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Vitamin-D Deficiency: An Alarming Situation for Pakistani Undergraduate Dental Students

Dr. Seema Shafeeq
dr.seema20@yahoo.com
Lecturer, Department of Community and Preventive Dentistry, The University of Lahore, MPH, BDS

Dr. Azfar Aheed
azfar.aheed @jsmu.edu.pk
Lecturer, Department of Operative Dentistry, Sindh Institute of Oral Health Sciences, Jinnah Sindh Medical University

Dr Darrosham Khan
darrosham.khan@jsmu.edu.pk
Lecturer , Community and Preventive Dentistry Department, Jinnah Sindh Medical University

Mohammad Ismail
mohdismail93@gmail.com
Lecturer, Department of Operative Dentistry, Sindh Institute of Oral Health Sciences, Jinnah Sindh Medical University

Dr Aisha Naureen
aisha.naureen@jsmu.edu.pk
Lecturer , Department of Operative Dentistry , Sindh Institute of Oral Health Sciences, Jinnah Sindh Medical University

Dr Muhammad Ali
doctor.muhammadali@hotmail.com
Assistant Professor , Community and Preventive Dentistry Department, CIMS, CMH Institute of Medical & Dental Sciences , Multan Cantt.
Corresponding Author: * Dr. Seema Shafeeq dr.seema20@yahoo.com

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ABSTRACT

Vitamins are one of the most important nutritional factors implicated in several oral and systemic diseases and conditions It is considered that adequate amounts of Various indications regarding the function of Vitamin D for oral health are highlighted through Knowledge of vitamin D for dental students. Current research has shown solid evidence regarding the correlation between periodontal health and consumption of vitamin D. Pakistan had a significant rate of vitamin D insufficiency. The objective of this study is to find out the knowledge regarding vitamin D among undergraduate dental students. This was a cross-sectional study conducted among dental students. The sample size was estimated as 100 using the Open Epi online sample size calculator. The dental care students aged 20-26 years of both genders were included in the study. Non-probability convenience sampling was employed to select the participants. Ethical clearance was received from the Institutional Review Committee of SIOHS. All data was collected by a self-made questionnaire for the knowledge, attitude, and practice regarding vitamin D deficiency among dental students. The reliability of the questionnaire was checked and Cronbach's alpha value was calculated as 82%. Overall 100 BDS students registered in this research. The average age of the participants was reported as 22.91±1.27 years. Out of 100 students, 32 were males and 68 were females

with a response rate of 100%. About 81% of students had exposure to the sun. About 89% of the dental students had heard about Vitamin D deficiency. There is a strong correlation between periodontal disease and vitamin D consumption and calcium, and the long-term prognosis of the disease depends upon early treatment. However, the importance of establishing awareness programs among dental students as well as among the local public helps structure more knowledge about vitamin D's importance.

Key Words *: Knowledge, Dental Students, Vitamin D*

INTRODUCTION

A balanced diet is essential for perfect health. Lack of optimal diet and a sedentary lifestyle is responsible for increased morbidity and mortality rates globally. Vitamins are one of the most important nutritional factors implicated in several oral and systemic diseases and conditions such as obesity, cardiovascular disease, stomach illnesses, and more cancers as well as oral cancers [(1)]

[(2)]. It is considered that adequate amounts of Vitamin D are significant for the effective function of multiple body parts and muscles of the body [(3)] [(4)]

Among healthcare practitioners, a well-known trait regarding Vitamin D is that it is responsible for mineralizing bones but does not completely depict this essential vitamin's significance. Various other physiologic and developmental mechanisms such as cardiovascular and muscle functioning depend on adequate amounts of vitamin D.

Various indications regarding the function of Vitamin D for oral health are highlighted through example knowledge of vitamin D for dental students. Current research has shown solid evidence regarding the correlation between periodontal health and consumption of vitamin D [(5, 6)] several nutritional supplements contain adequate levels of calcium and vitamin D that enhanced the health of periodontium and bone density in the mandible, and prevent alveolar bone resorption Periodontium includes the alveolar mucosa, gingiva, cementum, periodontium and alveolar bone considered the supporting structure of tooth [(7)], thus thorough deep knowledge helps for reliability is first importance while preventing tooth loss.

Vitamin D is highly prevalent worldwide, Approximately 1000 million vitamin D deficient or insufficient are reported from Vitamin D deficiency worldwide, As a matter of fact, vitamin D deficiency is considered an epidemic worldwide [(8)] A 2016 research of Pakistan revealed that 53% of participants have vitamin D insufficiency, 31% inadequate vitamin level and only 15% had normal vitamin D level [(9)]. Vitamin D deficiency is relatively high throughout the world but there seem to be many hazards in countries of sunny South Asia, especially among children, women and the elderly Knowledge gap between healthcare professionals and the general population is considered the biggest hurdle in vitamin D deficiency prevention [(10)]. Ultimately, it necessitates acquiring more and more knowledge of vitamin D among dental students and practitioners as well. A descriptive study in Saidu Medical College Khyber Pakhtunkhwa, Pakistan. A survey [(10)] conducted among final-year medical students regarding Vitamin D, 72% of participants had optimistic attitude and 27.9% had little awareness about vitamin D , one of the polls conducted in India 17, a lack of consistency between the information and attitude, negative response to sun rise exposure , majority of the students 53,3% identified as the main source of vitamin D, while concerning practice 64.2% students did not like sun exposure by themselves. In this way knowledge, attitude, and practice regarding Vitamin D is an integral part of students of medicine for their academic curriculum that continues in clinical practice. However, most of the studies have been done among medical students and a scarcity of data is available for dental students in this regard.

Despite enough understanding for vitamin D and its role of human body, Pakistan had a significant rate of vitamin D insufficiency. Public health strategies and public health awareness need to be addressed, that

involve all key stakeholders. That inevitably involves dental students level to an independent practitioner and tertiary care hospitals who play a pivotal role in policy making and legislation. Therefore, it entails more and more studies to be conducted to assess and upgrade knowledge about vitamin D deficiency. It also plays a vital role in bridging gaps of knowledge between healthcare providers and the population. Ultimately it should be considered as an issue addressed among dental students working in either a primary or tertiary care system. Hence this current study aimed in assessing the knowledge, attitude and practice of dental students with respect to vitamin D deficiency.

LITERATURE REVIEW

Background and Biological Rationale

Vitamin-D measures as serum 25-hydrooxyvitamin –D [25(0H) D] regulates calcium phosphate homeostasis, bone turnover, immune modulation –mechanism that also operate in the craniofacial complex and periodontium Deficiency has been linked with enamel and dentin hypo mineralization higher burden and greater severity of periodontal disease in observational research and systemic review [11, 12]

Burden of Vitamin –D deficiency (VDD) in Pakistan

Multiple Pakistani studies report a strikingly high prevalence of low 25(OH)D across ages and regions. In apparently healthy adults from urban centers (Karachi, Lahore, Islamabad), cross- sectional data frequently show >70% with deficiency and insufficiency; some cohort report 80- 90% below commonly used sufficiency cut-offs. Nationally focused reviews and city based surveys converge on the conclusion that Pakistan is a high –burden setting despite abundant sunlight.(13)

Evidence in university students and (future) oral–health workforce

While Pakistan lacks large, biochemically confirmed datasets specifically in undergraduate dental Students several student cohorts including medical and mixed medical /dental samples – provide a relevant proxy.

Karachi medical students includes a medical and dental college setting

VDD/insufficiency was "common '' in asymptomatic ,educated young adults despite reported sun exposure and calcium intake, underscoring behavioral and environmental determinants beyond simple UV availability.(14)

Islamabad Medical & Dental Undergraduate : A smaller MBBS student sample documented high rate of biomedical deficiency using a < 20ng/ml, threshold reinforcing that even health –literate youth are affected.

Knowledge /attitude /practices (KAP) among medical and dental students Studies from Karachi and Peshawar identify substantial awareness gaps and very low routine supplementation (6%) suggesting modified able drivers in campus populations that include dental students (13)

Together, these data imply that Pakistani undergraduate dental students –who share demographics, lifestyle and curricula with the studied groups are likely to have a high prevalence of unrecognized VDD, with potential downstream implications for their own skeletal /oral health and importantly for their counseling practices with patients.

Determinants relevant to dental students in Pakistan

Determinants repeatedly associated with VDD in the Pakistani cohort include female sex, urban residence limited outdoor time, winter season air pollution covered clothing, and low dietary intake/fortification – factors highly applicable to university life. Protective associations are seen with supplementation and vigorous exercise. (15)

Oral-health Consequences: what matters for dental trainees

Systematic reviews link higher serum 25(OH) D with lower odd of periodontitis and fewer decayed teeth in a dose –response manner, narrative review connect deficiency with caries, periodontal breakdown, and impaired oral development. Although high quality trails in students are scarce, the biological plausibility and consistent observational signals suggest that VDD among dental undergraduates may adversely affect oral –hard tissues and periodontium and could influence outcomes of clinical dental procedures.(16)

MATERIALS AND METHODS

It was a cross-sectional study conducted among dental students. The sample size was estimated as 100 using the Open Epi online sample size calculator. The statistics considered for knowledge of vitamin D deficiency as 89.2% (11) margin of error as 6.1% and 95% confidence level.

The dental care students of age 20-26 years of both genders were included in the study. The MBBS students were not considered in the study. Non-probability convenience sampling was employed to select the participants.

Approval ERC was taken before the conduct of the study. Informed and written consent was taken from those who agreed to participate in the planned study. All data was collected by a self-made questionnaire for the knowledge, attitude, and practice regarding vitamin D deficiency among dental students. The reliability of the questionnaire was checked and Cronbach's alpha value was calculated as 82%.

SPSS version 23 was used to evaluate data. Mean and SD were calculated for quantitative variables. Frequency & percentage was calculated for qualitative variables. The knowledge, attitude, and practice about vitamin D deficiency were stratified concerning gender, and a post- stratification chi-square test was applied. $P<0.05$ was taken as statistically significant.

RESULTS

Overall 100 BDS students registered in this research. The average age of the participants was reported as 22.91±1.27 years. Out of 100 students, 32 were males and 68 were females with a response rate of 100%. About 81% of students had exposure to the sun. About 89% of the dental students had heard about Vitamin D deficiency. Other descriptive statistics regarding knowledge, attitude & practice are summarized in **Table 1.** and A comparison of knowledge, attitude & practice concerning gender is represented in **Table 2.**

TABLE 1: DESCRIPTIVE STATISTICS FOR STUDY VARIABLES

VARIABLES	n (%)
Age in years	22.91±1.27
Gender	
Male	32
Female	68
Exposure to sun	
Yes	81
No	19
Knowledge, attitude & practice regarding Vitamin D deficiency	
Do you have any perception of vitamin D?	
Yes	89
No	11

Do you agree Vitamin D is vital for your health?	
Yes	91
No	9
Do you take Vitamin D supplements/tablets	
Yes	25
No	75
Have you ever been informed that you have a Vitamin D deficiency?	
Yes	20
No	80
Do you include vitamin D-rich foods in your diet?	
Yes	96
No	4
Did you receive instructions regarding preventing Vitamin D deficiency?	
Yes	60
No	40
From whom receive guidance about the prevention of Vitamin D deficiency?	
Family Doctor	50
Other	37
Friend	13
Do you know how to avoid yourself Vitamin D deficiency?	
Yes	95
No	5
Do you know that Vitamin D deficiency causes tiredness, low mood as well as muscle & bone pain?	
Yes	95
No	5
How frequently are you expose to sunlight?	

Daily	93
Other	6
Once in a week	1
At what time of the day you go outside?	
Afternoon	18
Early morning	76
At the time of sunset	6
Do you like going into the sun?	
Yes	15
No	77
Rarely	8

TABLE 2: COMPARISON BETWEEN GENDER FOR KNOWLEDGE, ATTITUDE & PRACTICE OF VITAMIN D DEFICIENCY

Question	Gender		Total
	Male	Female	
Have you heard of vitamin D?			
Yes	29	60	89
No	3	8	11
Do you think Vitamin D is essential for your health?			
Yes	28	63	91
No	4	5	9
Do you take vitamin D pill?			
Yes	5	20	25
No	27	48	75
Have you ever been told that you have Vitamin D issue in your body			

Yes	5	15	20
No	27	53	80
Do you have regular intake of vitamin D food			
Yes	29	67	96
No	3	1	4
Have you ever been offered any instructions about preventing Vitamin D deficiency?			
Yes	18	14	32
No	42	26	68
Who gave you the suggestion regarding the prevention of Vitamin D deficiency?			
Doctor	11	39	50
Others	12	25	37
Friends	9	4	13
Do you know how to prevent yourself from Vitamin D deficiency?			
Yes	31	64	95
No	1	4	5
Do you aware about the symptoms of Vitamin D deficiency like tiredness, & bone pain?			
Yes	29	66	95
No	3	2	5
At what time of the day you go outside?			
Afternoon	6	12	18
Morning	25	51	76
At the time of sunset	1	5	6
Do you like going into the sun?			
Yes	7	8	15
No	21	56	77
Don't know	4	4	8

DISCUSSION

There is a strong connotation between vitamin D levels and periodontal disease. [17] Hence, it should become a prerequisite to assess knowledge of vitamin D among dental students. The frequency of knowledge depicts better diagnosis of disease and will help to screen for deficiencies among the general population. As it is widely accepted that sunlight is the basic need for Vitamin D therefore this study found that approximately 80% of respondents were exposed to the sun as compared to the study conducted in Turkey where 66.5% of university students were expose under sunlight.[18]

Among all studies, a study conducted in Australia has different statistics regarding Vitamin D knowledge wherein lack of knowledge was evident and they had an idea that vitamin d deficiency was related to sun exposure.[19]

The deficiency of vitamin D varies among different occupations. Healthcare professionals are more likely to suffer from this deficiency (20). The outcomes of this research exhibited that 15% of female BDS students and 5% of male dental students had deficient vitamin D whereas 25% of dental students take vitamin D supplements compared to the study conducted in Malaysia stated that 98% of the subjects had awareness about Vitamin D, but more than 50% of participants did not use any supplements.[21]

Among all the participants, only 77% were interested in going into the sun as compared to the study carried out in India where only 68% of subjects were interested in sun exposure.[22] Moreover, this study highlights the fact that 91% of applicants informed that vitamin D is significant for health. In this study, it is evident that more than half of the participants (89%) have heard about Vitamin D. A similar study was conducted among medical students, and the results were found to be 100%. [23]

A Chinese study showed similar statistics regarding knowledge of vitamin D in contrast to this study. According to this study, most of the knowledge regarding Vitamin D was derived from media and newspapers and students have low intake of vitamin D supplements.[24]

Literature shows that there is a vast amount of data regarding knowledge of vitamin D. However, the statistics are lacking among dental students. Different studies assessed attitudes, perceptions, trends, and practices among different populations. Overall, there is sufficient knowledge of Vitamin D worldwide. The survey in Hong Kong revealed adequate awareness of vitamin D still, there was a majority that suffered with deficient levels.[25]

Within the limitation of this study, the outcomes of our study displayed that there was some understanding of the insight of vitamin D among dental students. The target population was quite small, however, it focused on dental students rather than medical which is a strength on its own. This gives a strong vision for showing vitamin D deficiency amongst general people and recognizing data regarding its shortage. Further, long-term prospective cohort studies with larger sample sizes are recommended to confirm the findings of this study.

CONCLUSION

In a nutshell, there is a strong correlation between periodontal disease and vitamin D consumption and calcium, and the long-term prognosis of the disease depends upon early treatment. However, the importance of establishing awareness programs among dental students as well as among the local public helps structure more knowledge about vitamin D's importance. As prevention should be initiated at an early stage, healthcare professionals and the general population could be at lower risk for tooth loss.

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