

## Special Article - Vitamin D Deficiency

# High Prevalence of Vitamin D Deficiency in Medical Staff Draws Attention to a Retraining Program for Vitamin D

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## Abstract

**Background:** Vitamin D is considered as a steroidal hormone and our knowledge about its roles in the skeletal and non skeletal health are rapidly expanding from the previous decade. Epidemiological studies have revealed an inverse association between vitamin D level and a wide range of modern diseases, such as type1 diabetes mellitus, multiple sclerosis, rheumatoid arthritis, breast cancer, and even heart diseases.

Vitamin D deficiency is one of the major health problems in the Middle East, first lines for solving the problem are medical staff. In order to increase attention of medical staff, in this survey we study the distribution of vitamin D level in health care professionals who attend a retraining program for vitamin D. Our aim was to draw the attention of the medical staff about their own deficiency and pay more attention on vitamin D status of their patients.

**Methods:** This cross sectional study was done on 80 health care professionals in the city of Yazd, who were selected through random sampling, in the summer of 2010. 25-Hydroxy vitamin D (25(OH) D) serum level was measured by ELISA method. Serum level of more than 30 ng/ml was considered as normal; 30 to 20; 20 to 10; and less than 10 were mild, moderate and severe deficiency respectively. The data were collected by a researcher-making questionnaire.

**Results:** The Study showed only less than ten percent of them had normal vitamin D. 54%, 23% and 15% had severe, moderate and mild deficiency, respectively. Among them vitamin D deficiency was more common in women ( $p=0.001$ ).

**Conclusion:** The present study found out high prevalence of vitamin D deficiency among health care professionals, despite a lot of studies which showed high prevalence of vitamin D deficiency in the general population and the general belief for adequate vitamin D consumption (400-600 IU/Day) and the assumption of adequate sun exposure in our sunny area give them the false conception that they are receiving enough vitamin D, therefore this is the first step to sensitize them about solving this health problem in themselves and their patients.

**Keywords:** Prevalence; Vitamin D deficiency; Health care professionals

## Introduction

Vitamin D is undoubtedly important for bone development and calcium-phosphorus metabolism though recent studies show much wider possible role in health and disease prevention (e.g. diabetic mellitus, hypertension and malignancy). Vitamin D is not really a vitamin; it is one of the most potent steroidal hormones known with wide range of action [1-6]. Circulating 25(OH) D levels are directly related to dietary vitamin D intake plus skin exposure to Ultra Violet (UV) light. Vitamin D intake from natural foods in our region is limited as few foods are fortified by vitamin D but plenty of sunshine exists almost around the year [7]. Despite proper latitude (31° N) for vitamin D production, use of sun screens and sun exposure avoidance, skin pigmentation (type III or IV Fitzpatrick scale) and dress code are reducing factors for dermal synthesis of vitamin D in the area specially for women. There are Other factors like spending more time in

doors, the season, and the extent of the air pollution blocking UV light [8]. We assume that health care professional may be less likely to be vitamin D deficient. This study aims to find out the prevalence of Vitamin D deficiency among physicians and nurses working even in sunny countries like the Middle East, vitamin D deficiency exists as a public health problem with significant morbidity [9,10]. Iran is one of the Middle Eastern countries with high prevalence of deficiency [11]. This study not only showed extent of deficiency in healthcare professional but it also informed them about their vitamin D status and sensitized them to solve this problem.

## Materials and Methods

This cross-sectional study was conducted on 80 healthcare professionals (doctors; nurses; medical students) in Yazd, in the summer of 2010. Participants were selected by convenient method who attended the retraining program for vitamin D. All cases were

**Table 1:** The prevalence of 25 (OH) vitamin D deficiencies.

Severity of deficiency	%	Number
Sever deficiency <<10ng/ml	54	43
Moderate deficiency 10 to 20	23	19
Mild deficiency 20- 30ng/ml	15	11
No deficiency	8	7
Total	100	80

healthy, Iranian, “between” 22 to 58 year of age. The questionnaire was designed by the researchers, and for each person a questionnaire was completed by demographic information; using sunscreen and consuming vitamin D supplements. Verbal consent was obtained for venipuncture. Serum 25(OH) D concentrations were measured by ELISA, using a commercial radioimmunoassay (Diasorin).

The range of 25(OH) D > 30 ng/ml was indicated as normal. Levels of 30 to 20; 20 to 10; and <10 ng/ml were considered as mild; moderate and severe deficiency, respectively [1].

Statistical analyses were performed using the SPSS 12.0 software. Because the data distribution was not normal, for the description of data, median of serum 25(OH) D was used. Characteristics of participants with 25(OH) D measurements were compared with Kruskal-Wallis and with Mann-Whitney tests. P values below 0.05 were considered to indicate statistical significance. This study was approved by the Research Committee of Yazd University of Medical Science.

## Results

Out of 80 participants, 50% were men. The mean age was  $36.35 \pm 8.95$ . The mean and median serum 25(OH) D were  $78.13 \pm 3$  ng/ml and 8.5 ng/ml respectively. They include various specialties from internal medicine and surgical wards. Serum level of vitamin D was shown in Table 1. Participants' characteristics were shown in Table 2. Vitamin D deficiency was significantly more severe in women ( $p = 0.001$ ). There was a direct relationship between consuming vitamin D supplements and serum level of 25(OH) D ( $p = 0.047$ ), but no relationship with using sunscreen, age or job.

**Table 2:** Independent variable related to median of 25(OH) D.

P value	Number	Median and (interquartile range)	Variable
<b>0.001</b>	40	14 (18.8)	Men
	40	5.9 (5.6)	Women
<b>NS</b>	25	7.1 (18.8)	< 30 yrs
	55	10 (12.2)	>30 yrs
<b>NS</b>	22	10 (6.6)	doctor
	18	8.7 (8.2)	Medical student
<b>40</b>	40	8 (25.6)	nurse
	10	8 (7.3)	Yes
<b>NS</b>	70	10 (16.3)	No
	32	6 (17.1)	Yes
<b>45</b>	48	10.5 (12.1)	No
	38	7.2 (17.4)	< half hour in week
	42	12 (11.1)	> half hour in week

NS: not significant

## Discussion

There is no general agreement for ideal level of vitamin D. Defined cut off point for frank bone disease is < 12 ng/ml; reaching maximum calcium absorption by level > 30ng/ml. And levels  $\geq 100$  ng/ml may be toxic level of 20 to 70 ng/ml of 25(OH) D is agreed to be the acceptable level [12]. Our results showed high prevalence of vitamin D deficiency in health care professionals of Yazd. In our study about half of them were severely deficient. Medical staff reports of vitamin D from Qataris showed 90% were deficient, In Boston Medical Center, 32% of healthy students, physicians, and residents were vitamin D deficient, and despite taking a multivitamin daily, high rate of vitamin D deficiency has also seen in Indian health care worker [13-15]. Low vitamin D was associated with some metabolic effects in doctors [16]. Medical staff are more aware of vitamins and thus they are expected to take some action to avoid deficiency by supplementation, but majority of daily supplement designed for prevention and are not suitable for deficient ones who are so prevalent in Iran and Arab countries in the Middle East and even European countries [17,18]; Low sunlight exposure due to poor outside activity, life style, excess clothing, abandoning sun exposure due to fear of skin cancer, pigmented skin and low intake of supplement are all factors responsible for the high prevalence of deficiency. Additional risk for medical staff is high demand for work in developing countries and shift working which limits the chance to have outdoor activity and sun exposure. Decades of investigation has increased our understanding about vitamin D and its roles, knowledge of medical staff needs to be improved [16,19]. Knowledge about their own vitamin D level may change their attitude toward vitamin D treatment in daily practice and draws their attention to this subject [20]. By integrating vitamin checking in this retraining program and giving a guideline how to treat them may be one of the ways to solve this problem in society.

vitamin D deficiency is more severe in women in the region as seen in our study, some studies have pointed out [21] veiling as a risk factor for the deficiency but it is not the major factor as vitamin D deficiency exists in both sexes, other factors like their life style may be more influential although veiling may influence degree of severity.

## Limitations

We assessed vitamin D deficiency in small sample size so we had some limitations to specify prevalence in different groups and specialties. (Doctors, nurses, medical students), we did not monitor their way of practicing after the retraining program to evaluate effect of the program in changing their practice. Other accurate way like HPLC method may HAVE given a precise result than Eliza.

## Conclusion

This study was done on health care professionals who are responsible for public health. Through this study, we tried not only to aware them about high prevalence of vitamin D deficiency but also made them sensitive on this popular health issue by revealing the extent of the problem in health care providers in our region.

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