

Original Research Article

Serum vitamin D3 deficiency among cases with extensive tinea corporis infection

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Received: 04 August 2020

Accepted: 26 August 2020

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ABSTRACT

Background: Abnormal serum vitamin D3 levels have been implicated as risk factors for development of various skin disorders. Hence this study was planned to assess the prevalence of vitamin D3 deficiency among patients with Tinea corporis who were attending outpatient department of dermatology in a tertiary care centre.

Methods: The cross sectional study was conducted by the department of dermatology, venereology and leprosy, at Sri Muthukumaran Medical College Hospital and Research Institute, among the patients attending the outpatient department, during the month of June to August 2019. A total of fifty cases with extensive Tinea corporis infection were included in the study. The study was conducted using a proforma with the detailed clinical history and also patients underwent skin scraping for KOH mount and serum vitamin D3 analysis. Data was entered in Microsoft excel and data analysis was done using Statistical Package for Social Sciences (SPSS) version 17.

Results: Among the cases with extensive Tinea corporis infection, only 20% of cases were found to have normal levels of serum vitamin D3 whereas 48.3% of cases were found to have serum vitamin D3 insufficiency and 31.7% of cases had deficiency of serum vitamin D3

Conclusions: Screening for vitamin D3 deficiency for all cases with extensive Tinea corporis infection can be recommended. Further large scale clinical trials are needed to assess whether vitamin D3 deficiency has any role to play in pathogenesis and treatment of extensive Tinea corporis infection.

Keywords: Vitamin D, Tinea corporis, Prevalence, Deficiency

INTRODUCTION

Vitamin D plays an important role in cutaneous physiology and mediating the immune system response. It helps in envelope formation and synthesis of the lipid permeability barrier.¹ Apart from this function it also stimulates the production of human cathelicidin, an antimicrobial peptide, which prevents skin disorders like atopic dermatitis.^{2,3}

The American academy of pediatrics recommends a daily intake of 400 IU of vitamin D3 for infants and children, while the Institute of Medicine and The Endocrine

Society recommend 400 IU daily for infants and 600 IU daily and 200 IU/day for children (1-18 years) and adults, respectively.^{4,5}

The normal range of serum vitamin D3 is 50-125 nmol/l and vitamin D deficiency refers to serum vitamin D levels between 30-50 nmol/l and vitamin D3 deficiency refers to serum vitamin D3 levels <30 nmol/l. Also high levels of serum vitamin D3 refer to values more than 125 nmol/l.⁵

Several studies reported an positive association between serum vitamin D3 levels and season, race, and age.^{6,7}

Since ultraviolet light exposure is necessary for vitamin D3 synthesis, it is not surprising that race and season have a significant impact on vitamin D3 status. The reason for the inverse relationship between serum vitamin D3 levels and age is unclear, though some authors have theorized that older children may have decreased oral supplementation or spend less time playing outdoors.⁸

The results of the studies conducted before shows conflicting information about the role of vitamin D in the cases with skin disorders. Both decreased and increased serum vitamin D3 levels have been implicated as risk factors for development of various skin disorders like atopic dermatitis, psoriasis and *Tinea* infections.^{9,10} Also there were studies proved that improvement of atopic dermatitis after oral supplementation with vitamin D3 has also been reported.^{11,12}

Hence this study was planned to assess the prevalence of serum vitamin D3 deficiency among the cases with extensive tinea infection, attending a tertiary health care centre.

Objectives

To assess the prevalence of vitamin D3 deficiency among patients with extensive *Tinea* infection who were attending outpatient department of dermatology in a tertiary care centre.

METHODS

The cross-sectional study was conducted by the department of dermatology, venereology and leprosy, at Sri Muthukumaran Medical College Hospital and Research Institute, among the adult’s patients (18-60 years) attending the outpatient department, during the month of June to August 2019. All patients with extensive tinea infection who were attending the outpatient Department of dermatology, venereology and leprosy were included in the study. Participants who were immunocompromised were excluded from the study. A total of fifty cases with extensive tinea infection were included in the study.

The individual participants were explained about the study and they were also assured that, their identity would be kept strictly confidential and they have the option to refuse participation in the study. Written informed consent was obtained from the study participant prior to the interview. Every effort was made, to be sure that all information collected from the participants, remain confidential. The study was conducted using a proforma with the detailed clinical history and also patients underwent skin scrapping for KOH mount and serum vitamin D3 analysis. The scoring of pruritus was graded on four point severity scale where nil(0), 1(mild), 2(moderate) and 3(severe). Data was entered in Microsoft excel and data analysis was done using Statistical Package for Social Sciences (SPSS) version 17.

RESULTS

In the present study, majority of the participants (26.7%) were belonging to age group of 31-40 years followed by 25% and 21.7% of participants in 41-50 years and 21-30 years of age, respectively. Also there were 20% and 6.7% of participants in the age group more than 50 years and between 18-20 years of age, respectively. The mean age of the study participants was found to be 37.56±12.71 years. With respect to gender, there were 58.3% and 41.7% of participants were males and females, respectively (Table 1).

Table 1: Proportion of participants in different age groups and gender.

Variables	Frequency	Percentage
Age group in years		
18-20	04	6.7
21-30	13	21.7
31-40	16	26.7
41-50	15	25
>50	12	20
Sex		
Male	35	58.3
Female	25	41.7

In this study among the study participants only 20% of cases with extensive tinea corporis infection were found to have normal levels of serum vitamin D3 whereas 48.3% of cases were found to have serum vitamin D3 insufficiency and 31.7% of cases had deficiency of serum vitamin D3 (Figure 1).

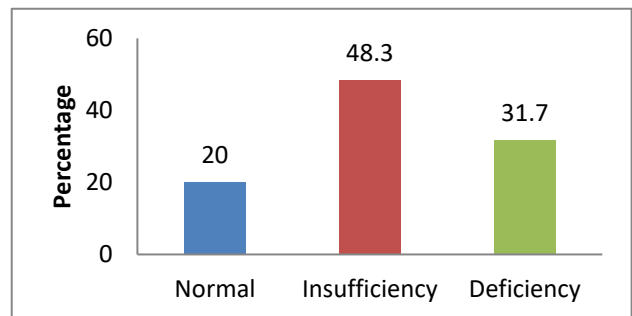


Figure 1: Prevalence of vitamin D3 deficiency among cases with Tinea.

Proportion of cases with different scores of pruritus, erythema and scaling with respect to their vitamin D3 levels were shown in Table 2. KOH mount showed positive in 96.7% of cases and only 3.3% of cases it was reported as negative.

In this study, majority of the study participants (71.7%) had extensive tinea corporis followed by 21.7% of cases with extensive tinea corporis et cruris and 3.3% of cases with extensive tinea corporis et *faceii* and extensive tinea corporis et *glutealis* each Table 3.

Table 2: Proportion of cases with different clinical presentations and vitamin D3 levels.

Variables	Total cases (%)	Proportion of cases with Vitamin D3 deficiency (%)
Pruritus scale		
Mild	03 (5)	0/3 (9)
Moderate	38 (63.3)	29/38 (76.3)
Severe	19 (31.7)	19/19 (100)
Scaling		
Present	53 (88.3)	48/53 (90.6)
Absent	07 (11.7)	0/7 (0)
Erythema		
Present	51 (85)	47/51 (92.2)
Absent	09 (15)	1/9 (11.1)
KOH mount finding		
Positive	58 (96.7)	48/58 (82.8)
Negative	02 (3.3)	0/2 (0)

Table 3: Proportion of cases with different types of Tinea.

Type of tinea	Frequency	Percentage
Extensive tinea corporis	43	71.7
Extensive tinea corporis et cruris	13	21.7
Extensive tinea corporis et faciei	2	3.3
Extensive tinea corporis et glutealis	2	3.3

DISCUSSION

In this present study, majority of the study participants (71.7%) had extensive tinea corporis followed by 21.7% of cases with extensive tinea corporis et cruris and 3.3% of cases with extensive Tinea corporis et *faciei* and extensive tinea corporis et *glutealis*, each.

In this study among the study participants only 20% of cases were found to have normal levels of serum vitamin D3 whereas 48.3% of cases were found to have serum vitamin D3 insufficiency and 31.7% of cases had deficiency of serum vitamin D3.

Female sex has been associated with lower serum vitamin D3 levels in the studies conducted by Andiran et al and Tolppannan et al.^{6,13} Also body mass index has been inversely correlated with serum vitamin D3 levels although this association did not reach statistical significance in the studies conducted by Andiran et al and Stoian et al.^{6,7}

Miyake et al found higher levels of maternal vitamin D intake protective against the development of atopic dermatitis, while there was no effect of maternal vitamin D intake on atopic dermatitis risk in a study by Camargo

et al.^{14,15} In contrast, a study in obese adults found that those who were vitamin D deficient were 5 times more likely to have atopic dermatitis than those who were vitamin D replete.⁹

In the study conducted by Chiu et al, it was reported that serum vitamin D deficiency was present in 39% of cases, insufficiency was noted among 35% and sufficiency was noted among only 26% of cases.¹⁶

Vitamin D regulates diverse aspects of the immune system. Vitamin D receptors are located on many immune cells, including monocytes, macrophages, T and B lymphocytes, and dendritic cells. Several experimental studies have shown that vitamin D can enhance innate immune clearance of pathogens and promote proliferation and secretion of highly inflammatory interleukin-1.^{17,18} Vitamin D deficiency has been associated with increased incidence of infectious disease, especially respiratory tract diseases, and infection-associated mortality in the general population.^{19,20}

CONCLUSION

The prevalence of serum vitamin D3 deficiency and insufficiency is quite high among the cases with *Tinea* infection. Hence public access to vitamin D through diet and UV exposure requires more attention. Also screening for vitamin D deficiency among all cases with *Tinea* infection can be recommended for all cases with *Tinea* infection. Further large scale clinical trials are needed to assess whether vitamin D deficiency is a predisposing factor for causing *Tinea* infection.

ACKNOWLEDGEMENTS

We would like to thank all, who has guided me by extending their knowledge and experience right from the inception to the completion of the work. Also, I would like to acknowledge the medical superintendent and all the staffs, for their support during the study period. Last but not least I am thankful to my study participants, without whom, this study would not have been possible.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the institutional ethics committee

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Cite this article as: Karthik RS, Shahul HG. Serum vitamin D3 deficiency among cases with extensive tinea corporis infection. *Int J Res Dermatol* 2020;6:729-32.