

Serum Vitamin D Status Among Workers Coming from Middle East

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Abstract

Background:

Vitamin D deficiency is common in the Middle East. To maintain health, vitamin D holds a very important place. Its deficiency is a major global health problem and affects both genders at all stages of life. Lack of exposure to sunlight is among the foremost causes of vitamin D deficiency.

Methods:

This hospital based cross sectional observational study carried out in the Department of Medicine in Comilla Medical College Hospital, Comilla, with a total of 100 cases purposively selected for the study. Detailed information was obtained in each individual according to protocol. Complete history was taken from patients. Thorough clinical examinations were done. Relevant investigations reports were collected. All the information was recorded in the fixed protocol. Collected data were classified, edited, coded and entered the computer for statistical analysis by using SPSS-23.

Results:

Out of 100 cases, 76.0% of participants belonged to age 21-40 years. The mean age was found 35.3 ± 8.4 years with range from 18 to 62 years. Majority (95.0%) of participants were male with a ratio of 19:1. The majority (86.0%) of participants were exposed to sunlight ≤ 15 min/day. Only 3(3.0%) participants used sun block. More than three fourth (79.0%) of the participants used to eating sea fish (≥ 3 days per/weeks) followed by 52(52.0%) drink milk (≥ 3 days per/weeks) and 12(12.0%) was supplement with omega-3 fatty acid (fish oil). Majority 41(41.0%) of the participants had back pain followed by 12(12.0%) muscle cramp, 8(8.0%) neck pain and 8(8.0%) headache. Almost two third (65.0%) of the participants had deficiency, 31(31.0%) had insufficiency and 4(4.0%) had normal 25-hydroxyvitamin D. Significant association was also found between inadequate drinking milk with decreased 25-hydroxyvitamin D level.

Conclusion:

In conclusion 25-hydroxyvitamin D deficiency (65.0%) and insufficiency (31%) common among Bangladeshi workers coming from Middle East. It was influenced by their decreased sunlight exposure (≤ 15 min/day) & clothing style. Inadequate consumption of milk and milk products may also play a role in decreasing vitamin D levels.

Keywords: 25-hydroxyvitamin D (25 OHD) level, Deficiency, Insufficiency, Workers, Middle east

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Introduction:

Hypovitaminosis D is a silent and usually unrecognized health problem. It is subdivided into two types depending on serum 25-hydroxyvitamin D (25 OHD) level. If serum 25 OHD level below 20ng/ml or 50nmol/L is termed as vitamin D

deficiency and between 21-29ng/ml or 52.5-72.5 nmol/L is considered as vitamin D insufficiency. In adults, hypovitaminosis D leads to bone pain, muscle weakness, increased risk for osteoporosis & fracture.¹ In a study by Abdelgadir et al in middle east shows hypovitaminosis D is an unnoticeable

clinical burden although most of the days in this region is sunny. In human, vitamin D synthesis depends on sun exposure.² Most of the researchers suggest that cause of this hypovitaminosis D was due to avoidance of sun exposure with inappropriate dietary habits.³⁻⁴ Girls are more vitamin D deficient as they receive little or no sunlight due to covering of their bodies with dark veils for cultural and religious reasons.⁵⁻⁷ A recent study on children in Saudi Arabia shows all are suffering from hypovitaminosis D and 72% are suffering from moderate deficiency.⁸ A recent study among Saudi locals and expatriates revealed higher vitamin D levels during winter months than in the summer.⁹ The reason for this unexpected trend in the summer was due to avoidance of sunlight due to scorching heat effects on skin. Hence, the understanding of the importance of vitamin D is essential for every individual to maintain a normal and healthy life. Despite of food supplementing with vitamin D, its deficiency still remains as one of the most prevalent diseases among adults worldwide especially in developing countries.¹⁰ There are very few nutrients that can provide vitamin D innately, so the most important source of vitamin D is sunlight exposure.¹¹ Therefore, it assumes that inadequate sunlight exposure, air pollution, winter season, and clothing style are risk factors for vitamin D deficiency. So only adding vitamin D to food is not enough to prevent its deficiency in developing areas like the Middle East. The Middle East is a transcontinental region centered on Western Asia and Egypt in North Africa and it encompassed the states or territories of Saudi Arabia, Kuwait, Oman Bahrain, Lebanon, Turkey, Syria, Cyprus, Jordan etc.¹² A large number of Bangladeshi people live in this region with adaptation of Arabian lifestyle. It is necessary to determine the prevalence of hypovitaminosis D to prevent diseases related to vitamin D in these people. General objective of this study was to find out vitamin D level among the workers coming from Middle East and to observe insufficiency and deficiency of vitamin D and determine risk factors for hypovitaminosis D such as time of sunlight exposure per week, cultural practices, skin pigmentation and dietary patterns.

Methods:

This hospital based cross sectional observational study was carried out in the Department of Medicine in Comilla Medical College Hospital,

Comilla from January to June 2018. The study was conducted on 100 indoor and outdoor patients who were workers coming from Middle East in Bangladesh of both sexes aged more than 18 years through purposive sampling method. People who had pre-existing condition affecting vitamin D or calcium metabolism including liver or kidney disease, eating disorders, skin diseases, pregnancy and breast-feeding status and patients on vitamin D and calcium supplementation were excluded from the study. Upon written consent of the workers, the interview was taken using a checklist in Bangla. The level of serum vitamin D was obtained using standard protocols of measurement at the Life Labs laboratory. Permission from the concerned authority was taken and documents were preserved confidentially. Statistical analysis was performed using SPSS Software version 23.0 for Windows.

Results:

Table-I showed out of 100, 76.0% participants belonged to age 21-40 years. The mean age was found 35.3±8.4 years with range from 18 to 62 years. Majority (95.0%) of the participants were male and male: female ratio was 19:1. Majority (70.0%) participants had completed SSC.

Table-I: Distribution of the study population by demographic characteristics (N=100)

Demographic characteristics	no. (%)
Age (Years)	
≤20	2(2)
21-40	76(76)
41-60	21(21)
>60	1(1)
Mean ±SD	35.3±8.4
Range (min-max)	18-62
Sex	
Male	95(95)
Female	5(5)
Educational status	
Illiterate	8(8)
SSC	70(70)
HSC	16(16)
Graduate	6(6)

Table-II showed majority (86.0%) participants were exposed to sunlight ≤ 15 min/day and 14(14.0%) were >15 min/day and 3(3.0%) participants used sun block. The dietary habit of the study participants was found that 79(79.0%) participants ate sea fish (per/weeks) followed by 52(52.0%) drank milk (per/weeks) and 12(12.0%) took supplement with omega-3 fat.

Table-II: Distribution of Vitamin D related Habitual Behavior of Participants (N=100)

Habitual Behavior	no. (%)
Time of Exposure to Sunlight	
≤ 15 min/day	86(86)
>15 min/day	14(14)
Use of Sunblock	
Yes	97(97)
No	3(3)
Dietary information	
Ate Sea fish (≥ 3 d/per/weeks)	79(79)
Drank Milk (≥ 3 d/per/weeks)	52(52)
Omega-3 fatty acid (fish oil) supplementation	12 (12)

Table-III showed 41(41.0%) participants had back pain followed by 12(12.0%) had muscle cramp, 8(8.0%) had neck pain and 8(8.0%) had headache. Other results are depicted in this table.

Table-III: Distribution of the study participants according to symptoms (N=100)

Symptoms	no. (%)
Back pain	41(41)
Muscle cramp	12(12)
Neck pain	8(8)
Headache	8(8)
Leg cramp	7(7)
Hypertension	7(7)
Lower abdominal pain	6(6)
Diabetes	5(5)
Dysuria	5(5)
Chest pain	4(4)
Knee pain	4(4)

65 (65.0%) participants had Vitamin D deficiency, 31(31.0%) had insufficiency and 4(4.0%) had normal 25-hydroxyvitamin D. The mean 25-hydroxyvitamin D was 19.7 ± 6.3 ng/ml with range from 2.9 to 48.0 ng/ml. 52(80.0%) participants who exposed sunlight ≤ 15 min/day was found in Vitamin D deficient, 30(96.8%) in insufficient and 4(100.0%) in normal vitamin D (p-value=0.061). The difference was no statistically significant difference among three groups who ate sea fish (≥ 3 days/weeks). 46(70.8%) participants who ate sea fish (≥ 3 days/weeks) developed vitamin D deficiency followed by 29(93.5%) insufficiency and 4(100.0%) in normal vitamin D (p-value=0.062). Twenty-two (33.8%) patients who drank milk were (≥ 3 days/weeks) in deficient, 26(83.9%) in insufficient and 4(100.0%) in normal vitamin D, was statistically significant (p-value=0.001) (Table-IV).

Table-IV: Association between Vitamin D related habitual factors with 25-hydroxyvitamin D level (N=100)

Variables	25-hydroxyvitamin D			p-value
	Deficient (n=65)	Insufficient (n=31)	Normal (n=4)	
Sunlight exposure (min/day)				
≤ 15	52(80)	30(96.8)	4(100)	0.061ns
>15	13(20)	1(3.2)	0(0)	
Use of sun block				
Yes	3(4.6)	0(0)	0(0)	0.435ns
No	62(95.4)	31(100)	4(100)	
Dietary information				
Ate Sea fish (≥ 3 days/weeks)	46(70.8)	29(93.5)	4(100)	0.062s
Drank Milk (≥ 3 days/weeks)	22(33.8)	26(83.9)	4(100)	0.001s
Omega-3 fatty acid (fish oil) supplementation	6(9.2)	5(16.1)	1(25)	0.447ns

Discussion:

This cross-sectional observational study revealed that most participants (76.0%) were aged between

21 and 40 years, with a mean age of 35.3 ± 8.4 years, ranging from 18 to 62 years. This demographic is characteristic of the typical age group of workers from Bangladesh employed in the Middle East, corroborating the findings of Naeem et al, where the mean age was slightly higher at 40.8 years, spanning from 19 to 72 years.¹³ Mahdy et al also reported similar mean ages for males and females at 40.8 and 35.9 years respectively.¹⁴ Gender distribution in our study showed a predominant male majority (95.0%), which reflects the gender disparity in migration for work to the Middle East, as supported by Mahdy et al, who found a different gender distribution among healthcare professionals.¹⁴ Naeem et al reported a more balanced gender distribution in their study conducted in the Qassim region, Saudi Arabia.¹³ Furthermore, a notable 70.0% of participants in our study had completed at least secondary school education (SSC). This contrasts with the findings of Alshahrani et al, where about 58% of participants held a bachelor's degree.¹⁵ Our study also observed that the majority (86.0%) of participants were exposed to sunlight for 15 minutes or less per day. This limited sun exposure was associated with varying levels of vitamin D sufficiency, echoing the results of Naeem et al, who highlighted that longer sunlight exposure correlated with adequate vitamin D levels.¹³ This finding is particularly significant in comparison to both urban and rural or semi-urban populations, where sun exposure and vitamin D status vary, as noted by Mahdy et al and El Tayeb et al.^{14,16} In terms of sun protection, only a small fraction (3.0%) of participants in our study used sunblock, whereas Alshahrani et al. found that 61% of their study participants seldom used sunscreen, and 20% used it frequently.¹⁵ Dietary habits also played a crucial role in vitamin D status; for instance, 79.0% of our participants consumed sea fish three times per week, which was significantly higher than the frequency observed by Alshahrani et al.¹⁵ Additionally, our findings regarding the correlation between dietary habits and 25-hydroxyvitamin D levels align with those of El Tayeb et al, who noted a significant difference in the consumption of milk products between participants with optimal and insufficient vitamin D levels.¹⁶ Moreover, our study identified common health complaints among participants, including back pain, muscle cramps, neck pain, and headaches. These findings are consistent with

those of Naeem et al, who reported bone pain and fatigue as prevalent symptoms of vitamin D deficiency.¹³ Alshahrani et al also observed a high prevalence of headaches and body pain among their participants.¹⁵ In conclusion, this study highlights the significant influence of demographic factors, sun exposure, and dietary habits on the vitamin D status of Bangladeshi workers in the Middle East. The prevalence of vitamin D deficiency remains a concern, underscoring the need for targeted interventions to address this issue among migrant worker populations. The implications of these findings suggest that both occupational and lifestyle factors must be considered in the management and prevention strategies for vitamin D deficiency.

Limitations:

The study population was selected from one specific tertiary hospital in Comilla city. So, the results might not portray the exact scenario of the community. Besides, the study was conducted over a very short period of time on a small sample size.

Conclusion:

The current study has provided an insightful scenario about hypovitaminosis D. Understanding the importance and role of vitamin D is essential for every individual to maintain a normal and healthy life. Despite food supplementation with vitamin D, its deficiency remains as one of the most unrecognized diseases among adults around the world. This study focused on Vitamin D deficiency among Bangladeshi workers coming from Middle East identifying that, (65.0%) of the participants had deficiency, 31(31.0%) had insufficiency and 4(4.0%) had normal 25-hydroxyvitamin D. Less exposure to sunlight ($\leq 15\text{min/day}$), not using sunblock, inappropriate food habit, not keeping enough portion of vitamin D containing food like sea fish, inadequate consumption of milk and milk products also played a vital role for decreasing vitamin D level.

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