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Original Research Article

A case control study of vitamin D levels in patients with vitiligo

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ABSTRACT

Background: Vitiligo is fairly commonly encountered disorder of pigmentation resulting in the presence of numerous depigmented macules and patches over the body. Vitamin D is an essential hormone synthesized in the skin. Levels of vitamin D have been found to be low in patients with vitiligo. The purpose of this study is to evaluate if vitamin D levels have any association with vitiligo, by estimating the levels of vitamin D in patients with vitiligo, and correlating type of vitiligo with vitamin D levels.
Methods: A hospital based case control study was done in the Dermatology outpatient department of a tertiary center in South India from October 2014 to May 2016. About 45 consenting patients who fulfilled the inclusion criteria were chosen for the study. About 45 age and sex matched consenting individuals without vitiligo were chosen as controls from the Dermatology outpatient department. A detailed history and clinical examination of all the consenting subjects was done. Blood samples were collected from both the cases and controls by venepuncture and sera separated. The levels of Vitamin D were estimated using a vitamin D ELISA kit.
Results: There was no statistically significant difference in vitamin D levels between patients and controls. There was no correlation between type of vitiligo and vitamin D value.
Conclusions: Vitamin D does not appear to have any role in vitiligo patients in this study.

Keywords: Vitamin D, Vitiligo vulgaris, Autoimmune disease

INTRODUCTION

Vitiligo is an acquired primary, usually progressive melanocytopenia of unknown etiology characterized by well demarcated depigmented macules and patches of different shapes and sizes.[1] It has a worldwide prevalence of approximately 0.5-1% with higher prevalence's being reported form the Indian subcontinent; ranging from 1.25 -8.8%.[1-4]

Vitamin D is an essential hormone that is synthesized in the skin that plays a role in the protection of the epidermal melanin unit through various mechanisms.[5] It has been observed that Vitamin D levels are low in patients with vitiligo and other autoimmune diseases.[5] There have only been a few studies regarding the relationship between vitamin D levels and vitiligo worldwide, and even fewer from India as a whole, let alone South India. In our study, we estimated the levels of vitamin D in patients with vitiligo, and compared with controls to find out the correlation between vitamin D and vitiligo.

METHODS

This was a case control study conducted between October 2014 and May 2016 in the outpatient department of the department of Dermatology in a tertiary center in Puducherry, South India. Forty five patients, who

presented to the outpatient department with vitiligo, aged 18 years and above were enrolled into the study. The diagnosis of vitiligo was confirmed by two dermatologists. Patients who had other conditions with depigmentation such as albinism, achromic naevus, and chemical leukoderma were excluded, as were any patients who had taken any treatment for vitiligo in the past three months, as well as patients who were on any calcium supplementation. A detailed history and clinical examination was done with all details being entered into a pre prepared proforma. Forty five age and sex matched controls who did not have vitiligo were recruited as controls.

Blood samples were collected from both the cases and the controls by venepuncture and sera separated. The level of vitamin D was estimated using a vitamin D, ELISA kit manufactured by DIAsource Immunoassays S.A. The levels of vitamin D were classified as sufficient (>30 ng/ml); insufficient (20-30 ng/ml) and deficient (<20 ng/ml).

Ethical clearance for the study from the institutional ethics committee was obtained.

RESULTS

Out of 45 cases, 26 were male and 19 were female, with a male: female sex ratio of 1.5:1. Mean age of patients was 43.78 ± 14.70 SD. Among cases, the number of patients engaged in outdoor work versus indoor work was approximately the same; the number of patients engaged in indoor work among controls was slightly higher. Mean duration of disease was 51.04 ± 72.88 months.

Among the patients, poliosis was demonstrated by 12 cases (26.7%), Erythema was demonstrated by 6 cases (13.3%), Koebners phenomenon was seen in 14 cases (31.1%) cases and repigmentation was observed in 13 cases (28.9%). A total of 8 patients had history of comorbid autoimmune conditions. Out of these, 4 cases were of hypothyroidism, 3 cases of diabetes mellitus and 1 case of rheumatoid arthritis.

Table 1: Mean levels of vitamin D among cases and controls and their significance.

Group	Case	Control
Number	45	45
Mean	19.31	20.93
Standard Deviation	3.623	5.634
P value	0.108	

Table 2: Distribution of vitamin D levels within cases and controls and their significance.

Vitamin D Serum level	Cases	Controls	P value
Sufficient	0	3(6.7%)	0.211
Insufficient	22(48.9%)	21(46.7%)	
Deficient	23(51.1%)	21(46.7%)	

The mean vitamin D level of cases was 19.31 ± 3.623 whereas in controls it was 20.93 ± 5.634. Thus while serum levels in cases was lower than that of controls, it was not statistically significant (Table 1).

Table 3: Correlation between type of vitiligo and vitamin D levels.

Type of vitiligo	Number	Mean vitamin D	Standard Deviation	P value
Acrofacial	19	19.37	4.017	0.153
Vitiligo vulgaris	24	19.67	3.212	
Focal	2	14.50	0.707	

Table 4: Correlation between other variables and vitamin D levels.

Vitiligo subgroup		Number	Mean vitamin D level	Standard deviation	P value
Gender	Male	26	19.23	3.881	0.864
	Female	19	19.42	3.339	
Age	>35 years	30	18.63	3.388	0.076
	<35 years	15	20.67	3.811	
Autoimmunity	Absent	37	19.38	3.982	0.792
	Present	8	19.00	0.926	
Duration of illness	> 60 months	11	19.91	2.982	0.535
	<60 months	34	19.12	3.828	

All of the cases were found to have either insufficient or deficient levels of Vitamin D, whereas out of the control group, only 3 patients were found to have sufficient levels of Vitamin D. There was no statistically significant difference between the groups in this regard (Table 2).

The majority of cases were that of vitiligo vulgaris subtype (53.3%), followed by acrofacial/ liptip vitiligo (42.2%) and focal vitiligo (4.4%). There was no statistically significant difference in vitamin D levels between the different types of vitiligo (Table 3).

There was no statistically significant difference in vitamin D levels within the case group with respect to age, gender, duration of illness or associated autoimmune condition (Table 4).

All patients had Fitzpatrick type V skin phototype. None of the recruited cases had any family history of vitiligo.

DISCUSSION

The age of patients in our study ranged from 18-76, with a mean age of 43.78 ± 14.70; with most of the patients belonging to the middle age group (36-55 years). Similar results were obtained in a study by Finamor et al as well as Takczi et al.[9,11] However the majority of patients in other studies had a mean age below 35.[6-8,12-20] This may reflect certain social attitudes towards the disease i.e. hesitancy to consult local physicians regarding vitiligo, or presenting to a tertiary center only after prolonged native treatment. The mean duration of disease was found to be 51.04 ±72.884 months. There was a slight male preponderance in our study, with a male to female ratio of 1.5:1.

We found that the mean levels of vitamin D among cases was 19.31 ± 3.623 while in the control group the mean level of vitamin D was 20.93 ± 5.634. Thus while it was found that mean vitamin D levels were lower in case group, this difference was not statistically significant. This is similar to results obtained by studies conducted by Ustun et al and Karagun et al, in their investigation of Vitamin D levels in Turkish populations.[10,14] Similar results were also obtained In a larger case control study conducted by Xu X et al in Chinese populations.[8] These findings contradict the majority of studies conducted in this regard which have revealed statistically significant lower levels of serum vitamin D in patients with vitiligo vulgaris. Another Indian study conducted by Sehrawat et al had also revealed significantly lower levels of vitamin D in vitiligo patients,[15] however this study was conducted in northern India. Hence ethnicity may be a factor in patients with a significant relationship between vitamin D levels and vitiligo. All the patients in our study belonged to Fitzpatrick phototype V. Moreover the Indian population in general has been found to have lower levels of vitamin D, with prevalence of Vitamin D deficiency in up to 70-100% of otherwise healthy Indian males.[21]

Interestingly it was found that out of the 90 participants in this study; only 3 patients (6.7%) in the control group had sufficient levels of vitamin D. The vast majority of participants, irrespective of whether they had vitiligo or not, were found to have either insufficient or deficient levels of vitamin D. This is similar to results obtained by Sehrawat et al, which found that none of the study participants had sufficient levels of vitamin D, in a study with 30 cases and similar age and sex matched controls.[15] This is explained by the high prevalence of vitamin D deficiency of India. In a number of studies that have been conducted in different geographical locations within the country, across age groups and various sociodemographic classes, it has been found that levels of vitamin D are uniformly low.[21] This appears to be paradoxical at first glance, owing to the increased exposure to sunlight in our population. It may be explained by the fact that Indian skin, belonging to Fitzpatrick phototype IV and V, has higher melanin content, acting as a natural sunscreen, and a number of dietary factors, including naturally lower levels of vitamin D and calcium in the Indian diet. Furthermore, most of these levels are based on western standards. The role of ethnicity is not considered in estimation of vitamin D levels. In this context it is also important to note that vitamin D levels based on ethnicity has to be standardized.

There was no significant correlation between type of vitiligo and serum levels of vitamin D. This has been the case in all previous studies conducted providing further evidence of lack of any role in vitamin D determining the clinical type of vitiligo that the patient develops.[12-20] There was no significant decrease in vitamin D levels in patients with associated autoimmune comorbidity in our study. Similar results have been found by Khurrum et al, Saleh et al as well as Beheshti et al.[7,18,19] All other studies had found a significant decrease in vitamin D levels in patients having comorbid autoimmune conditions.[12-20,] Further studies having a larger sample size may reveal a correlation in the Indian context.

In a country like India where vitamin D deficiency is endemic, with prevalences as high as 70-100%, it is difficult to determine the exact effect of vitamin D in vitiligo. Moreover we did not study the effect of vitamin D supplementation on vitiligo as it was beyond the scope of this study.

The limitations of this study includes the following

i. Smaller size of study population
ii. Lack of representation from various socioeconomic groups

This could have been overcome by selection of larger study group from various strata of the population.

CONCLUSION

In our study there did not appear to be any significant correlation between vitamin D levels and the type of

vitiligo in patients. However, owing to the widespread levels of vitamin D deficiency in our country, further studies involving a larger sample size are required.

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