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Sun protection practices in medical students: Gaps and recommendations

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ABSTRACT

Background: There are ample number of studies conducted internationally to assess the usage of sunprotection measures worldwide. However, there is a paucity of such studies from Indian population. Medical students (who represent well-read part of society) of a medical college in Jammu division of UT of Jammu Kashmir were assessed for the same to know usage and awareness patterns.

Material and Methods: A cross-sectional survey using a specially designed questionnaires was conducted on medical undergraduates of Acharya Shri Chander College of Medical Sciences. Descriptive and inferential statistics were used where appropriate.

Results: The questionnaire was completed and returned by 323 medical undergraduates including 171 males and 152 females in the age range of 18-27 years. Our study found that usage of sunprotection measures was more in females than males. Sunscreen usage including usage of >SPF30 sunscreen and once daily application was more significant in female students than males.

Conclusion: The usage of sunscreen was found to be more (statistically significant) in females.

INTRODUCTION: It is well recognized that exposure to solar radiation is a major risk factor for the development of skin cancer, photoaged skin, and immune system alterations. Acute sun exposure is associated with effects like tanning, erythema and burning.

Chronic sun exposure is associated with disorders of hyperpigmentation like melasma, ephelides, solar lentigines, skin aging and the dreaded skin malignancies (melanoma and non-melanoma skin cancers). Avoiding excessive sun exposure by sun avoidance between 10:00 am to 14:00 pm, seeking shade, using wide brim hats, umbrellas, sunglasses, avoiding tanning beds and use of sunscreens are considered effective measures in decreasing the effects of UV radiation on human skin. The overall incidence and prevalence of melanoma and non-melanoma skin cancers (NMSC), including basal cell carcinoma (BCC) and squamous cell carcinoma (SCC) is increasing globally.[1][2] Traditionally the incidence of skin cancers is thought to be low in Asians as compared to Whites due to the protective effect of eumelanin. However, recent research indicates that cutaneous malignancies are increasingly being diagnosed in the Indian subcontinent.[3] So there is increasing need for better sunprotective measures in non-Caucasians too. So we planned a survey aimed to investigate the knowledge, attitudes, and behaviors of students of a medical college with regard to sun exposure and protection.

AIMS AND OBJECTIVES: This study aims to explore the sun protection practices among medical students, identify gaps in their knowledge and behavior and provide recommendations to improve sunprotection adherence. We chose medical students to be investigated as they were in the age range when sun prevention behaviors have been proven to prevent skin aging and cancer.

MATERIALS AND METHODS: The present study was a single point cross-sectional study conducted at Acharya Shri Chander College of Medical Sciences, Jammu. The study included medical undergraduates of college from different districts of Union territory of Jammu Kashmir. Our study was based on a questionnaire which assessed demographics, sun protection behaviors, knowledge of sunprotection and attitudes towards sun safety. The questionnaire asked the participants about usage of sunscreen in general, sunscreens [with sun protection factor (SPF)>30 in particular], frequency of sunscreen application in a day, seeking shade, use of sunglasses and use of wide brim hat. The responses collected from the participants were done in the format of adverbs of indefinite frequency consisting of terminologies including Always (100 %), Usually (~90%), Often (~70%), Sometimes (50 %), Rarely (~30%) and Never (0 %) based on the subjective perceptions of the participants. Statistical analysis was done using table of values. Chi square test was used for analysis and p -value of <0.05 was considered to be significant.

RESULTS: A total of 323 students including 171 males and 152 females participated in the study. The age group of participants ranged from 18-27 years. Among Males, 13.4 % always used some method of sunprotection, 77.6% often used and 9 % never used any method. Among females, 40 % always used some method of sunprotection, 57 % often used and 3 % never used any method of sunprotection. While assessing seeking shade as a sun protection practice, it was found that 6 % males never used shade, 13% rarely used shade, 36% sometimes used shade, 38% usually used shade and 6 % always used shade whereas in females 3% never used shade, 13% rarely used shade, 34% sometimes used shade, 40% usually used shade and 11% always used shade. Hat usage was never by 51% vs 66% males vs females, rarely by 27% vs 23% males vs females, sometimes by 13% vs 16% males vs females, usually by 3% both males and females and always 5% vs 2% males vs females. Sunglasses were never used by 32 % males vs 33 % females, rarely by 22 % males vs 26 % females, sometimes by 27 % males vs 26 % females,

usually by 13 % males vs 11 % females, always by 7 % males vs 4 % females. Full-sleeved clothes was never used by 19 % males vs 11 % females, rarely by 18 % males vs 16 % females, sometimes by 27 % males vs 26 % females, usually by 25 % males vs 32 % females and always by 11 % males vs 14 % females. Sunscreen was never used by 37 % males vs 24 % females, rarely by 23 % males vs 15 % females, sometimes by 23 % males vs 16 % females, usually by 12 % males vs 20 % females and always by 5 % males vs 24 % females. Among sunscreens, sunscreen with SPF more than 30 were used by 42 % females vs only 27 % males. Frequency of usage of sunscreens once in a day was more in females at 57 % vs 40 % in males. Usage of sunscreens more than once in a day was at 14 % equal amongst males and females. The p values for the data obtained were determined. It was found that statistically significant p value (typically ≤ 0.05) was seen in frequency of sunscreen usage among females ($p= 0.003681289$) along with usage of broad spectrum sunscreens ($p=0.004000251$). Common barriers to sunprotection included forgetfulness, inconvenience and lack of perceived risk.

DISCUSSION: India being a tropical country, receives abundant sunlight throughout the year and the population is chronically sun exposed.[4] For several decades now, dermatologists have exhorted their patients to avoid or, at the very least limit exposure to sun since ultraviolet (UV) radiation is primary cause of skin cancer, photoaging and pigmentary disturbances, in addition to its acute effects like tanning and burning. All of these consequences of chronic sun exposure can be prevented if suitable types of sun protection behaviors are used e.g. avoiding sun exposure between 10:am to 2:pm, seeking shade, using sunscreen, minimizing sunburn, protective clothing and hats, sunglasses and use of sunscreens (including broad spectrum sunscreens with SPF> 30). When applied properly, sunscreens form a film or coating on the surface of the stratum corneum that attenuates or “filters out” radiation that would otherwise reach the living epidermis and dermis. The active agents in sunscreen products do this by either absorbing or scattering photons before they penetrate the skin surface. SPF is accepted as the worldwide standard for the assessment of protection against UV rays. This study was done with the logic that this sample represents one of the population subsets who are aware of sunprotection measures. Our study showed overall less awareness among medical graduates (13.4% males always used any method of sunprotection vs 40.1% females). Similar conclusions of low sunscreen usage were determined in previous study by Al Awadh *et al.* which showed that females were more commonly using sunscreens as compared to males.[5] Similar results of more sunscreen usage among females were found in various studies.[6] [7] [8] [9] [10] [11] Aggarwal *et al.* however, found no gender bias in sunscreen usage in their study.[4] In a study by Khalid M *et al.* found low sunscreen usage among general population.[12] Our study has clearly shown statistically significant usage of sunscreens (including broad spectrum sunscreens) among female counterparts vs males. The usage of sunscreen may be more in females because females of this age group are often more concerned about their cosmetic appearance and hence are more aware than their male counterparts. Also sunscreen agents are commonly included in beauty products and skincare ingredients, and are thereby more accessible to women.[8] Other barrier reported by Abromset *al.*, may be the presence of feminine scents in sunscreens which may lead to sunscreen products often perceived as being feminine.[13]

UV radiation has a broad spectrum, ranging from 40 to 400nm (30–3eV), which is divided into Vacuum UV (40–190nm), Far UV (190–220nm), UVC (220–290nm), UVB (290–320), and UVA (320–400nm), of which the latter two are medically important.[14] There are two distinct subtypes of UVA radiation. Short-wave UVA (320–340nm) and long-wave UVA (340–400nm), the latter constituting most of UVA radiation.[15] The amount of exposure to UVA usually remains constant, whereas UVB exposure occurs

more in the summer.[16]3.5% of UV energy is received as UVB and 96.5% as UVA on a single day in summers.[4] UVB affects the epidermis but UVA can penetrate up to dermis owing to its longer wavelength.[17] UVB content is highest when sun is directly overhead (at noon, at the equator, at high altitude).[18] [19]UVB protection is measured by a product's SPF, which theoretically indicates that products with high SPFs provide more protection against hazardous effects of sunlight than those with low SPFs. SPF is measured as the ratio of the amount of UV radiation required to burn the protected skin (with sunscreen) to that required to burn the same unprotected skin (without sunscreen), all other factors being constant.[20] [21] [22] [23] What is important to note is that a sunscreen with SPF of 15 blocks about 93% of UVB radiation, while SPF 30 blocks 97% of UVB.[24] Thus, statistical significance of usage of sunscreens with SPF>30 really makes a difference.

Various methods used to measure UVA protection of sunscreen include in vivo methods like immediate pigment darkening (IPD), persistent pigment darkening (PPD) and the widely used protection factor in UVA. [22] [25] [26] [27] A consensus conference recommended that a broad spectrum labelled sunscreen should have a critical wavelength of more than 370 nm and a PPD or protection factor in UVA greater than 4.[22]

80% of UV rays reach the earth on cloudy days as compared to other days, so it is of paramount importance to use sunscreens throughout the year and also on rainy or cloudy days.[28]

Also as demonstrated in various studies, the benefits of sunscreens are not limited to preventing wrinkling, pigmentary disorders, photodermatoses, premature photoageing, etc. but they also help in preventing sunburn and skin cancers.[29]

CONCLUSION: This study reveals significant gaps in sunprotection practices of medical students, despite their knowledge of risks associated with UV exposure. These gaps highlight the need for targeted interventions to medical students and general population, as behavior of future healthcare professionals is crucial, as they are expected to lead by example and educate patients on effective sunprotection.

Recommendations:

- Integrating comprehensive sun protection education into medical curriculum, emphasizing the importance of personal adherence.
- Conducting awareness activities about various physical methods of sunprotection like clothing, wide brimmed hats and sunglasses.
- Demonstration of appropriate technique of sunscreen application like quantity and frequency of reapplication by dermatologists
- Disseminating knowledge about various sunprotection parameters of a sunscreen e.g. SPF value, Boots star rating, etc.
- Develop programs to address common barriers for sun protection.
- The statistically significant use of sunscreens in women, calls for the need of specific sun protection awareness programs focused specifically on males.

Limitations:

- Small sample size
- The study is conducted at a single medical college, which limits the generalizability of findings to medical students of other regions.
- Cross sectional study design does not account for seasonal variations or changes in behavior over time

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