



Study on Situation of Vitamin D Deficiency in Middle-Aged Women in Karaj

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Abstract: Vitamin D is a fat-soluble vitamin that is an essential nutrient in the body. It is presents in both D2 and D3. Vitamin D deficiency as a major public health problem is known over the world. Considering the importance of vitamin D in the body, especially in middle-aged women, this study was conducted to determine the prevalence of 25-hydroxyvitamin D deficiency in 240 middle-aged women (40-60 years old) in late April 2017 in Karaj. Sampling was done randomly from Blood tests were performed among the patients. The results showed that the prevalence of vitamin D deficiency was 95-90%, and the incidence was more pronounced between the ages of 30 and 30 years. The mean serum level of vitamin D showed a positive significant difference in different decades of age ($P = 0.000$). There was inverse and not significant ($P = 0.84$) relationship between vitamin D serum level and weight. The correlation between mean serum levels of vitamin D and the veil was negative and not significant ($P = 0.81$). The relationship between mean serum level with the type of home was inverse and not significant ($P = 0.142$) and it was negative and significant ($P = 0.001$) with the home direction. The relationship of mean serum level with the number of pregnancies and the number of children was positive and not significant ($P = 0.159$). The correlation of the mean serum level of vitamin D with BMI was negative and not significant ($P = 0.567$).

Keywords: Correlation, Vitamin D deficiency, middle-aged women

Introduction

Vitamin D is an essential factor in regulating the metabolism of minerals and bone tissue in the body (Kilishadi *et al.*, 2014; John *et al.*, 2008). The lack of it has an irreversible effect on bone growth and development. Therefore, it plays an important role in human health, fertility and growth. The recommended amount of vitamin D is 200-600 IU per day for all. It is essential that the vitamin D plays both the role of vitamin and the role of hormone in the body as a vital ingredient in the body (Mobel and Hossein Pena, 2009; Mithal *et al.*, 2009; Norman, 2005).

Vitamin D has receptors in the organs, including bones, heart, kidneys, nervous system, skin, teeth and thyroid gland is also involved in strengthening the immune system (Holik, 2002). Therefore, the vitamin D deficiency has effects in all parts of the body (Gartner and Greer, 2003).

The presence of vitamin D is essential for the health of the musculoskeletal system. The adequate intake of vitamin D can greatly reduce the rate of osteoporotic fractures, including the hip fracture (Gholami, 2013). The production of vitamin D in the skin depends on factors such as age, skin pigmentation and UVB available to the body, which depends on the amount of UVB that reaches the surface, and that is affected by the geographic location, season, time, and atmospheric pollution level with increasing Air pollution reduces skin vitamin D synthesis (Allali *et al.*, 2006; Kilishadi *et al.*, 2014). Air pollution is a very important factor in determining the percentage of UVB reaching the earth, which in fact, the areas with high air pollution are lower UVB reaching and thus

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the skin synthesis of vitamin D is less. A study in India showed that the mean serum levels of 25 (OH) D were 54% lower in those living in more air pollution areas than those living in less-infected areas (Agarwal *et al.*, 2002).

More than 90% of the body's need for vitamin D in the skin is provided by the sun's UVB rays. Another source of vitamin D is a nutrient that only supplies a small amount of rheumatism (Mobel and Hossein Pena, 2009) Vitamin D deficiency is usually found in people who are not exposed to enough sunlight or who have very low dietary levels of vitamin D (Rahmati *et al.*, 2016).

Today, vitamin D deficiency exists in developed and developing countries and is a health problem in these countries. Holick *et al.*, 2005, found that 40 to 100% of the older men and women in Europe and Americans living in the community (not in the maintenance of the elderly) lack vitamin D. Estimates show that around one billion people in the world who suffering from moderate to severe vitamin D deficiencies (Holick, 2002; Sullivan *et al.*, 2005).

Comparison of the mean prevalence of vitamin D deficiency in Iranian males and females in the years 2000 and 2011 showed that the prevalence of deficiency in both genders increased in 1390 compared to 2000. Also, in 2011, women suffered from deficiency much more than men, and the prevalence of vitamin D deficiency in the southern region was lower than in other parts of the country (Saedinea *et al.*, 2013).

The prevalence of vitamin D deficiency in Middle Eastern countries, including Iran, is higher than Europe and the United States due to the type

of coverage and lack of adequate skin contact with sunlight, especially in women. Coverage, especially in women, is a major contributor to the prevalence of Vitamin D deficiency in Middle Eastern and Islamic countries for example, Saudi Arabia, the United Arab Emirates, Jordan, Turkey, and Lebanon, which cover women in all parts of exposed sunlight.

Regardless of the country's geographical position and the availability of suitable sunshine, unfortunately, many people in the country are unprofitable awareness of how to use this godly blessing. Training that increase awareness of how sunlight can be used can dramatically increase the vitamin D serum level and subsequently reduce its problems. The need for vitamin D varies in different age groups and should be provided depending on age and body condition. Mid-aged people who are also the subject of this study are more likely to be exposed to vitamin D deficiency than others. The ability to produce vitamin D via the skin is reduced in older people, so that a 70-year-old will make 75% less vitamin D than a 20-year-old person (John *et al.*, 2008).

Considering the importance of vitamin D in the body and its implications for bone health and the functioning of other organs, and given the rising life expectancy and demographic changes towards the growth of middle-aged populations in today's societies, and the importance of having a healthy life in this age, it is necessary to study the causes and teach ways to prevent and improve shows vitamin D deficiency.

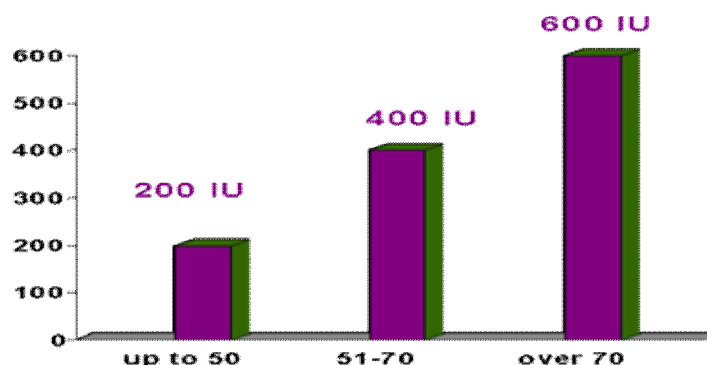


Figure 1. Relationship between age and daily need of vitamin D.

Materials and Methods

This cross-sectional study was conducted in April 2017 in Karaj. In present study 240 middle-aged women (30-60 years old) who were randomly selected from among the patients referring to comprehensive health centers. Demographic factors (including age, height and weight, veil type, type and direction of home, habitat area, rate When exposed to sunlight and the usage of sunblock lotion were recorded with a questioner, a blood sample was taken to determine the level of vitamin D (25 (D) OH).

Laboratory tests

Sampling was performed in spring and near the place of residence of the subjects after obtaining consent, and 2cc blood from women (30- 59 years old) was obtained fasting. Blood samples were transferred to the Laboratory of the Kahrizak Alborz Institute in 4-8 °C temperature. After centrifugation, the level of vitamin D (25 (D) OH) was measured. Statistical analysis was performed using SPSS software (version 21). The normal distribution of variables was verified by the Kolmogorov-Smirnov test. The continuous variables were reported as mean and standard deviation. P-value < 0.05 was considered as significant.

Results

Study participated with a total of 300 people, number of people who were pregnant, or under the supervision of supplement, underwent a doctor's review, and underlying conditions such as kidney, liver, endocrine disorder, corticosteroid and anticonvulsants therapy, they were out of the study, finally, 240 women ages between 30-59 years old were enrolled in the study. The mean serum level of vitamin D showed a positive significant difference in different decades of age (P

= 0.000). There was inverse and not significant (P = 0.84) relationship between vitamin D serum level and weight. The correlation between mean serum level of vitamin D and the veil was negative and not significant (P = 0.81). The relationship between mean serum level with the type of home was inverse and not significant (P = 0.142) and it was negative and significant (P = 0.001) with the home direction. The relationship of mean serum level with the number of pregnancies and the number of children was positive and not significant (P = 0.159). The correlation of mean serum level of vitamin D with BMI was negative and not significant (P = 0.567).

Discussion

The high prevalence of vitamin D deficiency (89.84%) was found in the studied samples that were confirmed by Hovsepian *et al.*, (2011). The vitamin D deficiency was higher in younger subjects than the older age groups (Hovsepian *et al.*, 2011). However, the research results of Niafar *et al.*, (2009) and Nakamura *et al.*, (1999) were different, because of a decrease in the vitamin D production capacity with aging and hormonal disorders. The research results of John and his colleagues showed that the ability of vitamin D production in skin gets less at the elderly comparing to 20-years-old, in that production of vitamin D in people with 70-years-old is 75% less than people with 20 years old (John *et al.*, 2008). Study at the Endocrinology and Metabolism Research Center of Tehran University of Medical Sciences revealed that the prevalence of vitamin D deficiency in the western regions of the country was about 60-40% (Saedinea *et al.*, 2013). The prevalence was severe and moderate, which is consistent with the results of the present study.

Table 1. Frequency of Vitamin D level at the different age category.

Vitamin D level	Frequency		Age					
	No.	Percent	30-39		40- 49		50-59	
			No.	Percent	No.	Percent	No.	Percent
1-9.9	64	27	47	42.19	11	17.19	6	9.38
10-19.9	66	28	43	65.15	16	24.24	7	10.61
20-29.9	51	21	27	52.94	13	25.49	11	21.57
30-39.9	22	9	7	31.82	11	50	4	18.18
40-49.9	22	9	5	22.73	7	31.82	10	45.45
50-75	12	5	4	33.33	5	41.67	2	16.67
75 <	3	1	0	0	1	3.33	2	66.67

Table 2. Frequency of demographic variations and their correlation with vitamin D level.

Variation	Category	Frequency		Average Group Vitamin Level	Standard deviation	Correlation with vitamin D	
		No:	Percent			Percent	Probably L.
Average age	30-34	80	33	15.32	12.06	36.6 ^P	P = 0.000
	35-39	53	22	20.87	12.5		
	40-44	37	15	26.91	16.17		
	45-49	27	11	27.37	21.06		
	50-54	24	10	27.25	15.31		
	55-59	19	8	35.7	22.36		
Average weight	40-49	5	2	22.56	17.32	-0.9 ^P	P = 0.84
	50-59	28	12	25.83	17.81		
	60-69	99	41	21.69	16.04		
	70-79	76	32	19.98	13.13		
	80-89	26	11	27.99	21.06		
	< 90	6	3	28.02	18.62		
Average of BMI	> 18.5	5	2	25.12	16.38	-3.7 ^P	P = 0.567
	18.5-24.9	61	25	26.87	18.44		
	25-29.9	138	58	19.69	14.98		
	< 30	36	15	25.88	15.90		
Average House Direction	North	93	39	23.32	16.77	-21.1 ^k	P = 0.001
	South	102	43	22.97	15.49		
	West-East	45	19	19.62	17.37		
Average Type of Home	House	120	50	26.1	18.35	-9.5 ^k	P = 0.001
	Flat	120	50	18.9	13.20		
Average Type of veil	Chador	182	76	22.65	16.72	-1.3 ^k	P = 0.81
	Mantou	58	24	21.99	15.26		
Average No. of Pregnancy	0	10	4	33.43	20.99	6.6 ^k	P = 0.171
	1	29	12	20.41	14.32		
	2	105	44	20.24	13.05		
	3	65	27	19.18	12.36		
	4	24	6	31.16	24.18		
	5	6	3	35.18	19.49		
	6	6	3	40.61	21.95		
	7	4	2	42.13	29.59		
Average No. of Child	0	11	4	30.97	21.47	6.8 ^k	P = 0.16
	1	28	12	20.93	14.32		
	2	106	44	20.28	13.05		
	3	65	27	18.85	12.36		
	4	14	6	34.5	24.18		
	5	6	3	35.18	19.49		
	6	7	3	40.61	21.95		
	7	4	2	42.18	29.59		
Average Literacy	Illiterate	19	8	34.75	21.96	-13.9 ^k	P = 0.004
	Elementary	60	25	24.9	18.19		
	Secondary	96	40	20.46	12.61		
	Diploma	60	25	19.43	15.00		
	Upper Diploma	5	2	25.27	3.52		
	150-159	92	38	20.48	14.73		
Average height	160-169	136	57	22.43	15.11	13.5 ^P	P = 0.037
	170 <	12	5	38.58	28.73		

*^P = Pearson's correlation and ^K = Kendall's correlation

Study of vitamin D deficiency in 11 European countries confirmed the prevalence of vitamin D deficiency in most of the studied countries (Scientific Committee on Food of European Commission Health & Consumer Protection Directorate General, 2003). There were similar reports in the Asian and even the sunny countries (Alagol *et al.*, 2000; Keane *et al.*, 1998). The studies that conducted by the Endocrine Research Center of Tehran University of Medical Sciences, revealed that the deficiency of

vitamin D was 40% to 80% in the country (Larijani *et al.*, 2003). According to the findings of the present study, the effect of veil on vitamin D was not significant in women. However, 30 percent of individuals wear Mantou were 30-40 years old and 10 percent aged 40-60 years old, but the sever deficiency was higher at the age of 30-40 years old. The average level of vitamin at the category of 30-34 years old was 15.32 while the mean vitamin level in the age group of 55-59 years old was 35.7.

The deficiency index in the study was 89.58% (215 person), the deficiency rate in the age group of 30-40 was about 130 out of 133 (97.74%), in the age group of 50-60, 58 out of 84 (69.05%), in the age group of 60 - 69, 38 out of 43 (88.37%). The higher prevalence of vitamin D deficiency in youth comparing to elderly can be attributed using more sunscreens and cosmetics, preference for living in apartments and afraid of skin cancer due to sun exposure. In addition, the older people are usually scattered around farming.

Conclusion

The prevalence of vitamin D deficiency was the high in studied population. Unfortunately, it was higher in the youth comparing to elderly. So, enrichment and fortified of dairy and some food with vitamin D, usage of vitamin D supplements and sun light exposure are recommended to reduce the prevalence of vitamin D deficiency in the community.

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