	14	28,0
Education Level		
Elementary/Middle School	16	32,0
High School / Vocational School	24	48,0
University	10	20,0
Occupation		
Housewife	28	56,0
Employee / Self - Employed	22	44,0
Menstrual Status		
Irregular Cycle	35	70,0
Stopped < 12 Months	15	30,0

Based on Table 1, the majority of respondents were in the 45–49 age group (22 people (44.0%)), while the 40–44 and 50–55 age groups each had 14 people (28.0%). Based on education level, the majority of respondents had a high school/vocational high school education (24 people (48.0%)), followed by elementary/junior high school (16 people (32.0%)) and college (10 people (20.0%)). Based on occupation, the majority of respondents were housewives (28 people (56.0%)), while 22 people (44.0%) worked as employees or self-employed. Based on menstrual status, the majority of respondents experienced irregular menstrual cycles (35 people (70.0%)), while 15 people (30.0%) had experienced the cessation of menstruation for less than 12 months.

Table 2 Distribution of VasoMotor Symptoms (n=50)

Variable	Mean±SD	Median	Minimum	Maximum
Vasomotor Symptoms (MRS)	2,84±0,97	3	0	4

Based on Table 2, the vasomotor symptom score in premenopausal women had an average value of 2.84 ± 0.97 with a median of 3, a minimum score of 0, and a maximum score of 4. This shows that the severity of vasomotor symptoms in respondents varied.

Table 3 Distribution of Quality of Life (n=50)

Variable	Mean±SD	Median	Minimum	Maximum
Quality of Life (MENQOL)	84,62±20,31	83	39	146

Based on Table 3, the quality of life score has an average value of 84.62±20.31 with a median of 83, a minimum score of 39 and a maximum score of 146. The higher the MENQOL score, the worse the quality of life.

Table 4 Shapiro - Wilk Normality Test

Variable	Shapiro - Wilk	p
Vasomotor Symptoms (MRS)	0,921	0,003
Quality of Life (MENQOL)	0,948	0,021

The results of the Shapiro–Wilk normality test showed that both variables had a p-value <0.05, indicating that the data were not normally distributed. Therefore, the correlation analysis was performed using the Spearman Rank correlation test.

Table 5 Relationship between Vasomotor Symptoms and Quality of Life

Variable	rho	P-value	Interpretation
MRS with MENQOL	0,612	< 0,001	Strong positive relationship

The Spearman Rank correlation test results showed a correlation coefficient (rho) of 0.612 with a p-value <0.001. This indicates a strong and statistically significant positive relationship between vasomotor symptoms and quality of life in premenopausal women. The higher the vasomotor symptom score, the higher the MENQOL score, which indicates a worse quality of life.

DISCUSSION

This study demonstrated a strong and statistically significant positive relationship between vasomotor symptoms and quality of life in premenopausal women ($\rho = 0.612$; $p < 0.001$). This finding indicates that the more severe the vasomotor symptoms, the poorer the quality of life. Vasomotor symptoms, particularly hot flashes and night sweats, not only cause physical discomfort but also affect daily activities, sleep quality, emotional well-being, and social interactions. Therefore, vasomotor symptoms are a major contributing factor to a decreased quality of life during the menopausal transition (Gibson *et al.*, 2024; Manson, 2024; Kingsberg *et al.*, 2023).

These findings are supported by the characteristics of the respondents, who were mostly in the 45–49 age range with irregular menstrual cycles, a characteristic of the active perimenopausal phase. Longitudinal studies have shown that vasomotor symptoms begin to increase during the perimenopausal phase and reach their highest prevalence in women with menstrual cycles that begin to become irregular, particularly in their mid-40s to early 50s (Harlow *et al.*, 2019; Santoro, N., Roeca, C., Peters, B. A., & Neal-Perry, 2022; Manson, 2024). Furthermore, the majority of respondents had a secondary education and were housewives. Educational attainment plays a role in improving women's health literacy and understanding changes during the menopausal transition, which can influence information-seeking behavior, utilization of health services, and coping strategies for menopausal symptoms (Avis *et al.*, 2021). In Indonesia, research also shows that women with higher levels of education tend to have better knowledge about menopause and are better able to adapt to the physical and psychological changes they experience (Marni *et al.*, 2025; (Della Wilutama, 2025). Meanwhile, work reflects psychosocial conditions, stress levels, and access to resources that can influence a woman's ability to cope with the symptoms she experiences. Thus, the characteristics of the respondents in this study align with the population of women who are physiologically and psychosocially more vulnerable to vasomotor symptoms and reduced quality of life (Theis *et al.*, 2023; Smith *et al.*, 2025; Kamallia *et al.*, 2021).

The results of the study showed a strong positive relationship between vasomotor symptoms and quality of life in premenopausal women ($\rho = 0.612$; $p < 0.001$). This finding indicates that the more severe the vasomotor symptoms experienced, the worse the respondents' perceived quality of life. Physiological changes that occur during the menopausal transition, namely fluctuations and decreases

in estrogen levels, disrupt the thermoregulatory mechanism in the hypothalamus, narrowing the thermoneutral zone, which in turn triggers hot flashes and night sweats. Recurrent symptoms can cause sleep disturbances, fatigue, decreased concentration, and mood swings, thus affecting women's daily activities, psychological functioning, and social interactions (Koysombat *et al.*, 2026). These findings align with growing scientific evidence showing that the pathogenesis of vasomotor symptoms is influenced not only by decreased estrogen levels but also by the activation of kisspeptin–neurokinin B–dynorphin (KNDy) neurons in the hypothalamus. Activation of these neurons increases the sensitivity of the thermoregulatory center, making women more susceptible to hot flashes and night sweats. This mechanism is the basis for the development of new nonhormonal therapies, such as neurokinin-3 receptor antagonists, which have been shown to be effective in reducing the frequency and intensity of vasomotor symptoms in menopausal women (Gompel & Stuenkel, 2023).

The results of this study are consistent with previous studies showing that the more severe the vasomotor symptoms experienced, the lower the quality of life of women during the menopausal transition. Gibson *et al.*, (2024) in a systematic review reported that women with moderate to severe vasomotor symptoms had a lower quality of life, especially in the physical, psychological, and social domains, and experienced more frequent sleep disturbances, decreased productivity, and increased use of health services. Similar findings were reported by Kingsberg *et al.*, (2023), who stated that hot flashes and night sweats were the menopausal symptoms that most contributed to a decline in women's quality of life and well-being. In Indonesia, Marni *et al.*, (2025) also found that the more severe the menopausal symptoms experienced, the greater the impact on quality of life across various domains, necessitating a comprehensive service approach. The consistency of these findings suggests that the impact of vasomotor symptoms is multidimensional and not limited to physical complaints, but also affects women's daily functioning and overall well-being.

However, vasomotor symptoms are not the only factor influencing premenopausal women's quality of life. Various biological, psychological, and social factors, such as age, body mass index, physical activity, stress levels, comorbidities, family support, education level, and access to health services, influence a woman's ability to adapt to changes during the menopausal transition. Therefore, decreased quality of life is the result of a complex interaction between hormonal changes and environmental and psychosocial factors experienced by each individual (WHO, 2024; Manson, 2024; Marni *et al.*, 2025).

The findings of this study have important implications for nursing practice and primary healthcare. Routine screening for vasomotor symptoms and quality of life assessment using validated instruments, such as the Menopause Rating Scale (MRS) and the Menopause-Specific Quality of Life Questionnaire (MENQOL), should be conducted in women aged 40–55. Furthermore, healthcare professionals should provide education about physiological changes during the menopausal transition, counseling, promoting a healthy lifestyle, and involving families as sources of psychosocial support. This comprehensive approach is expected to help women recognize and manage symptoms early, thereby minimizing their impact on quality of life.

This study has several limitations that should be considered when interpreting the results. The cross-sectional design does not allow researchers to explain the causal relationship between vasomotor symptoms and quality of life, while the relatively small sample size and the study's implementation in a single community health center (Puskesmas) limit the generalizability of the results to a broader population. Furthermore, the use of a self-report questionnaire-based instrument has the potential to introduce response bias. Therefore, further research is recommended to use a longitudinal design with a larger sample size and involving various regions to be able to provide stronger evidence regarding the relationship between vasomotor symptoms and quality of life in premenopausal women.

CONCLUSION

This study shows that premenopausal women experience vasomotor symptoms of varying severity, accompanied by varying quality of life. The analysis revealed a strong and statistically significant positive relationship between vasomotor symptoms and quality of life in premenopausal women. The more severe the vasomotor symptoms, the worse the perceived quality of life, making vasomotor symptoms a significant factor influencing women's well-being during the menopausal transition.

The findings of this study emphasize the importance of early screening for vasomotor symptoms using validated instruments, such as the MRS and MENQOL, as well as the integration of education,

counseling, and healthy lifestyle promotion in primary health care to reduce the impact of vasomotor symptoms and maintain women's quality of life during the menopausal transition.

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