One Health Journal of Nepal

Original Article Open Access

Prevalence of Vitamin D Deficiency in Women Attending Gynecological Clinic of Tertiary Care Hospital in Kathmandu, Nepal: A Descriptive Cross-Sectional Study

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ABSTRACT

Introduction: Hypovitaminosis D has been a matter of concern in Nepalese females with a high prevalence of up to 80%. The main aim of the study was to find the prevalence of Vitamin D deficiency in women attending the gynecology clinic of a tertiary hospital, Kathmandu, Nepal.

Methods: A hospital-based retrospective cross-sectional descriptive study was conducted among 234 women attending the gynecological outpatient department of Grande International Hospital who had got their Vitamin D levels tested. Data were collected from the electronic database of the hospital from 1st January 2020 to 31st December 2020 after the ethical consideration from Institutional Review Committee-Grande International Hospital. A convenient technique was used. A descriptive statistical analysis was performed using Epi Info7 software.

Results: Among 1209 women who visited the clinic, 234(19.4%) women had their Vitamin D levels checked. Among them, Vitamin D deficiency <20ng/ml and insufficiency 20-39ng/ml were found in 50(21.3%) and 112(47.9%) patients respectively. Further analysis of 50 cases of Vitamin D deficiency showed mild deficiency in 45(90%). Furthermore, among 136 pregnant patients, Vitamin D deficiency and insufficiency were present in 32(23.5%) and 72(52.9%) respectively. Likewise, among 17 postmenopausal patients, 2(11.8%) were deficient and 8(47.1%) were insufficient. The mean Vitamin D level was 26.9ng/ml S.D 11.4.

Conclusions: There was a high prevalence of Hypovitaminosis D in the Nepalese female population. Vitamin D level was lower in pregnant females when compared to non-pregnant females.

Keywords: *Nepal; Prevalence; Vitamin D deficiency; Women.*

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INTRODUCTION

Vitamin D deficiency, also known as Hypovitaminosis D, is an uprising public health problem.[1] Studies over the globe suggest a high prevalence of Hypovitaminosis D among females especially in pregnant females up to 70%.[2,3] Evidence shows high prevalence among Nepalese females up to 80% but a study showing the levels in pregnant and postmenopausal women in this population has not been undertaken.[4,5] Royal College of Obstetrics and Gynecology focuses on effective ways to increase vitamin D supplement use to prevent deficiency among females who are at risk. [6]

This study thus aimed to find the prevalence of Hypovitaminosis D among women in this population and its level in different age-group and trends according to pregnancy and menopausal status.

METHODS

A hospital-based retrospective cross-sectional descriptive study was conducted among 234 women attending the gynecological outpatient department of Grande International Hospital. Ethical approval was taken from the Institutional Review Committee- Grande International Hospital (Ref No 06/2021). A convenience sampling technique was used for the conduction of this study.

All female gynecological patients who had attended the gynecological clinic of Grande International Hospital and had undergone Vitamin D level assessment over the duration from 1st January 2020 to 31st December 2021 were included in the study. A total of 1209 women attended the gynecological clinic of Grande International Hospital over a duration of one year. The number of patients attending were less because of the COVID pandemic.

Those who had come to the gynecological clinic of Grande International Hospital during the same duration but had not done Vitamin D level assessment were excluded from the study.

Sample size calculation:

Sample size was calculated by using formula:

$n = z^2pq/e^2$

$= (1.96)^2*0.18*0.82/(0.05)^2$

$= 227$

Where,

n= required sample size

z =1.96 (at 95% confidence interval)

p= prevalence of Hypovitaminosis D (18%)[1] i.e. 0.18

q =1-p =1-0.18=0.82

e = allowable error =5%=0.05

Therefore, the calculated sample size was 227. Here, the total sample taken with convenient sampling was 234.

25 (OH) Vitamin D level[5] were categorized into:

1. Sufficient (≥30ng/ml)
2. Insufficient(20-29ng/ml) and
3. Deficient (<20ng/ml).

Deficient Vitamin D level[5] was further categorized into:

1. Severe (<5ng/ml)
2. moderate (5-<10ng/ml)
3. mild (10-<20ng/ml)(5)

Assessment of Vitamin D level in the blood was done by a quantitative method using Chemiluminescent immunoassay (CLIA)[4] which is the standard method done worldwide. Five milliliters (5ml) of blood was sampled from the patient and was centrifuged to estimate the Vitamin D level. Prevalence was calculated as: cases with vitamin D deficiency/Total cases studied

The prevalence of Hypovitaminosis D among women and its level in different age-group and trends according to pregnancy and menopausal status was assessed in this study. Informed consent was taken before the study and confidentiality of the patient was maintained.

Data was maintained on Microsoft Excel 2016 and statistical analysis was done on Epi Info 7 software. Mean, Standard deviation (S.D), and confidence interval (CI) were calculated for the central tendency.

RESULTS

Among a total of 1209 women attending the gynecological clinic over the duration of one year, 234(19.4%) women had their Vitamin D levels checked. Among 234 patients, it was found to be prevalent in 69.2% (n=162) females who had either insufficient (47.9%) or deficient (21.3%) Vitamin D levels.

Table 1. Prevalence of Vitamin D deficiency (n=234)

Vitamin D level checked	n(%)
Sufficient	72(30.8)
Insufficient	112(47.9)
Deficient	50(21.3)

The minimum age of the patient was 14 years and the maximum was 70 years with a mean being 33.8 years (S.D 8.4). The minimum and maximum level of Vitamin D recorded was 8 ng/ml and 73ng/ml respectively. The mean Vitamin D level was 26.9 ng/ml (S.D 11.4, 95% CI 25.52 - 28.5). The mean Vitamin D for pregnant and non-pregnant patients was 25.4 ng/ml (S.D 10.5) and 29.2 ng/dl (S.D 12.3) respectively. For the premenopausal and menopausal age group, the mean values were 26.6 (S.D 10.9) and 32.2 (S.D 16.6) respectively.

Among the 50 cases of Vitamin D deficiency, when further analyzed showed mild deficiency in 90% (n=45), moderate in 10% (n=5) with no case of severe deficiency.

Table 2. Severity of Deficient Vitamin D level, (n=50)

Vitamin D deficiency grading	n(%)
Mild	45 (90.0)
Moderate	5 (10.0)
Severe	0(0.0)

Table 3 shows Vitamin D level according to pregnancy and menopausal status. Among the 136 pregnant women, 76.4% women had either deficiency (23.5%) or insufficiency (53%) of Vitamin D showing high prevalence among pregnant women. Among the non-pregnant population, 59.18% had either deficiency (18.4%) or insufficiency (40.8%) of Vitamin D. Similarly, among the menopausal age group Vitamin D deficiency (11.8%) and insufficiency (47%) was present in 58.8 % of cases. For the premenopausal age group, 70% had either deficient (22%) or insufficient (48%) Vitamin D levels of the patients.

Table 3. Vitamin D level according to pregnancy and menopausal status (n=234)

Status		Sufficient, n(%)	Insufficient, n(%)	Deficient, n(%)	Total (%)
Pregnancy	Pregnant	32(23.5)	72(53.0)	32(23.5)	136(58.1)
	Non-pregnant	40(40.8)	40(40.8)	18(18.4)	98 (41.9)
	Total (%)	**72 (30.8)**	**112(47.9)**	**50 (21.4)**	**234(100.0)**
Menopausal	Premenopausal	65(30.0)	104(48.0)	48(22.0)	217 (92.7)
	Menopausal	7(41.2)	8(47.0)	2(11.8)	17 (7.3)
	Total (%)	**72 (30.8)**	**112 (47.9)**	**50 (21.4)**	**234(100.0)**

Most common age group in the study was 31-40 years (41.5%). However, the commonest age group who had higher, either deficiency or insufficiency of Vitamin D level was 21-30 years. In the age group of 21-30 years, insufficient Vitamin D level was 50% and deficient was 29.2%. In the age group of 31-40 years' insufficiency was 42.2% and deficiency was 14.4%.

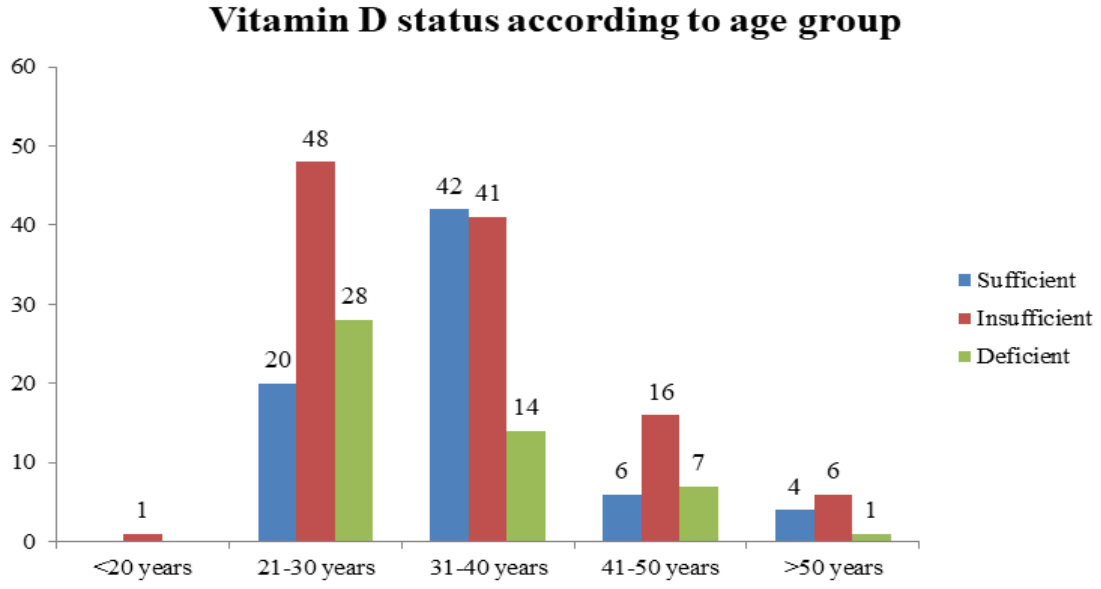

Figure 1. Bar diagram showing Vitamin D level according to age group (n=234)

DISCUSSION

High-risk population of Hypovitaminosis D includes all pregnant and breastfeeding women, especially teenagers and young women, infants and young children under 5 years, older people aged 65 and older, people who have low or no exposure to the sun and people who have darker skin as their bodies are not able to make much Vitamin D.[6] Maternal hypovitaminosis D is associated with preeclampsia, Gestational Diabetes Mellitus, Postpartum Depression, preterm birth, small for gestational age. In utero deficiency of Vitamin D is associated with several illnesses that later lead to childlike wheezing, respiratory infection, Type1 Diabetes mellitus, Multiple sclerosis, and Schizophrenia. [7, 8]

In our study, mean Vitamin D for pregnant and non-pregnant patients were <30ng/ml for both groups. However, comparing pregnant and non-pregnant patients, pregnant patients have statistically low Vitamin D levels. Similarly, a study done by Pratumvinit B et al. in pregnant women in Thailand also showed a high prevalence of hypovitaminosis D(75.5%). Of these, vitamin D insufficiency was found in 41.5% and vitamin D deficiency was found in 34% similar to our study.[7] However, Abassian et al. in their study done in Iran showed that Vitamin D insufficiency and deficiency were found to be 60.2% and 1.1% respectively which was less compared to our study.[9] This could be because of the difference in the nutritional health perspectives of women residing in developing countries. The mean value of Vitamin D for the premenopausal age group was <30ng/ml but for the menopausal age group >30ng/ml. Contrary to the present study, a study done by Suganthan et al. demonstrated that the menopausal age group also are at risk of hypovitaminosis D.[10] However, the present population has too less postmenopausal age group whose value couldn't be generalized.

Further categorization of deficiency of Vitamin D level showed mild deficiency in 90 % (n=45) and moderate in 10%(n=5) patients (Table 2). Contrary to the present findings, a study done by Marwaha RK showed a higher number of patients with moderate and severe Vitamin D deficient levels.[11] Differences could be because of variations in age. They have included population 50 years and above only, however; the present study included age group variation from 14-70 years with less number of postmenopausal patients. The commonest age group found to have a higher deficiency (n= 28) and insufficiency (n=47) of Vitamin D was 21-30 years showing high prevalence among the childbearing age group compared to other populations (Fig 1). Similarly, a study done by Ginde AA, et al. among the childbearing population also showed a high prevalence of Vitamin D deficiency.[12]

Vitamin D is essential not only for bone metabolism, but also for cardiovascular, neurodevelopment, and immunomodulation.[6] The Canadian Pediatric Society recently recommended 2000 IU daily of vitamin supplementation and higher target serum 25(OH) D levels for pregnant and lactating women.[13] It has been observed that maternal Vitamin D deficiency not only hampers the mother's health but also hampers fetus and infant's health.[14] American College of Obstetrics and Gynecology however doesn't recommend routine screening of Vitamin D level in pregnant women.[15] Since, there is a high prevalence of hypovitaminosis D among the pregnant female and is associated with complications in infant and child health, this should be considered of major importance, especially in the developing countries.[16] Age-related changes have been found to affect Vitamin D levels in various studies, unlike the present study.[17]

Present study showed a high prevalence of hypovitaminosis D in pregnant women and postmenopausal women demonstrating the requirement of supplementation in these populations. However, limitations being the less number of patients in the menopausal age group, generalization of our results are difficult.

CONCLUSIONS

Hypovitaminosis D was prevalent high in the female population. Vitamin D level was lower in pregnant females when compared to non-pregnant females. The child-bearing age group had more prevalence of Hypovitaminosis D.

ACKNOWLEDGEMENT

Not Applicable

CONFLICT OF INTEREST

None

FUNDING

This study was funded with the authors' own contributions.

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