



Brief Report

Vitamin D levels in non-users of sunscreen versus once-daily sunscreen users: A retrospective analysis from a cosmetic dermatology center in South India

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ABSTRACT

Sun exposure and UV light are known causes of photoaging. Therefore, every cosmetic dermatologist's prescription almost always includes sunscreen. A common perception is that regular usage of sunscreen drives the user to become Vitamin D deficient over a period of time. This has led to limited usage of sunscreen. We endeavored to evaluate any potential impact of such limited area use of sunscreens, on Vitamin D levels. It was found that Vitamin D levels did not correlate with limited sunscreen use which further indicates that, testing for Vitamin D deficiency at baseline, and adequate supplementation thereafter, are important, given the central role of Vitamin D in many dermatological conditions.

Keywords: Vitamin D, Sunscreen, Vitamin D synthesis

INTRODUCTION

Sun exposure and UV light are known causes of photoaging. Therefore, every cosmetic dermatologist's prescription almost always includes sunscreen. However, with a concern that sunscreen use reduces Vitamin D synthesis,^[1] it becomes important to truly know and advise patients on Vitamin D adequacy related to sunscreen use for cosmetic and anti-aging benefits, specifically in the Indian population. In our population, where skin cancer risk is generally low, sunscreen usage is driven predominantly by the singular motive of preventing or managing pigmentation, including pigmentary disorders and/or skin tanning. Although sunscreen is ideally recommended to be used every 2–3 h by all professional authorities, in clinical practice, patients often identify themselves as “regular” sunscreen users even if they used sunscreen at least once daily. We endeavored to evaluate the impact of this suboptimal use on the dynamics of Vitamin D levels.

MATERIAL AND METHODS

A retrospective chart analysis was done to compare levels of Vitamin D deficiency among once daily and occasional sunscreen users and non-users, from September 2019 to September 2020. Charts with relevant information on sunscreen use, Vitamin D levels, and demographics, were included in the study. Patients identified themselves as regular sunscreen users, if they used sunscreen a minimum of once daily, and at least over the face and neck, for at least 3 months.

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Occasional sunscreen users were those who used sunscreen less than 3 times a week over the previous 3 months. Non-users had never used sunscreens. Vitamin D deficiency was defined as levels of <30 ng/ml, with further stratification of deficiency levels as mild (20–30 ng/ml), moderate (10–20 ng/ml), or severe (<10 ng/ml). Key variables of Vitamin D supplementation, Vitamin D levels, and sunscreen use were analyzed against demographic and lifestyle factors, using SPSS software, and levels of significance were evaluated.

RESULTS

Of 992 cases, 88.5% were Vitamin D deficient, 11% were Vitamin D sufficient, with 33.7% being severely Vitamin D deficient. [Table 1] lists the prevalence of Vitamin D deficiency across demographic factors using the defined cutoff. About 42.4% of patients identified themselves as regular sunscreen users, while 5.5% were occasional sunscreen users, using sunscreens primarily when “stepping out.” The remaining 52.3% had never used sunscreen. At the defined cutoff, women were unlikely to be more Vitamin D deficient than men, [Table 1], but when stratified, severe deficiencies were significantly more common in women ($p < 0.001$).

Daily sunscreen users had significantly higher Vitamin D levels as compared to non-sunscreen users ($P = 0.019$, for

both cutoff at 30ng/ml and at stratified levels), being more likely to be on corrections ($P = 0.002$). Mean Vitamin D levels by gender, environment, Vitamin D supplementation, dietary habits, and sunscreen use are listed in [Table 2].

DISCUSSION

We found that Vitamin D levels were not lower in those who used sunscreens, at least over the face and neck, once daily, for photoaging benefits, compared to those who avoided using sunscreens altogether. Overall, Vitamin D deficiency in our population was high, like in previous studies.^[1] In our study, Vitamin D levels were similar in people in indoor or outdoor environments, in contrast to earlier studies that mention an indoor habitat and sunscreen use as associated with Vitamin D insufficiency.^[1-3] Studies have shown that some Vitamin D synthesis still occurs even with sunscreen use,^[4,5] though data from India are limited. In our study, sunscreen usage limited to a small body surface area may explain the lack of higher levels of Vitamin D deficiency, compared to non-users. The reapplication habit is less common due to the high local humidity, which precludes frequent reapplication of inherently occlusive products like sunscreens. The only factor that was associated with Vitamin D sufficiency in our study, was Vitamin D supplementation, which remains the mainstay of correcting

Table 1: Prevalence of various demographic parameters and Vitamin D levels.

Demographic parameters	Prevalence percentage (n)	Vitamin D deficiency (less than 30 ng/ml)	P-values (<0.05 - significant)
Gender			
Male	22.5% (223)	89.7% (200/223)	0.676
Female	77.5% (769)	88.7% (682/769)	
Total	992	68.4% (882/992)	
Environment			
Indoor	75.4% (735)	88.5% (653/735)	0.758
Outdoor	2.8% (28)	92.9% (26/28)	
Both	21.8% (211)	87.3% (186/211)	
Total	974	88.4% (865/974)	
Sunscreen use			
Regular	42.2% (419)	88.5% (371/419)	0.019
Occasional	5.5% (54)	77.8% (42/54)	
Never	52.3% (519)	90.4% (469/519)	
Total	992	88.5% (882/992)	
Dietary habits			
Non-vegetarian	79.5 (785)	88.3% (693/785)	0.418
Vegetarian	19.6% (191)	91.6% (175/191)	
Other	0.9% (9)	88.9% (8/9)	
Total	985	88.5% (876/985)	
Vit D Supplementation			
No supplementation	84.2% (818)	90.4% (744/818)	<0.001
Supplementation within the past 3 months	15.8% (155)	89% (138/155)	
Total	973	90.2% (882/973)	

Table 2: Correlation of mean Vitamin D levels with each parameter and their significance.

Parameters (n)	Mean Vitamin D levels in ng/ml (SD)	P-values (<0.05 - significant)
Gender		
Males (223)	16.90 (±10.19)	0.019
Females (769)	16.31 (±12.81)	
Environment		
Indoor (735)	16.27 (±12.59)	0.225
Outdoor (28)	15.15 (±9.75)	
Both (211)	17.27 (±11.82)	
Sunscreen users		
Regular users (419)	16.61 (±11.19)	0.463
Non-users (519)	16.06 (±12.59)	
Occasional users (54)	18.69 (+/-16.43)	
Dietary habits		
Non-vegetarian (785)	16.45 (±11.18)	0.159
Vegetarian (191)	16.38 (±16.21)	
Vitamin D supplementation		
No supplementation (818)	15.67 (±10.20)	0.018
Supplementation within the past 3 months (155)	16.62 (±13.41)	
Vitamin D unsupplemented group		
Sunscreen users (322)	16.02 (±10.08)	0.322
Sunscreen non-users (451)	15.37 (±10.09)	
Sunscreen occasional users (45)	16.03 (±12.11)	

Vitamin D deficiency in the skin of color, especially considering cultural sensibilities.^[6]

It is vital to understand that sun exposure leads to the activation of Vitamin D in the skin, which should be either supplied by the right nutrition or additional supplements in the first place. If this is not consumed adequately, deficiency is bound to happen irrespective of sunscreen use. We intended to highlight this aspect of correlation between Vitamin D versus sunscreen use, despite the minimum once daily use of sunscreen.

CONCLUSION

Our findings may be of practical value to dermatologists in India, for counseling patients who require photoprotection but are also concerned about Vitamin D deficiency. Further, testing for Vitamin D deficiency at baseline, and adequate supplementation thereafter, are important, given the central role of Vitamin D in many dermatological conditions.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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