Knowledge and Practice of Female Students Regarding Vitamin D Deficiency

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Abstract

Background: Many studies evidenced that Vitamin D is an essential for good health especially it is associated with bone development. The deficiency usually may cause osteoporosis, muscle cramps and back pain.

Objectives: The study aimed to determine the knowledge and the practices regarding vitamin D deficiency among the female students and associate the knowledge and selected demographic variables and correlate knowledge with the practice.

Method: In descriptive research design, a cross sectional survey approach was used. Totally 190 students were selected randomly from King Faisal University who met inclusion criteria. The data was collected by using structured questionnaire for assessing knowledge and checklist for practice.

Results: Among 190 female students, many 62(32.6%) were in the age group of 20 and above. Majority of them 77(40.5%) were at final year, and 87(45.8%) were married. Regarding the overall level of knowledge 97(51.1%) were having poor knowledge. About the practice, 80% of the students never had exposure to sunlight, 93.7% never engaged in outdoor physical activities. There was no significant association between knowledge and the selected demographic variables at the level of $P<0.05$. There was significant correlation between knowledge and their practices regarding the expose to sun light daily, engage in outdoor physical activities and wear abaya with niqab at $p <0.001$.

Conclusion: Most of the female students were unaware of vitamin D sources and preventive measures of its deficiency. Hence, the study recommends that, there should be more emphasis on awareness to improve knowledge and practices regarding vitamin D deficiency.

Keywords: *Vitamin D, Deficiency, Knowledge, Practice, Prevalence.*

Introduction

It is very important to maintain our health as a human. It is also essential to have a healthy diet to maintain and protect each one's health.[1] A healthy diet provides various nutrients to our body which includes a variety of plant-based and animal-based foods. Such nutrients make different functions and that yield energy and keep the body running. Nutrients are usually helping in body-building and strengthen the bones, muscles, tendons, and regulate the body processes.[2]

Macronutrients are consumed usually in large quantities, which provide energy, and they are proteins, carbohydrates, fats, and fatty acids.[3] Micronutrients are consumed usually in small quantities. It includes vitamins and minerals, but they are essential to the body processes.[4] Vitamins and minerals are acting in concert, they perform hundreds of roles in the body such as converting food into energy, repair cellular damage,

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helping in heal of wounds, shore up bones and bolster the immune system. Hence, vitamins and minerals are known as essential nutrient[5] on the other hand, vitamins cannot be synthesized in amounts adequate to meet the needs of our body.[6] There are totally 13 essential vitamins. Among these, **Vitamin D** is necessary for calcium absorption, and help in building and maintaining strong bones and teeth. Some of the important vitamin D are calciferol, calcitriol, cholecalciferol and ergocalciferol.[7,8]

Vitamin D is essential for good health especially it is associated with bone development.[9,10] The main sources of **Vitamin D are** fortified milk, fortified soy, fortified rice beverages, butter, egg yolks, fatty fish, fish-liver oil, and importantly from sunlight, the body when exposed to the sun.[7] When the people are homebound, live in northern latitudes, wear long robes or head coverings for religious reasons, or have an occupation that prevents sun exposure are at high risk of v**itamin D** deficiency.[11] For dark-skinned people, the pigment melanin reduces the skin's ability to make vitamin D in response to sunlight exposure. In addition to that risk factors for vitamin D deficiency were identified included obesity, lack of awareness, and lack of daily milk consumption.[9]

Statistical reports proved that around 47% of African American infants and 56% of Caucasian infants had vitamin D deficiency, while over 90% of infants in Iran, Turkey, and India had vitamin D deficiency.[12] Some studies proved that, 35% of adults in the United States were vitamin D deficient whereas over 80% of adults in Pakistan, India, and Bangladesh were Vitamin D deficient. In the United States, 61% of the elderly population were vitamin D deficient whereas 90% in Turkey, 96% in India, 72% in Pakistan, and 6 7% in Iran were vitamin D deficient.[13,14]

Studies in both Turkey and Jordan showed a strong relationship between the clothing and the low serum levels. The study results found that overall 59.9% of participants had a serum 25(OH)D level <30nmol/l. Serum 25(OH)D was highest in women wearing western clothing and levels decreased to be lowest in traditional women wearing hijab and completely veiled women wearing niqab. Only 4% of this study group had serum levels >50nmol/l, these were seen exclusively in men and the women wearing western clothing.[15]

In Saudi Arabia, studies in Vitamin D conducted as early as 1983–1984, the results indicated that the deficiency was around 30% in the general population. But, in the recent past, there has been a burgeoning of reports on Vitamin D in the world, and Saudi Arabia was not immune to it. Published data revealed that in the Saudi Arabian population, Vitamin D deficiency is as high as 100%.[16,17] Hence the study was aimed to determine the knowledge and the practices regarding vitamin D deficiency among the female students and correlate the knowledge and practice.

Method and Materials

In a descriptive research design, cross-sectional survey approach was used to assess the knowledge and the practices related to Vitamin D deficiency among the female students. The research was carried out in Alahsa. Totally 190 students were selected randomly from King Faisal University who met the inclusion criteria.

The data was collected by using a structured questionnaire. The tool consists of demographic variables, structured questionnaire on knowledge assessment, and the checklist for assessing the practice. Knowledge was assessed by using 20 items based on multiple-choice questions which were developed from various available literature related to Vitamin D deficiency.

The practice was evaluated by using a checklist showing 'yes' or 'no' responses. The validity and reliability of the tool was tested. According to the data plan, the data was collected from the students after obtaining informed consent. The scores were categorized as follows; they were below 50% indicates poor knowledge, 50 – 75% shows average knowledge and above 75% is considered as good knowledge. The collected data were analyzed by using descriptive and inferential statistics by using Statistical Package for Social Sciences (SPSS) package version 22, which includes number frequency, mean, standard deviation, chi-square, and correlation test for statistical analysis.

Findings

The study results were discussed under the following headings. They are demographic variables, level of knowledge, and practice score.

The frequency and percentage distribution of demographic variables of female students. Among 190 female students, many 62 (32.6%) were in the age group of 20 and above and only 37 (19.5%) were in the age of 18 years. Most of them 77 (40.5%) were at the final year, and 87(45.8%) were married. Most of the students

124 (65.3%) were living in the joint family system, but only 24 (12.6%) were in the extended family system. Regarding the source of health information, 32(16.8%) were received from relatives, 67 (35.3%) from mass media, and 43 (22.6%) from health care professionals.

Figure 1 expresses the overall score of knowledge which was graded as poor, average, and good knowledge. Regarding the overall level of knowledge, 97(51.1%) were in poor knowledge, 67(35.3%) average, and 26(13.6%) were in good knowledge.

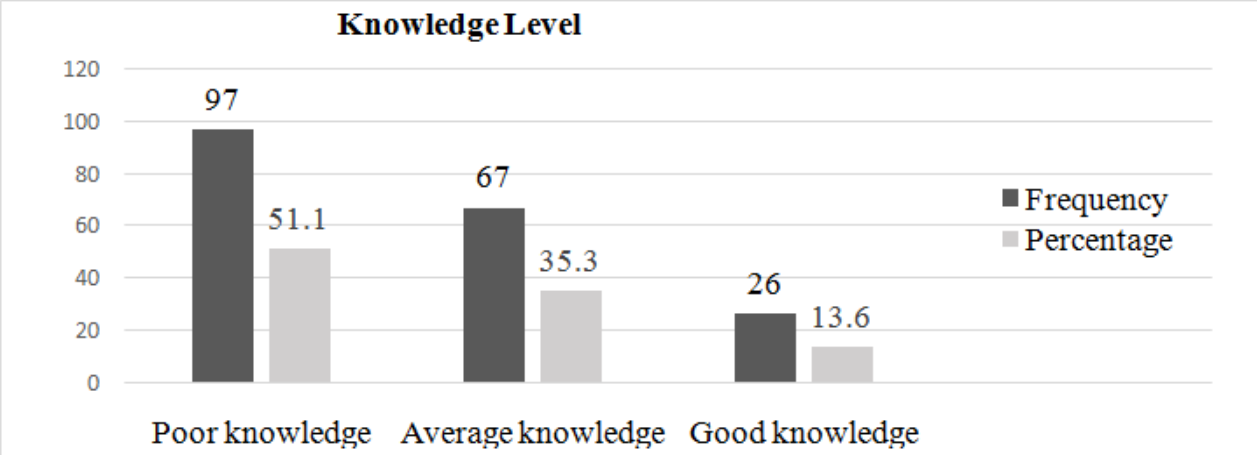

Figure 1. Frequency and percentage distribution of knowledge of students (n=190)

Table. 1 Descriptive statistical report of knowledge of female students (n=190)

Mean (Average)	9.75
Median	9
Range	17
Mode	12
Geometric Mean	8.96
Largest	19
Smallest	2
Sum	1853
Count	190
Standard Deviation	3.8
Variance	14.46

Table 1 shows that the average mean score of knowledge level was 9.75 with a standard deviation of 3.8. About the general information of Vitamin D deficiency 87.2 of students aware. But regarding the sources of vitamin D, 32.7% were knowing the correct information. The majority were saying, the sun is the only source. Around 74.6% were knowing about the health benefits of Vitamin D and few were telling about that vitamin D is essential for bone health exactly. Only 23.7% knew about the signs and symptoms and 18.9% were known to the consequences of vitamin D deficiency.

Table 2. Practice Checklist for Vitamin D deficiency (n=190)

S.No.	Practice activities	Yes		No	
		F	%	F	%
1.	Do you expose 5 to 10 minutes to sun light daily?	38	20	152	80
2.	Do you engage in outdoor physical activities?	12	6.3	178	93.7
3.	Do you wear complete covered abaya with Niqab?	158	83.2	32	16.8
4.	Do you consume fortified milk?	26	13.7	164	86.3

S.No.	Practice activities	Yes		No	
		F	%	F	%
5.	Do you apply sunscreen lotion during day time daily?	137	72.1	53	27.9
6.	Do you have complaining of vitamin D deficiency symptoms like muscle pain or fatigue?	69	36.3	121	63.7
7.	Do you have weight gain?	62	32.6	128	67.4
8.	Do you have more hair loss?	71	37.4	119	62.6
9.	Do you undergo test for checking Vitamin D in blood level regularly?	43	22.6	147	77.4
10.	Do you take treatment for muscle pain and fatigue?	32	16.8	158	83.2
11.	If you are deficient of vitamin D, do you want to take vitamin D supplementation?	134	70.5	56	29.5

F = Frequency; % = Percentage

Table 2 shows the result of the practice of students. Among them, 80% never had exposure to sunlight at least 5 to 10 minutes daily and 93.7% never engaged in outdoor physical activities. Around 13.7% of students consumed fortified milk and 72.1% used sunscreen lotion during day time daily. Regarding the vitamin D deficiency symptoms, 36.3% of students had symptoms, and remaining 63.7% had no symptoms. About 32.6% had weight gain problems and 37.4 had hair loss problems. Among them 77.4% never undergo tests for checking vitamin D level in blood and 83.2% never had taken treatment for muscle pain and fatigue. But if they will be deficient in vitamin D, 70.5% wanted to take vitamin D supplementation.

Association between knowledge level and the selected demographic variables: The chi-square test revealed that there was no significant association between knowledge level and the selected demographic variables at the level of $P<0.05$.

Correlation between knowledge and their practices regarding vitamin D deficiency: There was a significant positive correlation between knowledge and their practices regarding the expose 5 to 10 minutes to sunlight daily at r value=0.36 ($p <0.001$). There was a significant positive correlation between knowledge and them engage in outdoor physical activities at r value=0.15 ($p <0.001$). There was a significant positive correlation between knowledge and them wear complete covered abaya with Niqab at r value=0.236 ($p <0.001$). There was a significant positive correlation between knowledge and them consume fortified milk at r value=0.34 ($p <0.001$).

Discussion

In a recent study, conducted in Jeddah, Saudi Arabia on awareness of vitamin D deficiency, out of 1022 participants, 472 (46.1%) were aged between 18–28 years.[18] In the current study,62 (32.6%) participants were in the age of 20 and above. The study found the main sources of vitamin D information were health care providers (44%), followed by friends (29.8%), and then media (26.2%). The other study findings[19] evidenced that, the most health sources received from physicians(37.4%), followed by Television programs (34.8%), and media (32.0%). This was contradicted with previous studies. A similar study was done in the United Arab Emirates,evidenced that more than half of participants trusted that the media is the source of their health information.[20] In the current study regarding the source of health information 32(16.8%) were received from relatives, 67(35.3%) from mass media and, 43 (22.6%) from health care professionals.

The study conducted in Saudi reported that, limited sun exposure due to intense heat, cultural reasons for covering the body, and an infrastructure that makes sun exposure difficult.[21] Our study results showed that 97(51.1%) having poor knowledge. The study conducted in Jeddah proved that, mean score knowledge was 5.9 ± 1.2 (39.3%).[18] In the current study the average mean score was 9.75.

A qualitative study[22] mentioned that 76% of subjects answered that vitamin D is good for the bones. In the present study, 87.2% of students aware of vitamin D deficiency. Among them, 32.7% were believed that, sunlight is the only source. Around 74.6% were knowing about the health benefits of Vitamin D. Only 23.7% knew about the signs and symptoms of vitamin D deficiency and 18.9% were known to the consequences of vitamin D deficiency disease.

A cross-sectional study showed that 89.3% of people willing to undergo tests for vitamin D and 96.4% of them were responded that, they wanted to be taken vitamin D supplementation if they were deficient.[23] In this study 77.4% never undergo tests for checking Vitamin D in blood level and 83.2% never had taken treatment for muscle pain and fatigue. But, 70.5% people wanted to take vitamin D supplementation if they will be deficient.

The study reported that taking vitamin D supplements is associated with less pain or weakness, feeling tired and having a deficiency.[24] Another significant correlation resulted between outdoor activities and feeling pain or weakness (p=0.042).There was a significant positive correlation between knowledge and their practices regarding the expose 5 to 10 minutes to sunlight daily at r value=0.36 (p <0.001). There was a significant positive correlation between knowledge and engage in outdoor physical activities at r value=0.15 (p <0.001).

Conclusion

The results of the study evident that,most of them were unaware of vitamin D sources and preventive measures of its deficiency. There is a need to emphasize the importance of establishing awareness programs to the public about vitamin D and its necessity. Health education and promotion programs should always focus on the sources of vitamin D. There is also important to increase awareness about the long-term effect of vitamin D deficiency and its correlation with chronic diseases. The study recommends that there should be more emphasis on awareness to improve knowledge and practices regarding vitamin D deficiency.

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References

1. e-Library of Evidence for Nutrition Actions (eLENA) [Internet]. World Health Organization. World Health Organization; 2019. Available from: https://www.who.int/elena/en/
2. Ikeda J. Eat for Life: The Food and Nutrition Boards Guide to Reducing Your Risk of Chronic Disease. The American Journal of Clinical Nutrition. 1993Jan;57(2):233–4.
3. Ramesh S, Missiriya S. IEC strategy in knowledge on protein energy malnutrition among mothers of under-five children in a south Indian village. International Journal of education. 2011;3(1):49–50.
4. Jeff Ellison. The Three Macronutrients and Energy Density [Internet]. Heuser Health. 2017. Available from: http://heuserhealth.com/three-macronutrients-energy-density
5. Bakar HA, Rauf A, Sarwar MH, Sarwar M. Essential Vitamin and Mineral Nutrients Body Needs and Their Best Food Sources. American Journal of Economics, Finance and Management [Internet]. 2017;3(4):36–41. Available from: http://www.aiscience.org/journal/ajefm
6. Combs GF, McClung JP. The vitamins: fundamental aspects in nutrition and health. Amsterdam: Elsevier/Academic Press; 2017.
7. Ross AC. DRI, dietary reference intakes: calcium, vitamin D. Washington, DC: National Academies Press; 2011.
8. Al-Badr W, Martin KJ. Vitamin D and Kidney Disease. Clinical Journal of the American Society of Nephrology. 2008 Jan;3(5):1555–60.
9. Tripkovic L, Lambert H, Hart K, Smith CP, Bucca G, Penson S, et al. Comparison of vitamin D2 and vitamin D3 supplementation in raising serum 25-hydroxyvitamin D status: a systematic review and meta-analysis. The American Journal of Clinical Nutrition. 2012 Feb;95(6):1357–64.
10. Ardawi M-SM, Qari MH, Rouzi AA, Maimani AA, Raddadi RM. Vitamin D status in relation to obesity, bone mineral density, bone turnover markers and vitamin D receptor genotypes in healthy Saudi pre- and postmenopausal women. Osteoporosis International. 2010;22(2):463–75.
11. Mishal AA. Effects of Different Dress Styles on Vitamin D Levels in Healthy Young Jordanian Women. Osteoporosis International. 2001Jan;12(11):931–5.
12. Erol M, Yiğit Ö, Küçük SH, Gayret ÖB. Vitamin D Deficiency in Children and Adolescents in

Bağcılar, İstanbul. Journal of Clinical Research in Pediatric Endocrinology. 2015May;7(2):134–9.

13. Holick MF. The Vitamin D Epidemic and its Health Consequences. The Journal of Nutrition. 2005Jan;135(11):2739–48.
14. Calvo MS, Whiting SJ, Barton CN. Vitamin D fortification in the United States and Canada: current status and data needs. The American Journal of Clinical Nutrition. 2004Jan;80(6):1710–6.
15. Alagöl F, Shihadeh Y, Boztepe H, Tanakol R, Yarman S, Azizlerli H, et al. Sunlight exposure and vitamin D deficiency in Turkish women. Journal of Endocrinological Investigation. 2000;23(3):173–7.
16. Bakarman KA, Bajubair MA. A Meta-Analysis Study: Vitamin D Deficiency in Saudi Arabia between 2009 and 2013. Saudi Journal of Internal Medicine. 2016;6(2):11–9.
17. Sammak ME, Wossaibi AA, Howeish AA, Saeed JA. High prevalence of vitamin D deficiency in the sunny Eastern region of Saudi Arabia: a hospital-based study. Eastern Mediterranean Health Journal. 2011Jan;17(04):317–22.
18. Alamoudi LH, Almuteeri RZ, Al-Otaibi ME, Alshaer DA, Fatani SK, Alghamdi MM, et al. Awareness of Vitamin D Deficiency among the General Population in Jeddah, Saudi Arabia. Journal of Nutrition and Metabolism. 2019 Mar; 2019:1–7.
19. Aljefree N, Lee P, Ahmed F. Exploring Knowledge and Attitudes about Vitamin D among Adults in Saudi Arabia: A Qualitative Study. Healthcare. 2017;5(4):76.
20. Bloukh SH, Edis Z, Qassim S, Al-Hariri Y. Vitamin D Deficiency Practice Among Female Medical Students In Ajman, UAE. International Research Journal of Pharmacy. 2018;9(7):53–8.
21. Mokdad A, Tuffaha M, Bcheraoui CE, Daoud F, Hussaini HA, Alamri F, et al. Deficiencies under plenty of sun: Vitamin D status among adults in the kingdom of Saudi Arabia, 2013. North American Journal of Medical Sciences. 2015;7(10):467.
22. Christie FTE, Mason L. Knowledge, attitude and practice regarding vitamin D deficiency among female students in Saudi Arabia: a qualitative exploration. International Journal of Rheumatic Diseases. 2011May;14(3).
23. Babelghaith SD, Wajid S, Al-Zaaqi MA, Al-Malki AS, Al-Amri FD, Alfadly S, et al. Knowledge and practice of vitamin D deficiency among people lives in Riyadh, Saudi Arabia-A cross-sectional study. Biomedical Research. 2017;28(7):3114-8.
24. Kennel KA, Drake MT, Hurley DL. Vitamin D Deficiency in Adults: When to Test and How to Treat. Mayo Clinic Proceedings. 2010;85(8):752–8.