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ORIGINAL ARTICLE

Frequency of Perceived Fear of Vitamin D Deficiency among Female Medical Students and its Relationship with Dietary Practices

SANA NOOR[1], NOOR SHAHID[2], UZAIR AZHAR[3], FARYAL ARIF[3], SUHLA AZHAR[3], ANEEQA RAVAIL[3]
[1]Assistant Professor, Department of Community Medicine, Avicenna Medical and Dental College, Lahore.
[2]Statistician, Department of Community Medicine, Central Park Medical College, Lahore.
[3]Research Student, Avicenna Medical and Dental College, Lahore.
Correspondence to: Sana Noor, Email: dr.sanajamal@gmail.com, Cell: 0300-2129163

ABSTRACT

Objectives: To determine the precautionary measures and determinants leading to the fear of vitamin D deficiency among female medical students in Lahore.

Methodology: A cross-sectional study was carried out among medical students in Lahore from December 2021 to March 2022. The data was collected from 383 female medical students using the non-probability convenience sampling technique. The data was collected from a self-designed questionnaire to collect information about the vitamin D deficiency.

Results: The average age of the participants was 21.21±1.40 SD. Most of the participants were unmarried. Nearly 31 (8.1%) were married. The knowledge of Vitamin D deficiency was statistically insignificantly different among different socio-economic class and smoking status (p-value = 0.30, p-value = 0.68).

Conclusion: The fear of Vitamin D deficiency was significantly associated with past family history of bone disorder. Most of the participants who had feared of Vitamin D deficiency reported that they do not have any kidney and liver disorder. Polycystic ovary disorder was statistically significantly related with fear of Vitamin D deficiency. Gastrointestinal disorder was significantly associated with Vitamin D deficiency fear.

Keywords: Vitamin D deficiency, Physical Inactivity, Diet

INTRODUCTION

25-Hydroxyvitamin D which is simply known as vitamin D is an essential lipid soluble vitamin which is mainly produced endogenously but can also be taken exogenously as a food supplement. In endogenous synthesis, when skin is exposed to ultraviolet B rays (280-320), 7- de-hydro cholesterol is converted into cholecalciferol[1].

Vitamin D promotes the growth and remodeling of the bones by maintaining the calcium and phosphate homeostasis. In addition to it also plays role in cell growth, resolving inflammation, modulation of immune system and tumor suppression. Reduced vitamin D levels in body results in enhanced production of PTH which promotes bone reabsorption resulting in increased alkaline phosphatase and phosphorus levels.

Chronic Vitamin D deficiency causes rickets in children, Osteomalacia and osteoporosis in adults. It enhances the risks of coronary artery diseases, hypertension, infectious diseases, and cancer[2].

Vitamin D deficiency is increasing because of less intake of calcium and vitamin D rich diet, obesity, decreased exposure to sunlight and use of sun blocks. However, in female gender, dietary habits, darker pigmented skin are also main factors that are highly associated with vitamin D deficiency.

Studies on association between vitamin D and other health outcomes are done but fewer studies have guided young adults. Young adults drink carbonated beverages instead of drinking milk thus reducing intake of both vitamin D and Calcium thus, potentially enhancing the risks of fractures caused by vitamin D deficiency[3].

A study conducted in Karachi on young medical students showed that despite of good sun exposure and calcium containing diet, vitamin D deficiency is not uncommon in asymptomatic medical students. [2]

Vitamin D deficiency is defined as body calcidiol level less than 20ng/ml while defined as vitamin D insufficiency if calcidiol level is 21—29ng/ml[4].

An interesting study was conducted in undergraduate medical students of different health professionals and universities to analyze awareness about sunlight exposure and the importance of vitamin D. The results of that study showed that most of the participant medical students were found to show sun aversion intentionally and only 8% have knowledge about minimum exposure to sunlight to produce vitamin D[5].

A study done on the prevalence of vitamin D deficiency in Pakistan showed 53.5% had vitamin D deficiency, 31.2% had insufficient vitamin D, and only 15.3% had normal[6].

Medical students have long indoor working hours. A study done in India showed indoor working and lifestyle reduces the exposure to adequate sunlight and results in vitamin D deficiency. The clinically presented and diagnosed cases of vitamin D deficiency represents the iceberg's tip[7].

Exposure to sunlight in winter, before 10am, after 3 pm produces little amount of vitamin D in skin[8].

Less availability of foods that are vitamin D fortified further increases the risk of vitamin D deficiency in young students[9].

Another study showed younger age, less physical activity, female gender and residency in urban areas enhances risk of vitamin D deficiency in Asian population[10].

The main goal of this study is to find out precautionary measures and determinants leading to the fear of vitamin D deficiency among female Medical Students in Lahore, which ultimately can cause serious morbidities. This study is being done to fulfill the knowledge gap about causation of vitamin D deficiency as fewer studies are done on this particular topic and to identify the measures and interventions that can help to reduce the prevalence of this problem.

MATERIAL AND METHODS

A cross-sectional study was carried out among medical students in Lahore from December 2021 to March 2022. The data was collected from 383 female medical students from various medical colleges in Lahore using the non-probability convenience sampling technique. The minimum sample size was calculated using the WHO sample size calculator and was found to be 383 using 95% confidence, 5% margin of error, and 53.5% as the prevalence of vitamin D deficiency in Pakistan [6].

The data was collected from a self-designed questionnaire based on various socio-economic and demographic factors, exposure to the sun, working atmosphere, dietary patterns, and past history of any medical illness and bone disorder. The reliability of the questionnaire was tested using Cronbach's alpha.

Written consent was taken from each participant prior to the data collection. The study was approved by the Institutional Review Board (IRB) of Central Park Medical College. The chi-square test of association was applied to observe the relation of socio-economic and demographic factors with fear of vitamin D deficiency. The level of significance was taken as 5%. Regression

analysis was performed to observe the dependence of knowledge about vitamin D deficiency on various contributing factors. IBM SPSS 26.0 was used for statistical analysis.

RESULTS

The average age of the participants was 21.21 + 1.40 SD (in years). Most of the participants were unmarried. Nearly 31 (8.1%) were married. The knowledge of Vitamin D deficiency was statistically insignificantly different among different socio-economic class and smoking status (p-value = 0.30, p-value = 0.68).

The fear of Vitamin D deficiency was associated with the past family history of bone disorder. The fear of Vitamin D deficiency was significantly associated with past family history of bone disorder. Most of the participants who had fear of Vitamin D deficiency reported that they do not have any kidney and liver disorder. Only 3.13% and 1.04% of the participants had kidney and liver disorder along with fear of Vitamin D deficiency. Having kidney or liver disorder was insignificantly associated with Vitamin d deficiency. Polycystic ovary disorder was statistically significantly related with fear of Vitamin D deficiency. Nearly 15.67% of the participants had gastrointestinal disorder. Among those had fear of Vitamin D deficiency. Gastrointestinal disorder was significantly associated with Vitamin D deficiency fear (Table I).

Table 1: Crosstab of various disorders with fear of Vitamin D deficiency

Factors	Category	Fear of Vitamin D deficiency		Total	p-value
		No	yes		
Family history of bone disorder	No	08	180	188	0.00*
	Yes	27	168	195	
Kidney disorder	No	35	336	371	0.31
	Yes	0	12	12	
Liver disorder	No	35	344	379	0.68
	Yes	0	04	04	
Gastrointestinal disorder	No	19	304	323	0.00*
	Yes	16	44	60	
Polycystic ovary disorder	No	35	311	346	0.02*
	Yes	0	37	37	
Persistent stress, anxiety, depression	No	16	146	162	0.40
	Yes	19	202	221	

*p-value<=0.05

Uni-variable regression analysis was used to observe the attitude regarding fear of Vitamin D deficiency. The reference category for all the factors were none. Use of suns cream is directly related to Vitamin D deficiency. The odds of using suns cream were 3.88 times higher among participants who had fear of Vitamin D deficiency. The odds of having fear of Vitamin D was 2.35 times higher among those whose nature of job is outside (Table II).

Similarly fear of Vitamin D was directly associated to fruit consumption. The use of milk or dairy products was inversely related to the fear of suffering from Vitamin D. The odds of drinking milk or using dairy products were 0.87 times higher among the participants with Vitamin D deficiency.

Table 2: Univariable analysis of the attitude of participants regarding fear of Vitamin D deficiency

Factors	B	p-value	OR
Sun exposure	0.19	0.59	1.22
Use of suns cream	1.36	0.00*	3.88
Nature of job	0.85	0.05*	2.35
Have sun exposure	-0.53	0.22	0.59
Daily exercise	-0.16	0.70	0.85
Take soft drinks	-0.34	0.42	0.72
Consume fruits	1.48	0.00*	4.39
Milk or dairy products	-2.04	0.00*	0.13
Vitamins supplements or Regular medicines	-1.26	0.07	0.28
Weight gain	0.98	0.01*	2.65

*p-value<=0.05

Multivariable binary logistic regression analysis was performed to observe the contribution of significant factors observed from uni-variable regression analysis. The factors such as use of suns cream, fruit consumption, intake of milk or daily products and weight gain were highly significant for the fear of Vitamin D deficiency Table III.

Table 3: Multivariable analysis of the attitude of participants regarding fear of Vitamin D deficiency

Factors	B	p-value	OR
Use of suns cream	1.44	0.00*	4.20
Nature of job	1.46	0.01*	4.29
Consume fruits	3.08	0.00*	21.64
Milk or dairy products	-2.34	0.00*	0.10
Weight gain	1.70	0.00*	5.52

*p-value<=0.05

DISCUSSION

This study was done to find out and acknowledge the precautionary measures and determinants leading the fear of vitamin D deficiency among female medical students. It was seen that vitamin D deficiency is common in this group of study. Other studies done on prevalence of vitamin D deficiency showed there is a high deficiency of vitamin D in patients particularly in females and younger age populations[11], and prevalence and fear of vitamin D deficiency is high among young healthy Pakistanis and duration of exposure to sunlight is one of common determinant[12]. In this study, Fear of having vitamin D deficiency was significantly associated with past family history of any bone diseases. Majority of subjects did not have any kidney or liver disease so; fear of vitamin d deficiency was less significantly associated with any kidney or liver diseases. Another study concluded that reduced vitamin d level was observed in patients of chronic liver disease[13]. Students suffering from PCOS had significantly high fear of decreased vitamin D levels. A study done in South India revealed high incidence of vitamin d deficiency in females suffering from PCOS but the association between metabolic syndrome and decreased vitamin d was not evident[14].

It was seen that having prolonged GIT distress or disorder was also associated with fear of having vitamin D deficiency. The use of sunscreens was one of the common fears. Previous studies showed that Vitamin d deficiency was seen in girls who were using sunscreens as compared to those who don't use[15].

Inadequate exposure to sunlight was common and major fear and determinant of vitamin D deficiency. Another study also showed that vitamin D deficiency was observed in the subjects that had less sunlight exposure[16]. Duration of exposure to sunlight was also an important factor[17].

The use of milk and dairy products was associated with decreased fear of vitamin D deficiency in this study. Another study acknowledged that increased availability and intake of vitamin d fortified food and consumption of dairy products reduces the risk of vitamin d deficiency[18,19] and showed that less dairy products intake resulted in increased vitamin d deficiency's prevalence[20].

Limitations: It was a cross-sectional study based on questionnaires data. Sampling for measurement of serum vitamin D level was not done.

CONCLUSION

The incidence of precautionary measures leading to Vitamin D deficiency were accessed among female medical students. Most commonly affected factor was physical well-being. The comprised factor was related with minor health issues like osteoporosis, Osteomalacia, rickets in children, PCOs in girls and women, kidney disorders, liver disorders and gastrointestinal disorders. Major variations in Vitamin D deficiency were explained by these factors.

Recommendations: There should be emphasis on awareness campaigns about the harmful effects and precautionary measures of Vitamin D deficiency at school and colleges level to avoid all the disorders and diseases.

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