Short Communication

Status of Vitamin-D in diabetic patients

Mohammad Ali Bayani (MD) [*1]
Reza Ghadimi (MD, PhD) [2]
Rogheyeh Akbari (MD) [3]
Fayyaz Saeedi [4]
Bahar Banasaz (MD) [* 5]

1- Department of Endocrinology, Babol University of Medical Sciences, Babol, Iran.
2- Social Determinants of Health Research Center, Babol University of Medical Sciences, Babol, Iran.
3- Department of Nephrology, Babol University of Medical Sciences, Babol, Iran.
4- Infectious Diseases and Tropical Medicine Research Center, Babol University of Medical Sciences, Babol, Iran
5- Babol University of Medical Sciences, Babol, Iran..

*** Correspondence:**
Bahar Banasaz, Babol University of Medical Sciences, Babol, Iran.

E-mail: bahar.banasaz@gmail.com
Tel: 0098 111 2238301-5
Fax: 0098 111 2238284

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Abstract

Background: Vitamin D (vit D) deficiency has been found to have an inverse relationship with the occurrence of type-2 diabetes mellitus (DM). The aim of this study was to assess the vit D level in type-2 diabetic patients.

Methods: One hundred-twenty DM patients selected as case group and 120 healthy individuals as control group were investigated in this study from October 2011 to September 2012 in Shahid Beheshti and Ayatollah Rouhani teaching hospital in Babol, North of Iran. Both groups were matched regarding age and gender. Serum levels of 25(OH)-vitamin D were measured in both groups. The data were collected and analyzed.

Results: The mean age of the case group was 51.2±7.98 and in control group was 50.6±7.73 years. The mean concentration of vit D in the case group was 18.7±10.2 and in the control group was 24.6±13.5 ng/dl (p=0.002). The mean concentration of vit D in male subjects in both groups were equal but in women with diabetes was lower than the healthy women (19.3±11.9 versus 27.03±10.28 ng/dl, respectively) (p=0.0001). In diabetic patient vit D level was deficient in 77 (64.2%), insufficient in 30 (25%) and sufficient in 13 (10.3%) patients. In the healthy group, these parameters were seen in 44 (36.6%), in 46 (38.4%) and in 30 (25%) patients.

Conclusion: The results show that vit D concentration was significantly lower in diabetic patients than the healthy individuals. Although the mean concentration of vit D in males in both groups was equal but in the women with diabetes was lower than the healthy women.

Keywords: Diabetes Mellitus, Vitamin D, Deficiency, Male, Female

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With the increasing prevalence of DM all over the world, it is expected that this disorder will remain as one of the main causes of morbidity and mortality (1). In recent years, studies have shown that using vitamin D (vit D) can help decrease the incidence of diabetes and adjustment of insulin and glucose (2-5). Surveys demonstrated that consuming supplements of calcium with vit-D will significantly reduce FBS level (6). So, using supplements of vit-D alone can prevent the incidence of Type-1 diabetes (7). Recently, some studies have shown that the prevalence of vit D deficiency has increased and more than 50% of adult age suffer from this deficiency (8). The prevalence of vit D deficiency in the USA adult age was reported to be about 25% to 54% (9). In a multi-center study in Iran, Heshmat et al. reported that the prevalence of moderate to severe vit D deficiency was 47.2, 45.7 and 44.2% in age group of <50, 50-60 and >60 years old, respectively (10). DM is characterized by the combination of insulin resistance and impaired panceratic β-cell function.

Some studies suggested that vit D could have a direct (via its role on the activation of pancreatic beta-cell and sensitive organs) or indirect (by regulation of calcium hemostasis) positive effect on insulin secretion and sensitivity (11-12). The aim of this study was to determine the level of vit D in diabetic patients and then compared with non- diabetic subjects.

Methods

From October 2011 to September 2012, 120 diabetic patients who referred to the clinics of Rouhani and Shahid Beheshti teaching hospitals in Babol, Iran were selected as case group and 120 healthy subjects matched regarding sex and age (as control group) were evaluated. Inclusion criteria were patients whose diabetes was confirmed and were between 30-60 years old and agreed to participate in this study. Exclusion criteria were: use any drugs consisting of vitamin D, any disorder except diabetes such as osteomalacia, osteoporosis, inflammatory rheumatism and patients treated with corticosteroids, using drugs which interfere with vitamin D metabolisms such as carbamazepine, phenobarbital, sodium valporate, gabapentin, isoniazid, mineral oil and calcitonin. The control group was selected as the normal population subjects matched with the cases sex and age.

According to season changes in Vitamin D level, all samples were collected in one season. Vitamin D level was measured with quantitive ELISA using IDS kit, England. Vitamin D deficiency was defined as serum 25(OH) D concentration of less than 20ng/ml, insufficiency as 20ng/ml <25(OH) D<30 ng/ml and sufficiency was defined as 25(OH) D higher than 30 ng/ml (15). The data were collected and analyzed. To determine the differences in vitamin D levels, in both groups we used t-test. A p-value less than 0.05 was considered significant.

Results

Fifty males and 70 females were enrolled in each group. The mean age of the case group was 51.2±7.98 and in control group was 50.6±7.73 years. The mean concentration of vit D in diabetic patients was 18.7±10.2 ng/dl and in the non-diabetic patients was 24.6±13.5 ng/dl (p=0.002). The mean concentration of vit D in diabetic male patients was 18.04±7.4 and in non-diabetic male patients was 21.23±16.6 ng/dl (p=0.219). The mean concentration of vit D in women with diabetes was 19.3±11.9 and in healthy women was 27.03±10.28 ng/dl (p=0.00) (table 1). Totally in diabetic patients, Vit-D level was deficient in 77 patients (64.2%), insufficient in 30 (25%) patients and sufficient in 13 (10.3%) patients sufficient.

In the healthy group, 44 (36.6%) patients had a deficiency of Vit-D, 46 (38.4%) patients with insufficiency of vit D and 30 (25%) patients had sufficiency of vit D.

Table 1. Vit-D levels in the case and in the control group

	Diabetic patients	Healthy person	Pvalue
Men	18.04±7.4	21.23±16.6	0.219
Female	19.3±11.9	27.03±10.28	p=0.00
Total	18.7±10.2	24.6±13.5	0.002

Discussion

The results of this study showed that there was a statistical difference between vit D concentration in diabetic patients and the healthy subjects. Insufficiency of vit D in two groups also had higher prevalence. Need et al. showed that the patients who had higher levels of vit D concentration had lower FBS in comparison with the other groups. These results were similar to our findings (13). Lee et al. found that 89% of their study individuals suffered from deficiency of this vitamin and just 9 out of 300 persons had sufficient vit D concentration. They also found that the mean concentration of vit D in their patients was 26.11±13.6 this is higher than our findings in the diabetic patients (14).

This difference may be the result of different sunshine duration status in Korea and in Iran. Other study that was performed by Daga et al. in the North of India demonstrated that 91.1% of diabetic patients had vit D insufficiency. In their study vit-D concentration in diabetic patients was 7.88±1.2, however, in non-diabetic individuals, it was 16.64±7.83. Different diets in two groups were considered this difference. For example because of Caspian sea, seafood are used more in Mazandaran than India (15).

Gagnon et al. found that the mean serum concentration of vit D in diabetic patients was lower than the non-diabetic individuals (16). Taheri showed that mean serum concentration of vit D in diabetic patients was 20.6±11.4 and in non-diabetic individuals was 22.22±16.03 (17). These results were almost similar to the findings of our study. The weakness of this study is that we did this study only in one

season and because of sunshine duration difference in each season level of vitamin D may undulate during the year, so this study cannot predict the condition of hypovitaminosis in this area.In conclusion, our findings demonstrated that vit D concentration in diabetic patients was significantly lower in comparison to non-diabetic individuals. According to the high prevalence of vit D deficiency in this group, treating with vit D supplements maybe useful and seems to be necessary.

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