

Quality of Life and Vitamin D Status in Perimenopausal Women

R. Uma Maheswari^a, J. Latha^b, R. Ursula Sampson^c

^aAssistant Professor of Biochemistry, Department of Biochemistry, Madurai Medical College, Government Rajaji Hospital, Madurai.

^bAssistant Professor of Biochemistry, K.A.P.V. Government Medical College, Trichy.

^cProfessor of Biochemistry, Meenakshi Medical College, Hospital & Research Institute, Enathur, Kanchipuram.

Corresponding Author: J. Latha

ABSTRACT

According to WHO, the present decade women, have longer life expectancy than men. At the same time, morbidity status of women increases with age and affects their quality of life. Vitamin D, is an independent predictor of mortality and important nutrient to women health. Vitamin D deficiency was reported in varying degrees in tropical and subtropical countries among children and women. Vitamin D insufficiency is pandemic and is more common in females than males. The health consequences in postmenopausal women with pre-existing loss of estrogen will be aggravated by age-related changes in the VDR and vitamin D synthesis. Hence, postmenopausal women have high morbidity and mortality. Women in perimenopausal age are to be focussed for early identification and focus on promoting health, in preventing the disease in later life. This may have positive impact on women's quality of life and may reduce financial consequences. Hence, the present study mainly focuses on the role of vitamin D status affecting the quality of life in perimenopausal women.

Keywords: Vitamin D; perimenopausal; women

1. INTRODUCTION

Modern science and technologies have increased the life expectancy of manhood. According to WHO, the present decade women, have longer life expectancy of 48 to 70 years than men, with 45 to 60 years¹⁻⁴. At the same time, studies shows that the quality of life in women is affected by conditions like falls and fractures,

osteoporosis, hypertension, diabetes, metabolic syndrome, cardiovascular disorders, obesity, arthritis, cancer etc which are common in postmenopausal women¹⁻⁴. High incidences of osteoporotic fractures have been reported in Indian women above 40 years of age⁵. The health consequences in postmenopausal women with pre-existing loss of estrogen will be aggravated by age-related changes in the VDR and vitamin D synthesis. Hence postmenopausal women have high morbidity and mortality.

Benefits of vitamin D includes stronger bones, improved mood, increased energy, better hormone performance, reduction in inflammation, cancer, heart disease etc. The factors like extent of skin exposure to UV radiation, pollution, geographical latitude and altitude, season, cloud cover, time of the day and skin pigmentation influences the synthesis of VD⁶⁻⁷. Urbanization and life style modifications also act as a key factor for Vitamin D deficiency⁸. Vitamin D deficiency was reported in varying degrees in tropical and subtropical countries among children and women. Vitamin D insufficiency is pandemic and is more common in females compared to males⁹⁻¹².

Low Vitamin D, is an independent predictor of mortality⁴. Though Vitamin D has attained a lot of focus during the last couple of decades, but as a possible multifunctional and important contributor to health, to the best of our knowledge, very

few studies have been carried out on vitamin D in maintaining health before menopause.

Due to the sharp increase in the morbidity status of elderly women, a study on the vitamin D status in perimenopausal women is essential, for early identification and focus on promoting health, in preventing the disease in later life. Such morbidity reduction may have positive impact on women's quality of life and may reduce financial consequences⁴. Hence, the present study mainly focuses on the role of vitamin D status affecting the quality of life in perimenopausal women.

Perimenopause is a state of transition from reproductive life to menopause. There is no uniform definition of when this transitional period or "perimenopause" begins⁴. However, various criteria (such as first occurrence of more than 7 days difference in cycle length) have been proposed⁴. The perimenopause extends until 12 months period of amenorrhea has elapsed⁴. The average duration of perimenopause is documented as 4.8 years in a prospective study of cycle intervals and symptoms⁶. At present, a very few studies have been done on this population.

The level of vitamin D in perimenopausal women has been focused to prevent health issues after menopause. The present study was designed to evaluate, the vitamin D status of women in perimenopausal age. Aim of this study was to compare the quality of life among perimenopausal women with vitamin D status in maintaining health.

2. MATERIAL AND METHODS

This cross-sectional study was conducted in, Meenaskhi Medical College Hospital And Research Institute, Kanchipuram, Tamil Nadu from July 2012 to September 2013. Number of study groups: Two, Sample size: 72. Institutional Ethical Committee approved the study. Healthy women volunteers between 40-55 yrs, and regularly or irregularly

menstruating were included in the study. An informed consent was obtained from all the participants belonging to different religious and socioeconomic backgrounds.

Exclusion criteria

Women on vitamin D supplements, hormonal therapy, H/O amenorrhea >12 months and with H/O chronic diseases like hypertension, diabetes, etc and on anabolic drugs, anti depressants, prior bariatric surgery, thiazide diuretics are excluded from our study.

Biochemical parameters

Serum 25(OH)D was measured by immunodiagnostic direct Elisa method¹³. Based on the 25(OH)D status, 36 women with adequate vitamin D status (25 (OH) D >30 ng), were taken as sufficient vitamin D group and 36 age matched women with inadequate vitamin D (25(OH) D <30 ng) were taken as hypovitaminosis D group.

Quality of life assessment

Quality of life (QOL) was evaluated by SF 36 questionnaire. SF 36 is generic and multi-dimensional measure of self-reported health status, which evaluates a person's overall satisfaction with life and health. The questionnaire was self-administered and all subjects were helped to complete the questionnaire. SF-36 questionnaire, measures the physical and mental status of the people for the last four weeks¹⁴. It consists of 36 questions measuring physical and mental health status in relation to eight health concepts.

1. Physical component score: Physical functioning, role physical, bodily pain, general health

2. Mental component score: Vitality, social functioning, role emotional, mental health

General health, vitality and social functioning have correlation with both of the summary scales. Responses to each of the SF-36 items are scored and summed according to a standardized scoring protocol using SF-36 Health Survey Manual and Interpretation Guide and expressed as a score of 0- 100 for each question¹⁴. The higher score means better QOL. The QOL is the worst at 0 score and best at 100 score.

Statistical analysis

The data analysis was done by individual student ‘t’ test using SPSS, version 17. The data’s were also subjected to independent samples test (unpaired) to evaluate the significance of difference of mean of control and study groups.

3. RESULTS

In our study, Vitamin D values were estimated in healthy perimenopausal women of 40-55 years. The percentage of study population with deficient, insufficient and sufficient vitamin D levels were

respectively 19%, 31% and 50% as shown in the Fig. 1.

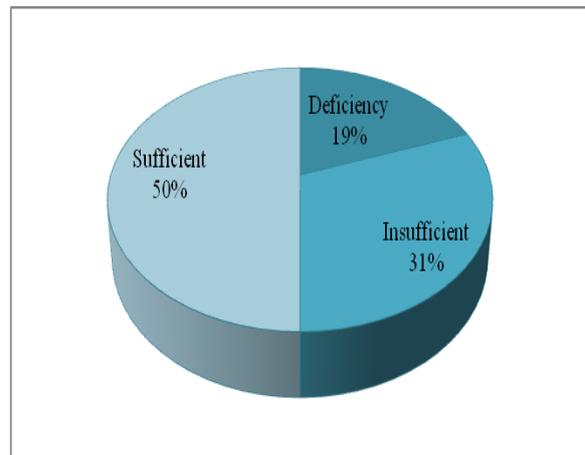


Fig. 1: Vitamin D status in perimenopausal women

Table 1: Vitamin D status

Vitamin D	Sufficient	Insufficient	Deficient	P value
Number of participants	36	22	14	NA
Percentage of study population	50%	31%	19%	NA
25(OH)D	36.59±6.80	22.05±1.58	16.30±3.01	0.000 ^{a,b}
	Sufficient	Hypovitaminosis D		
Number of participants	36	36		NA
25(OH)D	36.59±6.80	19.82±3.6		0.000
Age	46.27±3.67	46.24±3.77		NS

a-Comparison between sufficient and insufficient Vitamin D level; b-Comparison between insufficient and deficient Vitamin D level; P< 0.001 is considered significant; NS- Not significant NA- Not applicable

In our study, the three categories of Vitamin D values were grouped into Hypovitaminosis D group (Deficient and Insufficient; n=36) and Sufficient Vitamin D (n=36) group for further analysis. The observed mean value of perimenopausal women with hypovitaminosis D was 19.82±3.6 and sufficient Vitamin D was 36.59±6.8 as shown in Table 1.

Vitamin D and quality of life

Our study evaluated the QOL in perimenopausal women with adequate and inadequate Vitamin D status using SF-36. The results of our study showed that QOL is impaired in low Vitamin D status group (study group) when compared with control group.

Vitamin D and subscales scores of physical compartment

Figure 2 represents the association of subscales of physical compartment score

with sufficient Vitamin D and hypovitaminosis D perimenopausal women. The physical function, role physical, bodily pain and general health scores were analyzed. The mean values of the sub scales of physical compartment were shown in Table 2. The physical function and bodily pain scores were found to be significantly (p < 0.001) decreased in hypovitaminosis D women when compared to VD sufficient women. There was no significant difference in the role physical and general health subscales between the two groups. Serum 25(OH)D levels were positively correlated with physical component score such as physical functioning (p < 0.001) and bodily pain (p<0.001) as shown in Figure 2. Moreover, the serum 25(OH)D levels was not correlated with general health and role physical subscales.

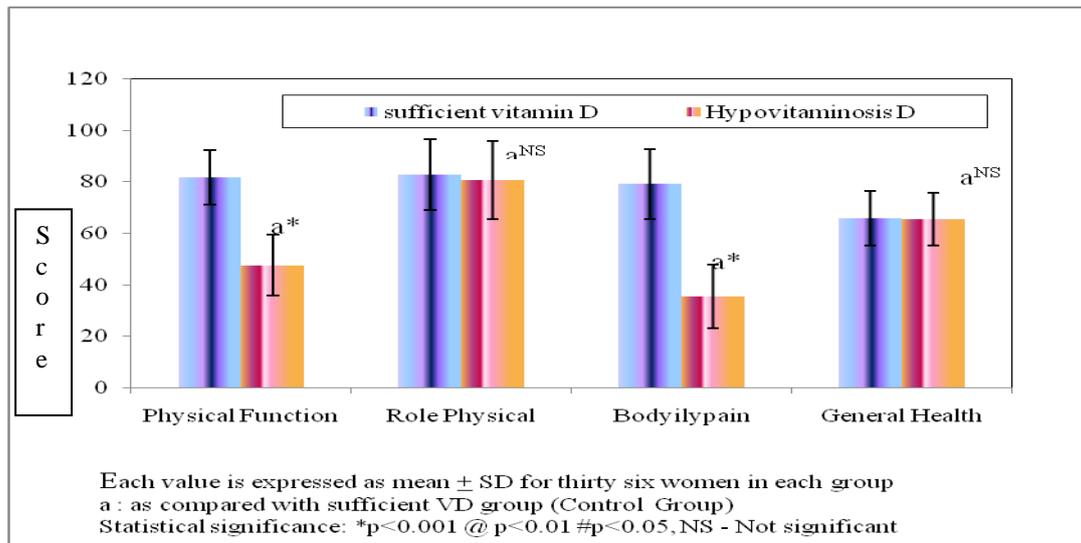


Fig. 2: Relation between Vitamin D and subscales scores of physical compartment

Table 2: Comparison of Quality of Life with Serum 25 (OH) D >30 ng/ml and <30 ng/ml in Perimenopausal Women

Components	Sufficient VD (n=36) 25 OH D = 36.59±6.78	Hypovitaminosis D (n=36) 25 OH D = 19.73±3.61	p value
Physical Functioning	81.86±10.6	47.51±11.8	0.000 ^{a*}
Role Physical	82.75±13.8	80.63±15.2	NS
Bodily Pain	79.15±13.6	35.54±12.3	0.000 ^{a*}
General Health	65.9±10.6	65.34±10.3	NS
Vitality	70.36±7	59.70±6	0.000 ^{a*}
Social Functioning	53.8±5.1	52.97±5.3	NS
Role Emotional	69.19±2.01	65.29±6.5	NS
Mental Health	63.65±6.3	63.24±6.2	NS
Physical Compartment Score	69.48±12.8	43.53±10.06	0.000 ^{a*}
Mental Compartment Score	53.49±11.83	56.57±12.6	NS

Vitamin D and subscale scores of mental compartment

Figure 3 illustrates the correlation between Vitamin D status and subscale scores of mental compartment. The vitality, social functioning, role emotional and mental health scores were analyzed (Table 2). In our study, we observed that vitality score was significantly increased (p<0.001) in Vitamin D sufficient women than hypovitaminosis D perimenopausal women. There was no significant difference between the other subscales, role emotional, mental functioning and social functioning in our study.

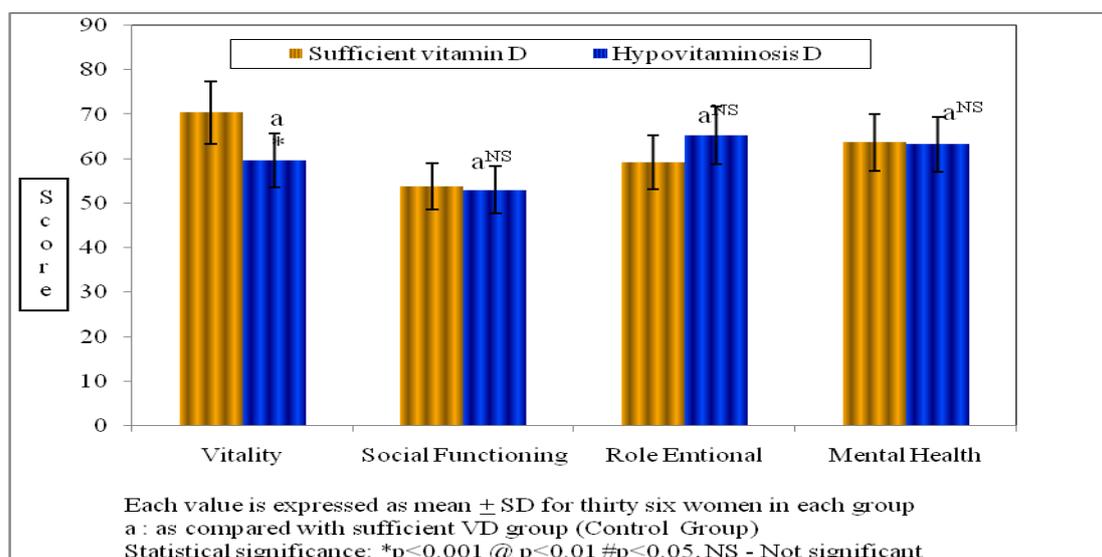


Fig. 3: Relation between Vitamin D and subscales scores of mental compartment

Comparison of physical and mental compartment score

Figure 4 illustrates the correlation between the comparison of Vitamin D status with physical compartment scores and mental compartment scores.

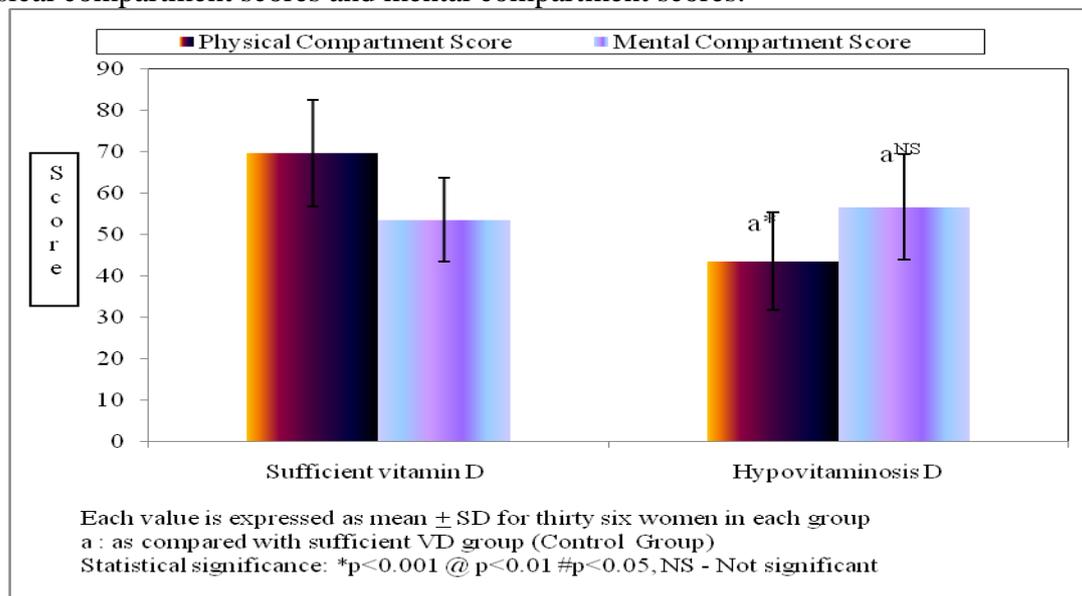


Fig. 4: Comparison of physical and mental compartment score

The observed results reveals that (Figure 4) the physical compartment score was significantly decreased in hypovitaminosis D perimenopausal women ($p < 0.001$). There was no significant association in mental compartment score between the two groups in our study. It is clearly understood from the observed results that the Vitamin D levels were, more likely to be associated with physical compartment than the mental compartment.

4. DISCUSSION

In general, there are multiple factors that affect the availability of the Vitamin D as well as the body's response to it. The factors that limit sunlight exposure and intensity will determine the prevalence of Vitamin D deficiency. Hence, low Vitamin D status may be caused by a number of factors, including insufficient synthesis in the skin (due to limited sunlight exposure) and inadequate intake or absorption of VD¹⁵.

Vitamin D and subscales scores of physical compartment

In the present study, physical functioning, of the hypovitaminosis D women, was found to be decreased than the

sufficient vitamin D women. It implies that the daily physical activities were affected in women with the low vitamin D levels whereas the general health and role physical sub-scales were unaffected. This may due to the reason that all the participants were healthy women who have the similar perception about their health and their routine day to day activities were not affected. These findings are in accordance with Ecemis et. al¹⁶.

The subscale bodily pain was found to be significantly decreased in the group of women with hypovitaminosis D. According to literatures, muscle weakness was identified as the predominant feature of clinical syndrome of vitamin D deficiency literatures¹⁵⁻¹⁷. It includes proximal muscle weakness, diffuse muscle pain and gait impairment¹⁵. This result is in accordance in various studies¹⁷. A study by Ecemis et al, showed that the bodily pain score was not associated with vitamin D levels¹⁶.

Vitamin D and subscale scores of mental compartment

Reading the sub scales of mental compartment, the vitality scores of sufficient Vitamin D perimenopausal women were higher when compared with

the hypovitaminosis D women. Women with insufficient vitamin D levels were observed to, feel tired and worn out easily because of their low energy levels¹⁶. The role emotional, mental health and social functioning subscales were not found to be significantly related to vitamin D status. It means that the Vitamin D status does not affect the social and daily activities due to physical and emotional problems. The study by Ecemis et al, showed that the social functioning score was lower in Vitamin D insufficient group, while role emotional and mental health are not affected by Vitamin D levels which correlates our present study¹⁶.

Comparison of physical and mental compartment score

Our present study also observed the difference between physical compartment score and mental compartment score. The observed result was that the physical compartment score was found to be more significantly lower in the hypovitaminosis D women when compared to the mental compartments score. It was also observed that the vitamin D status was significantly associated with the physical compartment than the mental compartment. The findings of Ecemis et al, also support our present study¹⁶.

The results of our study showed that quality of life was impaired in hypovitaminosis D than the vitamin D sufficient perimenopausal women. In our study, physical component score, physical functioning score, bodily pain and vitality scores were found to be significantly associated with vitamin D levels in perimenopausal women.

5. CONCLUSIONS

Our study concludes that Vitamin D insufficiency is subclinical, that inadequate levels of Vitamin D are common in healthy perimenopausal women. It signifies that, sufficient vitamin D status is necessary to maintain good quality of life even in healthy women. The blood level of vitamin D should be maintained above 30 ng/ml to have a better quality of life.

Hypovitaminosis D should be in differential diagnosis of patients with nonspecific symptoms such as fatigue, pain and low mood even if the patient is not in high risk groups. Public health messages on the importance of vitamin D, its role in overall wellbeing and ways of achieving sufficient vitamin D status should also be disseminated to the public. The result is a further increased risk of malignancy, bone loss, hypertension, diabetes, depression, falls and osteoporotic fractures. The study has few limitations like dietary Vitamin D content was not assessed and the cross section nature.

REFERENCES

1. Das, Pamela; Samarasekera, Udani, The story of GBD 2010: A "Super-Human" Effort", *The Lancet*, 2012, 380 (9859), 2067–2070.
2. Pandey S, Srinivas M, Agashe S, Joshi J, Galvankar P, Prakasam CP, Vaidya R, Menopause and metabolic syndrome: A study of 498 urban women from western India, *J Midlife Health*, 2010, Jul;1(2), 63-9.
3. Steven R. Cummings, Dennis M. Black, Susan M. Rubin, Lifetime Risks of Hip, Colles, or Vertebral Fracture and Coronary Heart Disease Among White Postmenopausal Women, *Arch Intern Med*, 1989, 149(11), 2445-2448.
4. O. Ortmann, O. Pagani, A. Jones, N. Maass, D. Noss, H. Rugo, C. VandeVelde, MattiAapro, R. Coleman, *Cancer Treatment Reviews*, 2011, 37, 97–104.
5. Shatrugana V, Soundarajan N, Sundaraiah P, Raman L, Backpain, the feminine affliction, *Economic and Political Weekly*, 1990, 28, 2–6.
6. Treloar AE, Menstrualcyclicality and the premenopause, *Maturitas* 1981, 3, 249–264.
7. Hutchinson G, Hall A, The transmission of ultra-violet light through fabrics and its potential role in the cutaneous synthesis of vitamin D. *Hum. Nutr. Appl. Nutr.* 1984, 38A, 298 – 302.
8. Armin zittermann, Jangummert, Non classical Vitamin D action, *Nutrients*, 2010 April; 2(4), 408-425.
9. Vikramlondhey, Vitamin D deficiency: Indian scenario, *JAPI*, Nov 2011.

10. Mosekilde, Vitamin D and elderly life, *Clinical endocrinology*, 2005, 62, 265-281.
11. Trevor G Marshall, Vitamin D discovery out spaces FDA decision-making, *Bio Essays*, Feb 2008, 1-10.
12. Foong-ming, Awing Bulgiba, High prevalence of vitamin D insufficiency and its association with metabolic syndrome among Malay adults in Kuala Lumpur, Malaysia, *Biomed central public health*, 2011, 11:735.
13. Oster P et al. *AKT Gerontol.* 1982, 13:221-2.
14. Ware JE, Snow KK, Kosinski M, et al. *SF-36 Health Survey Manual and Interpretation Guide.* 1993. Boston, MA: The Health Institute.
15. Michael F. Holick, Neil C. Binkley, Heike A. Bischoff-Ferrari, Catherine M. Gordon, David A. Hanley, Robert P. Heaney, M. Hassan Murad, and Connie M. Weaver. Evaluation, Treatment, and Prevention of Vitamin D Deficiency: an Endocrine Society Clinical Practice Guideline. *JCEM*, July 2011, 96,7.
16. G. C. Ecmis and A. Atmaca J. *Endocrinol. Invest.* Quality of life is impaired not only in vitamin D deficient but also in vitamin D insufficient premenopausal women. 2013, March 19, as DOI: 10.3275/8898.
17. Straube S, Moore RA, Derry S, McQuay HJ. Vitamin D and chronic pain. *Pain* 2009, 141: 10-3.

How to cite this article: Maheswari RU, Latha J, Sampson RU. Quality of life and vitamin D status in perimenopausal women. *International Journal of Research and Review.* 2020; 7(1): 571-577.
