



Assessment of Menopausal Symptoms Using Menopausal Rating Scale and Their Association with Serum Vitamin D Levels

¹Dr Shilpa Sharma, Resident, Department of Obstetrics and Gynecology, B.R.D. Medical College, Gorakhpur.

²Dr. Najma Malik, Associate Professor, Department of Obstetrics and Gynecology, B.R.D. Medical College, Gorakhpur.

³Dr. Ruma Sarkar, Professor and Head, Department of Obstetrics and Gynecology, B.R.D. Medical College, Gorakhpur.

⁴Dr Harish Chandra Tiwari, Associate Professor, Department of Community Medicine, B.R.D. Medical College, Gorakhpur.

Corresponding Author: Dr Shilpa Sharma, Resident, Department of Obstetrics and Gynecology, B.R.D. Medical College, Gorakhpur.

How to citation this article: Dr. Shilpa Sharma, Dr. Najma Malik, Dr. Ruma Sarkar, Dr. Harish Chandra Tiwari, “Assessment of Menopausal Symptoms Using Menopausal Rating Scale and Their Association with Serum Vitamin D Levels”, IJMACR- August - 2025, Volume – 8, Issue - 4, P. No. 137 – 143.

Open Access Article: © 2025 Dr Shilpa Sharma, et al. This is an open access journal and article distributed under the terms of the creative common’s attribution license (<http://creativecommons.org/licenses/by/4.0>). Which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Type of Publication: Original Research Article

Conflicts of Interest: Nil

Abstract

Menopause usually occurs around the age of 50, and when women go through menopause they generally experience unpleasant symptoms. Vitamin D is a type of steroid hormone that is required for bone health and the proper balance of calcium and phosphorus in the body. This study aimed to investigate the relationship between serum vitamin D levels and menopausal symptoms in women going through menopause using the Menopausal Rating Scale (MRS). The present study was a hospital-based observational cross-sectional study conducted on 200 participants. This study was carried out between 2024 and 2025 on all women between the ages of 40 and 65 who attended the OPD, Department of Obstetrics and Gynecology at B.R.D. Medical College, Gorakhpur. The

average age of the research participants was 50.2 ± 6.8 years. Results showed that most of the patients (42%) had vitamin D deficiency (<12 ng/mL). Menopause Rating Scale (MRS) ratings scores were significantly higher in all domains (somatic, psychological, and urogenital) for women with vitamin D deficiency. The ROC analysis revealed that vitamin D predicted severe symptoms ($MRS \geq 26$) with an $AUC=0.82$ ($p<0.001$) and a cut-off ≤ 14.3 ng/mL. Patients with deficient vitamin D showed a higher prevalence of menopausal symptoms than those with sufficient levels, which included hot flashes (92.9% vs. 50.0%), sleep disturbances (81.0% vs. 40.9%), joint pain (85.7% vs. 45.5%), and vaginal dryness (75.0% vs. 34.1%). Vitamin D deficiency was also linked to other health problems. Vitamin D

deficiency was more common in individuals that were vegetarians, experienced < 30 minutes of sun exposure each day, overweight or obese, and consumed fewer supplements and especially during the monsoon or winter seasons. These results represent the necessity of focused interventions, including dietary changes, vitamin D supplements, and lifestyle modifications, for maintaining ideal vitamin D levels and possibly minimizing the severity of menopausal symptoms.

Keywords: Menopause, Menopausal Rating Scale, Menopausal Transition, Vitamin D

Introduction

Menopause, which typically occurs between the ages of 45 and 56, is caused on by a decline in ovarian follicular activity for no other physiological or clinical reason (Crandall et al., 2023). Most women that undergo the menopausal transition experience unpleasant symptoms associated with decreasing or variable estrogen levels. The menopausal transition has been observed to increase vasomotor symptoms, vaginal dryness, poor sleep, and depression (Al-Safi & Santoro 2014). The majority of women going through menopause have vasomotor symptoms, which can be uncomfortable and frequently persist for a decade or longer (Kaunitz & Manson 2015). The increasing life expectancy for women suggests that most will experience the menopausal transition and spend a significant amount of time in this stage of life (Talaulikar 2022).

Vitamin D represents a steroid hormone that is necessary for maintaining bone health and the body's equilibrium of calcium (Ca) and phosphorus (P) levels (Yilmaz et al., 2016). In the summer, the sun's UV rays cause the skin to produce vitamin D₃, or it may be consumed through diet, particularly fatty fish. Following its hydroxylation in the kidney to produce 1,25-dihydroxyvitamin D

(1,25(OH)₂D) and liver to produce 25-hydroxyvitamin D (25(OH)D), the active metabolite can enter the cell and interact to the vitamin D receptor before it binds to a responsive gene such as calcium binding protein (Lips 2006).

Women may experience cognitive impairment and depression symptoms throughout menopause, which are more subtly and occasionally related to hormones (Santoro et al., 2015). For these symptoms, hormone therapy (HT) is the most effective treatment; transdermal and oral estrogen formulations are equally efficient (Kaunitz & Manson 2015).

In order to improve quality of life, clinicians can better customize treatment strategies by knowing the natural history of menopausal symptoms as well as the advantages and disadvantages of hormonal and non-hormonal possibilities (Al-Safi & Santoro 2014). The purpose of this study was to measure menopausal symptoms in women going through the menopause using the Menopausal Rating Scale (MRS) and examine how these symptoms correlate with serum vitamin D levels.

Material and Methods

This was a hospital-based observational cross-sectional study conducted from 2024 - 2025 on all women aged 40-65 who visited OPD of the Department of Obstetrics & Gynecology, B.R.D. Medical College, Gorakhpur.

Inclusion Criteria

Participants for the research were women between the ages of 40 and 65 who visited the Gynecology OPD.

Exclusion Criteria

- Pregnant and lactating women.
- Women with uncontrolled diabetes mellitus or cardiac disease.
- Women with a history of alcohol or drug abuse.

- Women who are on hormone replacement treatment (HRT).

- Women receiving cancer therapy or in remission

The study included patients who fulfilled the inclusion and exclusion criteria. The study has a sample size of 200. After filling out a consent form, participants were considered eligible to participate in the study. Data collection was carried out in the study region after obtaining consent from the Institute Ethical Committee (Annexure), the Head of the Department of Obstetrics and Gynecology, and the Dean, B.R.D. Medical College, Gorakhpur.

Statistical Analysis

Several variables were represented using descriptive statistics. With SPSS version 16, data analysis was carried out using the appropriate tests (correlation and chi-square test). A p-value of less than 0.05 was considered significant.

Results

The average age of the research participants was 50.2 ± 6.8 years. Data on socio-demographic profile of study participants showed that the majority of the participants were illiterate (41.5%), followed by primary (31%) and secondary (27.5%) education. Residency of the participants showed that 56% were from urban regions, while 44% from rural regions. According to the Kuppaswamy scale, 11% of people were in the upper class (Class I), 22.5% were in the upper middle class (Class II), 39.0% were in the lower middle class (Class III), 21.0% were in the upper lower class (Class IV), and 6.5% were in the lower class (Class V).

Table 1: Distribution of vitamin D levels and their association with serum concentrations

Vitamin D category	N (%)	Mean \pm SD (ng/mL)	p-value
Deficient (<12)	84	9.3 ± 2.1	<0.001*

ng/mL)	(42.0%)		
Insufficient (12–20 ng/mL)	72 (36.0%)	15.8 ± 2.4	
Sufficient (>20 ng/mL)	44 (22.0%)	28.6 ± 5.2	

(*p-value < 0.05 statistically significant)

Table 1 representing levels of vitamin D and their association with serum concentrations. The mean vitamin D levels in the three groups differ significantly (p-value < 0.001).

Table 2: Comparison of MRS domains (Mean \pm SD) across vitamin D status groups in perimenopausal women

MRS Domain	Deficient (n=84)	Insufficient (n=72)	Sufficient (n=44)	p-value
Somatic	8.2 ± 2.3	6.1 ± 1.9	4.5 ± 1.2	<0.001*
Psychological	7.8 ± 2.1	5.9 ± 1.7	4.0 ± 1.4	<0.001*
Urogenital	5.4 ± 1.6	4.2 ± 1.3	3.1 ± 0.9	<0.001*
Total MRS	21.4 ± 4.2	16.2 ± 3.1	11.6 ± 2.3	<0.001*

(*p-value < 0.05 statistically significant)

Table 2 compared the domains of the Menopausal Rating Scale (MRS) in women with different levels of vitamin D. The findings indicate that women with low vitamin D levels score considerably higher than other categories in all areas (somatic, psychological, and urogenital). Significant negative correlations were identified between the different MRS domains with serum vitamin D levels i.e., somatic symptoms ($r = -0.72$, $p < 0.001$), psychological symptoms ($r = -0.68$, $p < 0.001$), and urogenital symptoms ($r = -0.59$, $p < 0.001$). Vitamin D has a statistically significant association with severe symptom prediction, as indicated by its Area under the Curve (AUC) of 0.82 (p-value of <0.001). Lower vitamin D levels are closely linked to the development of severe menopausal symptoms, as evidenced by the ideal cut-off value of ≤ 14.3 ng/mL for vitamin D prediction.

Table 3: Prevalence of menopausal symptoms and comorbidities based on Vitamin D status

Symptom	Deficient	Insufficient	Sufficient	p-value
Hot Flashes	78 (92.9%)	58 (80.6%)	22 (50.0%)	<0.001*
Sleep Disturbances	68 (81.0%)	49 (68.1%)	18 (40.9%)	<0.001*
Joint Pain	72 (85.7%)	55 (76.4%)	20 (45.5%)	<0.001*
Vaginal Dryness	63 (75.0%)	42 (58.3%)	15 (34.1%)	<0.001*
Comorbidities				
Osteoporosis	32 (38.1%)	18 (25.0%)	6 (13.6%)	0.006*
Hypertension	28 (33.3%)	22 (30.6%)	12 (27.3%)	0.741
Type 2 Diabetes	24 (28.6%)	20 (27.8%)	10 (22.7%)	0.752

(*p-value < 0.05 statistically significant)

Table 3 represents the prevalence of menopausal symptoms and comorbidities based on Vitamin D status.

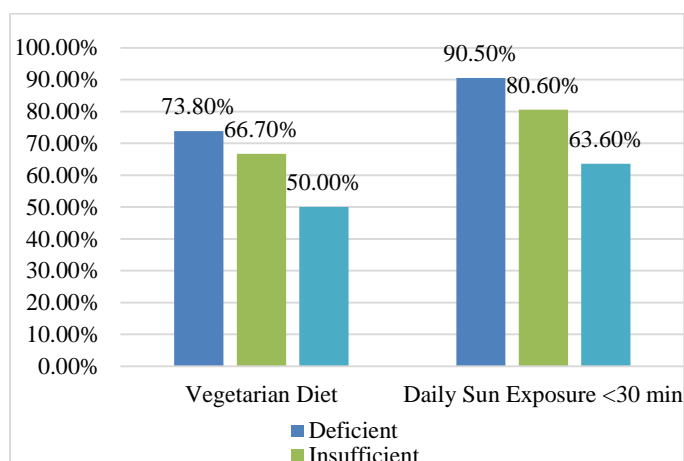


Figure 1: Comparison of dietary habits and sun exposure among the participants

Figure 1 showed participants' distribution according to their vitamin D levels, food preferences, and sun exposure. A statistically significant relationship between a vegetarian diet (p-value = 0.032) and sun exposure (p-

value <0.001) with vitamin D insufficiency was detected.

Table 4: Distribution of BMI, Supplement Use, Severity level, and Seasonal Variation across Vitamin D categories

BMI Category	Deficient	Insufficient	Sufficient	p-value
Underweight (<18.5)	12 (14.3%)	8 (11.1%)	6 (13.6%)	0.002*
Normal (18.5–24.9)	28 (33.3%)	34 (47.2%)	26 (59.1%)	
Overweight/Obese (≥25)	44 (52.4%)	30 (41.7%)	12 (27.3%)	
Supplement Use				
Regular Calcium/Vitamin D	10 (11.9%)	18 (25.0%)	24 (54.5%)	<0.001*
Duration (Years)				
<5 Years	38 (45.2%)	40 (55.6%)	28 (63.6%)	0.102
≥5 Years	46 (54.8%)	32 (44.4%)	16 (36.4%)	
Severity				
Mild (≤16)	12 (14.3%)	34 (47.2%)	38 (86.4%)	<0.001*
Moderate (17–26)	44 (52.4%)	32 (44.4%)	6 (13.6%)	
Severe (≥27)	28 (33.3%)	6 (8.3%)	0 (0.0%)	
Season				
Summer (Apr–Jun)	18 (21.4%)	24 (33.3%)	22 (50.0%)	<0.001*
Monsoon (Jul–Sep)	36 (42.9%)	28 (38.9%)	12 (27.3%)	
Winter (Oct–Mar)	30 (35.7%)	20 (27.8%)	10 (22.7%)	

(*p-value < 0.05 statistically significant)

Table 4 represents the distribution of BMI, supplement use, severity level, and seasonal variation across vitamin D categories. The mean waist circumference and BMI of participants with vitamin D deficiency were significantly higher than those who had sufficient or insufficient levels. As vitamin D status improved, both parameters

showed a downward trend ($p < 0.001$). Vitamin D deficient participants had the highest mean BMI ($26.8 \pm 3.2 \text{ kg/m}^2$) and Waist Circumference ($88.4 \pm 6.7 \text{ cm}$), followed by the insufficient group ($24.9 \pm 2.8 \text{ kg/m}^2$ and $84.2 \pm 5.9 \text{ cm}$) and the sufficient group ($23.1 \pm 2.4 \text{ kg/m}^2$ and $80.1 \pm 4.3 \text{ cm}$).

Discussion

Menopausal age is a major indicator of both fertility loss and an elevated risk for a number of midlife diseases and issues (Ahuja 2016). The average age of the research participants recorded in the present study was 50.2 ± 6.8 years. According to a previous study, Indian women menopause on average at 46.2 years, which is significantly younger than their Western counterparts' average of 51 years (Ahuja 2016).

According to the current study's findings, the majority of patients (42%) exhibited vitamin D deficiency ($<12 \text{ ng/mL}$). Patients with low vitamin D levels tend to be more likely to have fatigue, muscle cramps, mood fluctuations, hair loss, back discomfort, and weight gain (Sadat-Ali et al., 2018). Bone mineral densitometry and vitamin D levels were shown to be strongly correlated in women during and after menopause, according to a study by Bener & Saleh (2015). In women going through menopause, vitamin D helps with genitourinary tract issues and controls the growth of vaginal epithelial cells. Adipokine synthesis and immunological function are also influenced by vitamin D (Mei et al., 2023).

In the present study mean somatic, psychological, and urogenital scores (MRS) recorded in the deficient group were 8.2 ± 2.3 , 7.8 ± 2.1 , and 5.4 ± 1.6 , respectively, whereas those of the sufficient group were 4.5 ± 1.2 , 4.0 ± 1.4 , and 3.1 ± 0.9 . All these showed significant negative correlations with vitamin D levels ($p < 0.001$). According to LeBlanc et al. (2014), in postmenopausal

women, there is not any evidence that serum 25-hydroxyvitamin D (25(OH)D) levels and menopause-associated symptoms are clinically linked. Hakim et al. (2022) reported that 52.4% of the participants during study had vitamin D deficiencies which was not linked to menopausal symptoms.

Arslanca et al. (2020) found that irrespective of age or duration of menopause, declines in vitamin D levels were substantially linked to hot flashes in postmenopausal women. Talaulikar (2022) reported that up to 85% of women experience menopausal transition symptoms, which can include both psychological and physical symptoms. Crandall et al. (2023) stated about 50% to 75% of women experience vasomotor and GSM symptoms during the menopausal transition. Menopausal symptoms, such as hot flashes (92.9%), sleep difficulties (81.0%), joint pain (85.7%), and vaginal dryness (75.0%), were recorded more prevalent in patients with low vitamin D levels. When compared to patients with normal vitamin D levels, there was a significant difference found in menopausal symptoms and serum vitamin D level. Comorbidities (Osteoporosis, Hypertension and Type 2 Diabetes) were also observed in the study participants. Presence of Osteoporosis (38.1%) was found significantly higher in women with vitamin D deficiency ($p=0.006$).

Gaugris et al. (2005) stated that the most frequent causes of low vitamin D levels were a lack of dietary vitamin D intake, a lack of sun exposure, the conditions of a nursing home, the winter months, and aging. It was also observed in present study that the prevalence of vitamin D deficiency was higher among vegetarians, and in those who spent less than 30 minutes a day in the sun. Individuals who were overweight or obese, and used less supplements were also had low vitamin D. López-Baena

et al., (2020) stated that certain metabolic variables and clinical outcomes in young postmenopausal and older women may be improved by vitamin D treatment with cholecalciferol or calcifediol.

Conclusion

According to the findings of the study, serum vitamin D levels and the various MRS domains (somatic, psychological, and urogenital) showed significant negative relationships. The frequency of menopausal symptoms and circulating vitamin D levels are significantly related. Prevalence of comorbidities were also recorded higher in vitamin D deficient women. A decreased vitamin D level was associated with lifestyle variables such as a lack of supplements, vegetarian diets, and little sun exposure. According to these findings, specific approaches must be taken to maintain optimal vitamin D levels to possibly reduce the intensity of menopausal symptoms. These treatments may include dietary adjustments, vitamin D supplementation, and lifestyle changes.

References

1. Santoro N, Epperson CN, Mathews SB. Menopausal symptoms and their management. *Endocrinol Metab Clin North Am.* 2015;44(3):497-515.
2. Kaunitz AM, Manson JE. Management of menopausal symptoms. *Obstet Gynecol.* 2015;126(4):859-76.
3. Crandall CJ, Mehta JM, Manson JE. Management of menopausal symptoms: a review. *JAMA.* 2023;329(5):405-20.
4. Al-Safi ZA, Santoro N. Menopausal hormone therapy and menopausal symptoms. *Fertil Steril.* 2014;101(4):905-15.
5. LeBlanc ES, Desai M, Perrin N, Wactawski-Wende J, Manson JE, Cauley JA, et al. Vitamin D levels and menopause-related symptoms. *Menopause.* 2014;21(11):1197-203.
6. Sadat-Ali M, Al Essa ON, Alani FM, Al Omar HK, Ebrahim WY. Correlation of symptoms to serum vitamin D levels? *Clin Nutr ESPEN.* 2018;24:31-4.
7. Arslanca T, Korkmaz H, Arslanca SB, Pehlivanoglu B, Celikel Ö. The relationship between vitamin D and vasomotor symptoms during the postmenopausal period. *Clin Lab.* 2020;66(7). doi: 10.7754/Clin.Lab.2019.191116.
8. Bener A, Saleh NM. Low vitamin D, and bone mineral density with depressive symptoms burden in menopausal and postmenopausal women. *J Midlife Health.* 2015;6(3):108-14.
9. Lips P. Vitamin D physiology. *Prog Biophys Mol Biol.* 2006;92(1):4-8.
10. Yilmaz R, Salli A, Cingoz HT, Kucuksen S, Ugurlu H. Efficacy of vitamin D replacement therapy on patients with chronic nonspecific widespread musculoskeletal pain with vitamin D deficiency. *Int J Rheum Dis.* 2016;19:1255-62. doi: 10.1111/1756-185X.12960.
11. Talaulikar V. Menopause transition: Physiology and symptoms. *Best Pract Res Clin Obstet Gynaecol.* 2022;81:3-7.
12. Ahuja M. Age of menopause and determinants of menopause age: A PAN India survey by IMS. *J Midlife Health.* 2016;7(3):126-31.
13. López-Baena MT, Pérez-Roncero GR, Pérez-López FR, Mezones-Holguín E, Chedraui P. Vitamin D, menopause, and aging: quo vadis? *Climacteric.* 2020;23(2):123-9.
14. Mei Z, Hu H, Zou Y, Li D. The role of vitamin D in menopausal women's health. *Front Physiol.* 2023;14:1211896.

15. Hakim NH, Mohamed ML, El-Biely MM, Taha OT, Hassan A. Vitamin D levels and menopause-related symptoms in postmenopausal women. Middle East Fertil Soc J. 2022;27(1):29.
16. Gaugris S, Heaney RP, Boonen S, Kurth H, Binkovitz JD, Sen SS. Vitamin D inadequacy among post-menopausal women: a systematic review. QJM. 2005;98(9):667-76.