VITAMIN D DEFICIENCY AMONG DOCTORS AND STAFF NURSES: A NEGLECTED DOMAIN AMONG MEDICAL CARE GIVERS

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Abstract

Background: Various factors lead to hypovitaminosis (decreased vitamin D levels in serum/blood), in general population, sunlight being one of the major factors. Doctors and staff nurses are particularly at risk due to long working hours indoors, which deprives them of adequate Ultraviolet light exposure.

Methods: It was a prospective descriptive cross sectional study conducted at Ziauddin University Hospital, Keamari campus, from August 2018 to July 2019. The objective of this study was to determine the status of vitamin D deficiency among doctors and staff nurses working at Ziauddin University Hospital. All those doctors and staff nurses were included in the study, who were already advised by physicians to get serum vitamin D levels done for their symptoms.

Results: A total sample of 118 was collected. 56 doctors and 62 staff nurses participated in the survey. 85 out of 118 (72%) subjects were either deficient or insufficient of vitamin D.

Conclusion: Even though doctors and nurses are considered to have better understanding of vitamin D deficiency symptoms and morbidity it causes; still this study found out that majority of the healthcare providers working at Ziauddin hospital were deficient of this vitamin.

Keywords: Vitamin d deficiency; doctors; nurses; tertiary care hospital; Pakistan
Introduction
Vitamin D And Its Significance
Vitamin D belongs to a group of secosteroids that are fat-soluble and exist in the five forms starting from vitamin D1 to D5. For human beings D2 (ergocalciferol) and D3 (cholecalciferol) hold the most significance. Calcitriol (1, 25 Dihydroxycholecalciferol) is found to be an active form of vitamin D in vivo. Vitamin D absorbs calcium and phosphate from the intestines.(1) Various factors that may lead to hypovitaminosis include obesity, multiparity (multiple pregnancies), clothing factor, diet, air pollution, inadequate exposure to sunlight, malabsorption; and, in infants, less amount of vitamin D found in breast milk.(2),(3) In adults, vitamin D deficiency can cause osteomalacia, osteoporosis and reduced bone mineral density; thus elevating the chances of bone fractures.(1) It can invite a plethora of problems comprising of metabolic disorders, autoimmune conditions, psychiatric, respiratory (breathing), cardiovascular (heart) diseases and even cancers.(1),(4) In paediatric (children less than 14 years) age group, it can lead to rickets which is characterized as bowing of the legs (3). Vitamin D is a synthetic product which is predominantly absorbed by fortified foods. Vitamin D3 is synthesized in a first stage. At first, in the skin where 7-dehydrocholesterol reacts with ultraviolet light from the sun and later in the liver it is hydroxylated to 25-hydroxyvitamin D (25(OH)D). Vitamin D and in the kidneys it is further converted to the metabolically active form, 1?, 25-dihydroxyvitamin D (1?, 25-(OH)2D). Most of the vitamin D which is measured in serum is of D3 type. The amount of vitamin D recommended for all infants, children, and adolescents to be consumed in a day is 400 to 600 IU.(4),(5),(6)

Hypovitaminosis D/Vitamin D deficiency
It is an extremely common health problem all around the planet; it seems to be widely recognized as a pandemic.(7) Approximately one million people in the world have low levels of vitamin D. A survey conducted in 2007 revealed the prevalence in Canada to be about 70%-97%.(4) It was rare in South Asia previously.(8) But unfortunately currently it has reached epidemic proportions in South Asia. Studies from different Asian countries; Tehran, China, India, Turkey, Lebanon, Jordan, Saudi Arabia, Iran and Tunisia gave an evidence of high prevalence of vitamin D deficiency (44-95%), although all of them have adequate sunshine(9). The study conducted in 2007 revealed that Pakistan has 80-85% prevalence of vitamin D deficiency in their local population.(10) Prevalence of vitamin D deficiency in Pakistan is found to be to be 74%.(11) Karachi is located at 24° N latitude and 67° E longitude. Although the weather in Karachi is warm or hot throughout the year and there is abundant sunlight almost daily but the prevalence of Hypovitaminosis D was alarmingly elevated according to studies conducted in Karachi from 2009 to 2015, (60% to 91.5%) (9),(11),(12) It was rare in South Asia previously.(8) But unfortunately currently it has reached epidemic proportions in South Asia. Studies from different Asian countries; Tehran, China, India, Turkey, Lebanon, Jordan, Saudi Arabia, Iran and Tunisia gave an evidence of high prevalence of vitamin D deficiency (44-95%), although all of them have adequate sunshine(9). The study conducted in 2007 revealed that Pakistan has 80-85% prevalence of vitamin D deficiency in their local population.(10) Prevalence of vitamin D deficiency in Pakistan is found to be to be 74%.(11) Karachi is located at 24° N latitude and 67° E longitude. Although the weather in Karachi is warm or hot throughout the year and there is abundant sunlight almost daily but the prevalence of Hypovitaminosis D was alarmingly elevated according to studies conducted in Karachi from 2009 to 2015, (60% to 91.5%) (9),(11),(12) It was rare in South Asia previously.(8) But unfortunately currently it has reached epidemic proportions in South Asia. Studies from different Asian countries; Tehran, China, India, Turkey, Lebanon, Jordan, Saudi Arabia, Iran and Tunisia gave an evidence of high prevalence of vitamin D deficiency (44-95%), although all of them have adequate sunshine(9). The study conducted in 2007 revealed that Pakistan has 80-85% prevalence of vitamin D deficiency in their local population.(10)

Methodology
The study was a prospective descriptive cross sectional study conducted at Ziauddin University Hospital, Keamari campus, from August 2018 to July 2019. Ziauddin Hospital Keamari campus is a 100 bedded tertiary care facility. It has around 60 doctors besides consultants and 85 staff nurses in total. A sample size of 118 patients (56 doctors and 62 staff nurses) were included in the study that fulfilled the inclusion criteria. Post graduate doctors, medical officers and staff nurses were included in the study where as consultants, morbidity high BMI, the ones taking vitamin D supplements and with history of adrenal or gonadal disease, history of gastrointestinal resection or hysterecomy, any metabolic bone disease, pregnancy and lactation, parathyroid, malignancy, thyroid, hepatic and renal disease, malabsorption syndrome or chronic diarrhea were excluded. A questionnaire was devised that included age, designation, daily working hours and test results of vitamin D levels from Ziauddin Hospital's laboratory.

Results
Total sample of 118 was collected. 56 doctors and 62 staff nurses participated in the survey. Rest either did not fulfill the criteria or did not get a blood test done. Total 63(53%) females and 55(47%) males were included in the survey. Age of doctors and nurses was between 24 to 38 years. Daily working hours for staff nurses are 6 hours to 12 hours. All doctors do a 9 hour job daily and post graduates do an additional 32 hours on call duty every third or fourth day. 85 out of 118 (72%) subjects were either deficient or insufficient of vitamin D. The difference between vitamin D level values can be assessed by looking at the pie chart (figure 1). 48 out of 62(56%) staff nurses and 39 out of 56(61%) doctors were vitamin D deficient/insufficient. 55(65%) females and 30(35%) males were vitamin D insufficient or deficient. Severity of vitamin D deficiency is illustrated in Table 1.

Discussion
Vitamin D is most commonly estimated by the levels of 25-hydroxyvitamin D that are circulating in the body. Serum level should be >30 ng/ml (75 mmol/l). It is further classified as insufficient from 20 to <30ng/ml, deficiency between 10 ng/ml and 20 ng/ml, and severe deficiency <10 ng/ml.(13) Literature from different countries, about vitamin D deficiency, clearly demonstrates magnitude of the issue but there are only few studies regarding this among health care professionals. To the best of authors' knowledge nothing as such has been carried out in Pakistan for the evaluation of vitamin D status among doctors or/and staff nurses. Ziauddin Hospital as mentioned earlier is a 100 bedded tertiary care hospital with a busy ICU and 24 hours emergency department that...
Vitamin D deficiency/insufficiency is a worldwide awful predicament. Vitamin D deficiency has also been found in Indian health care workers.(10) According to a study carried out in 18 Indian cities, among medical and paramedical personnel, 79% of subjects were deficient, 15 % were insufficient, and just 6 % were sufficient in vitamin D status.(15) Medical staff reports of vitamin D from Iran showed 92% were deficient.(16) In Boston, 32% healthy pupils, general physicians and trainees were found to be vitamin D deficient.(17) In Portland, a study revealed that 51.4% internal medicine house staff was vitamin D deficient.(18) Staff nurses in Ziauddin University Hospital work for 6 to 12 hours in a day. Most of them are rotated in the morning, evening and night shifts every 20 days. Doctors have to spend 9 hours daily in the hospital along with 32 hours on call every 3rd or 4th day as reported in this study. The possible reason for lower serum vitamin D levels among Medical care personnel can be a reduced exposure to sunlight. In general, workers who spent maximum time in an enclosed interior may be at jeopardy of vitamin D deficiency but there has been relatively little research into the healthiness of indoor workers.(19)

In this study females were found to be more vitamin D deficient as compared to males. One reason could be veiling or extra clothes for Islamic teachings and Pakistan's culture or a quarterly sun but deficiency exists in both sexes. This suggests that veiling may influence degree of severity.(5) Shakiba M et al, supported the idea since females were more deficient in her study too.(16)

This study also found out that staff nurses were 10 times more at risk for vitamin D deficiency/insufficiency as compared to doctors. Additional risk for staff could be demanding workload, shift working and the protective uniform; which limit the chance to have outdoor activity and a small sample size from a single hospital and lifestyle was not considered. There were certain limitations of this study. Firstly; it was not population-based so the results cannot be generalized. Secondly; it was a small sample size from a single hospital and lifestyle was not excluded.

Conclusion

Vitamin D deficiency/insufficiency is a worldwide awful predicament. The results of this study are an eye opener for all doctors and staff nurses and they should get their levels checked frequently and treat themselves. Health care professionals should take care of their own health to be adequately productive at work.

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