

Original Research Article

ASSESSMENT OF KNOWLEDGE, ATTITUDE AND PRACTICES REGARDING SUNSCREEN USE AMONG MEDICAL STUDENTS

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ABSTRACT

The global incidence of skin cancer is rising, and ultraviolet (UV) radiation is the most critical modifiable risk factor. As future healthcare workers, medical students represent a core force for sun safety education, yet their own sun protection behaviors fall far short of guideline requirements. This study aimed to assess the knowledge, attitude, and practice (KAP) levels related to sunscreen use among medical students at Muzaffarnagar Medical College. A cross-sectional study design was adopted, and a validated structured questionnaire was used to survey 30 medical students from January to June 2026. Four categories of data were collected: demographic characteristics, sun protection knowledge, attitudes toward sunscreen, and actual sunscreen use behaviors. The study results showed that 83.3% of respondents had sufficient knowledge of the benefits of sunscreen, while only 36.7% used sunscreen on a regular basis. Female students had significantly better sun protection behaviors ($p=0.001$). The most common reasons for non-regular use were forgetting to apply sunscreen (30%) and concerns about the cost of products (20%). A total of 76.7% of participants held positive attitudes toward sunscreen, but a notable gap existed between their knowledge and actual practice. While their knowledge and attitudes met basic standards, sunscreen use remained far from ideal. Targeted educational interventions should be integrated into medical curricula to close this gap, and support future physicians to develop consistent, evidence-based sun protection habits.

Keywords: Sunscreen, Medical Students, Skin Cancer Prevention, UV Protection.

INTRODUCTION

Multiple studies have confirmed that skin cancer has become a major global public health problem, with its incidence rising continuously over the past few decades. Among skin cancer cases, non-melanoma skin cancer is the most common malignant tumor worldwide, while melanoma has a lower incidence yet accounts for the vast majority of all skin cancer-related deaths.^[1,2] solar ultraviolet (UV) radiation is the core pathogenic factor for these tumors. Excessive sun exposure and a history of sunburn during childhood and adolescence directly increase a person's lifelong risk of developing melanoma.^[3] Ultraviolet exposure is the most important modifiable risk factor, and primary prevention centered on photoprotection is a key public health strategy.^[4]

The academic community has summarized three general categories of universal mitigation measures for ultraviolet radiation: staying in shaded areas, wearing protective clothing, and applying sunscreen. Sunscreen blocks ultraviolet rays from penetrating the skin by absorbing or reflecting them. It can reduce the risk of skin cancer, and also prevent sun-induced skin damage such as photoaging.³⁵ Despite its clear benefits and wide popularity, the use of sunscreen still fails to meet established standards.³ Studies 1,^[5] show that even groups with high levels of relevant knowledge, such as college students and medical staff, exhibit a knowledge-action gap marked by insufficient sun protection habits.

This study defines medical students as a unique and important research population in the field of skin cancer prevention and control. As future physicians,

they must not only master knowledge of skin cancer prevention, but also act as role models and educators for patients. Their personal sun protection behaviors will influence their future clinical work. However, existing studies,^[2,5,7] have confirmed that medical students generally fail to comply with sun protection guidelines, which will undermine their professional efficacy in promoting sun protection.

As stated in reference,^[8] India is a region with high tropical ultraviolet radiation, where most of the local population is exposed to sunlight over long periods, making it a suitable setting for conducting research on sun protection behaviors. This study selected Muzaffarnagar Medical College in Uttar Pradesh, India as its research site; the area served by this college has high sunlight intensity. Between January and June 2026, the study assessed medical students at this college on their sun protection-related knowledge, attitudes, and practice levels, identified existing gaps to support subsequent educational interventions, and aimed to improve sun protection behaviors among future medical practitioners.

Objective: The core objective of this study is to assess the Knowledge, Attitude, and Practice (KAP) level of sunscreen use among medical students at Muzaffarnagar Medical College. Specifically, the study examines their awareness of the harms of ultraviolet radiation, their attitudes toward the importance of sun protection, and their actual sunscreen use patterns. It identifies gaps in KAP to support the development and implementation of subsequent targeted educational programs.

The secondary objectives of this study are to explore the associations between demographic factors such as gender and year of study and KAP scores, so as to identify student subgroups at risk of inadequate sun protection and enable these groups to benefit from targeted interventions; in addition, this study will investigate the common reasons why medical students fail to consistently use sunscreen, producing practical data to support the development of programs to improve sun protection adherence.

MATERIALS AND METHODS

This study is a questionnaire-based cross-sectional medical research project, conducted from January 1 to June 30, 2026, at Muzaffarnagar Medical College (a tertiary-level medical institution) in Begrajpur, Uttar Pradesh. A total of 30 medical students were enrolled in the study, including third- to fifth-year current clinical students and interns. The sample size was determined based on the study's feasibility and descriptive nature.

Inclusion Criteria

- Medical students currently enrolled in the MBBS program at Muzaffarnagar Medical College.
- Students in their third year, fourth year, final year, or internship.
- Students who provided written informed consent to participate in the study.

Exclusion Criteria

- Students in the pre-clinical years (first and second year).
- Students who were absent or on leave during the data collection period.
- Students who did not provide consent to participate.

Data Collection Procedure: Data were collected using a pre-tested, semi-structured questionnaire. The questionnaire was divided into three sections:

1. Demographic Information: This section collected data on age, gender, year of study, and self-reported Fitzpatrick skin type.
2. Knowledge Assessment: This section included 10 closed-ended questions assessing knowledge about the harmful effects of UV radiation, the link between sun exposure and skin cancer, and the importance of sunscreen. Response options were "Yes," "No," or "I don't know."
3. Attitude and Practice Assessment: This section consisted of 10 questions. Five questions evaluated attitudes towards sunscreen use (e.g., "Do you believe sunscreen is important?"), and five questions assessed actual sunscreen practices (e.g., "Do you use sunscreen regularly?"). Response options were based on a Likert scale or Yes/No format.

The questionnaire was validated through a pilot study conducted on 5 medical students, and necessary modifications were made based on the feedback. Following the pilot, the final questionnaire was administered to the 30 participants. Informed consent was obtained from each participant before data collection. Participants were assured of the confidentiality of their responses, and the study adhered to the ethical principles of the Declaration of Helsinki. Data collection was carried out in a classroom setting, with the principal investigator present to clarify any doubts.

Statistical Data Analysis: The collected data were entered into a Microsoft Excel spreadsheet and analyzed using SPSS version 26.0. Descriptive statistics, including frequencies and percentages, were calculated for all categorical variables (demographics, knowledge, attitude, and practice questions). Mean and standard deviation were calculated for continuous variables. The association between categorical variables, such as gender and knowledge level, was analyzed using the Chi-square test. A p-value of less than 0.05 was considered statistically significant. The results were presented in the form of tables and graphs.

RESULTS

A total of 30 medical students participated in the study, comprising 18 (60%) females and 12 (40%) males. The mean age of the participants was 22.5 ± 1.8 years. Regarding academic year, 9 (30%) were in the third year, 12 (40%) in the fourth year, and 9 (30%) were final-year students/interns. Most

participants (53.3%) had Fitzpatrick skin type III [Table 1].

Table 1: Demographic Characteristics

Characteristic	Category	Frequency (n)	Percentage (%)
Gender	Male	12	40.0
	Female	18	60.0
Academic Year	Third Year	9	30.0
	Fourth Year	12	40.0
	Final Year/Intern	9	30.0
Skin Type	Type II	4	13.3
	Type III	16	53.3
	Type IV	10	33.3

Table 2: Knowledge Regarding Sunscreen Use

Question	Correct Response (n)	Percentage (%)
Sun exposure is a major risk factor for skin cancer	27	90.0
Sunscreen prevents skin cancer	25	83.3
Sunscreen should be applied 20 minutes before sun exposure	18	60.0
Sunscreen needs to be reapplied	20	66.7
Sunscreen should be used on cloudy days	15	50.0
Overall Adequate Knowledge	25	83.3

Regarding knowledge [Table 2], 90% (n=27) were aware that sun exposure is a major risk factor for skin cancer, and 83.3% (n=25) knew that sunscreen helps prevent skin cancer. However, only 60% (n=18)

knew the correct application timing, and only 50% (n=15) recognized the need for sunscreen on cloudy days. Overall, 83.3% (n=25) of participants demonstrated adequate knowledge (scoring >60%).

Table 3: Attitudes Towards Sunscreen Use

Attitude Statement	Agree (n)	Percentage (%)
Sunscreen is important for skin health	28	93.3
Sunscreen should be part of daily routine	23	76.7
I am concerned about the risk of skin cancer	20	66.7
I would recommend sunscreen to others	26	86.7
Positive Attitude	23	76.7

As shown in [Table 3], 93.3% (n=28) agreed that sunscreen is important for skin health, and 76.7% (n=23) believed it should be part of a daily routine.

Additionally, 86.7% (n=26) would recommend sunscreen to others. A positive attitude was observed in 76.7% of students.

Table 4: Practices Regarding Sunscreen Use

Practice Statement	Yes (n)	Percentage (%)
Regular use of sunscreen (always/often)	11	36.7
Reapply sunscreen when outdoors	8	26.7
Use sunscreen on all exposed body parts	9	30.0
Use sunscreen in winter/cloudy days	6	20.0
Good Practice	11	36.7

Table 5: Gender Differences in Sunscreen Practice

Practice	Female (n=18)	Male (n=12)	p-value
Regular Sunscreen Use	9 (50%)	2 (16.7%)	0.001*

*Significant at p<0.05

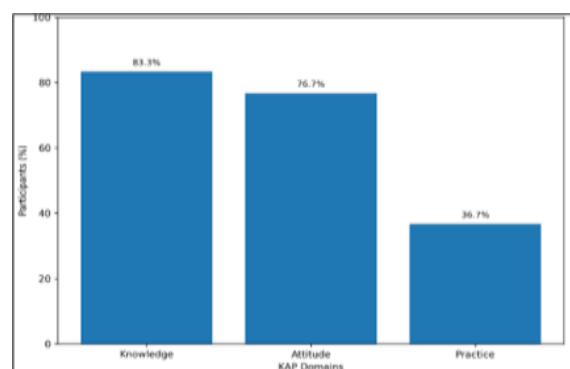


Figure 1: Levels of Knowledge, Attitude, and Practice

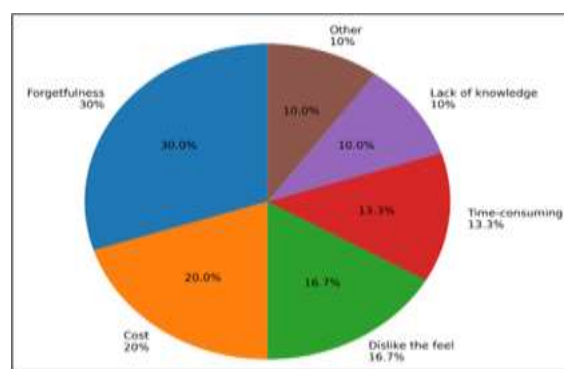


Figure 2: Reasons for Not Using Sunscreen

Sunscreen usage practices were suboptimal [Table 4]. Only 36.7% (n=11) reported regular use, while 26.7% (n=8) reapplied it when outdoors. Use on cloudy days was reported by just 20% (n=6). A significant gender difference was observed, with 50% of females reporting regular sunscreen use compared to only 16.7% of males ($p=0.001$) [Table 5]. The bar chart [Figure 1] illustrates the distribution of overall KAP levels. While 83.3% had adequate knowledge and 76.7% held positive attitudes, only 36.7% exhibited good practice. This indicates a significant KAP gap.

DISCUSSION

This study took medical students from Muzaffarnagar Medical College in India as research subjects, and evaluated their levels of knowledge, attitude, and practice (KAP) related to sunscreen use. The study found that 83.3% of the students had sufficient awareness of the risks of sun exposure and the benefits of sun protection, while only 36.7% used sunscreen regularly. This disconnect between knowledge and practice is consistent with the conclusions of three previous studies on the same topic,^[2,5,7] which confirms that this widespread common challenge also exists among India's future cohort of physicians.

This study's analysis of medical students' knowledge of skin cancer and sun protection is comparable to the conclusions of three studies on the same topic focused on medical student populations, conducted in Saudi Arabia,^[3] Turkey,^[1] and Iran.^[6] The Saudi Arabian study,^[3] found that most participants were aware of the link between sun exposure and skin cancer. In the present study, 90% of respondents identified sun exposure as a core risk factor for the disease, while 83.3% knew that sunscreen can prevent skin cancer. However, a significant gap exists in the practical application of this knowledge: only 60% knew that sunscreen must be applied 20 minutes before sun exposure, and only 50% were aware that sunscreen is needed even on cloudy days. The Turkish study,^[1] found that only 43.1% of its participants used sunscreen during winter, and the Iranian study,^[6] also identified widespread insufficient standard sun protection knowledge. For these reasons, more targeted sun protection education must be rolled out, shifting from generalized awareness building to practical, actionable knowledge that can be implemented in daily life.

The survey data from this study shows that 93.3% of the surveyed medical students recognize the importance of sunscreen, and 76.7% believe that sunscreen use should be incorporated into daily self-care. A study of Iranian medical students,^[6] also corroborates that this positive attitude is a widespread common pattern. However, this positive attitude has not been converted into stable, regular use behavior. Our assessment concludes that while medical students have sufficient relevant knowledge,

psychosocial factors are the core barrier to consistent use: in this study, 30% of respondents abandoned sunscreen use due to forgetfulness, and 20% discontinued use due to cost concerns. Data from a Saudi Arabian study,^[3] which recorded that 31.26% of respondents cited cost and 28.22% cited lack of time as reasons for non-use, also confirms that these barriers are widely prevalent. As such, intervention measures should not only focus on filling knowledge gaps, but also address habit-related issues and improve the accessibility of sunscreen.

This study observed that the proportion of women who regularly use sunscreen reached 50%, while only 16.7% of men did so, and this difference was statistically significant ($p=0.001$). A similar multinational study in Saudi Arabia showed that just 6% of men used sunscreen, compared to 40% of women; a related study from Turkey also corroborated this cross-regional gap. This difference arises from cultural norms that require women to maintain fair skin, as well as men's higher likelihood of engaging in high-risk health behaviors. We advocate for implementing targeted education, specifically to educate male medical students that ultraviolet radiation risks have no gender difference, so as to fill this cognitive gap.

This study observed two core sets of data: only 26.7% of students reapply sunscreen, and the sunscreen use rate on cloudy days is merely 20%. Reapplication is a necessary core step to maintain the effectiveness of sun protection, yet it is widely overlooked. The low use rate on cloudy days reflects the cognitive misconception that "ultraviolet rays only cause harm on sunny days", a misconception that has also been observed in other studies. Citing data from a Turkish study.

Limitations of the study: This study has six core limitations that must be openly acknowledged, detailed as follows: First, this study's sample size is only 30 cases, so its conclusions cannot be generalized to the broader population of medical students across India. Future large-scale, multi-center studies are needed to obtain more representative, robust data; Second, the study relies on self-reported data, which is susceptible to recall bias and social desirability bias. Participants may overestimate their sunscreen use to project a positive health image; Third, the study adopts a cross-sectional research design, which can only present time-slice cross-sectional data, and thus cannot verify causal associations or track long-term behavior changes; Fourth, the study was conducted solely at a single institution, Muzaffarnagar Medical College. The unique demographic and educational characteristics of this institution may have influenced sun protection behaviors, leading to insufficient generalizability of the study's conclusions; Fifth, the questionnaire did not include two core influencing factors: sunscreen SPF value and the correct application amount of sunscreen; Sixth, the study period ran from January to June, so it cannot capture sun protection behaviors during India's midsummer. Despite the limitations

listed above, this study still provides valuable preliminary data for the field of sunscreen-related knowledge, attitude, and practice (KAP) among medical students in rural India, and clarifies the core areas that require intervention.

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CONCLUSION

This study conducted a sun protection knowledge, attitude and practice (KAP) survey among medical students at Muzaffarnagar Medical College, and identified a typical KAP gap in this group: while the students have sufficient knowledge reserves and positive attitudes toward sun protection, the vast majority have not translated their awareness into consistent sun protection behaviors. As future medical practitioners, the personal habits of this group will influence their ability to deliver patient education for clinical skin cancer prevention. This study also found that female students' sun protection practices outperform those of male students, with the core barriers to adopting sun protection behaviors being forgetfulness and cost. Targeted interventions should be rolled out for male students, and solutions at the behavioral and systemic levels should be promoted, rather than only carrying out knowledge-only education.

The core conclusion of this study points out that the curriculum system of Muzaffarnagar Medical

College and all similar medical schools urgently needs to add comprehensive sun protection education interventions. Specific implementation measures include: launching practical training on the application and reapplication of sunscreen to break through the limitations of pure theoretical teaching; promoting affordable sunscreen to integrate sun protection into daily life; rolling out targeted science popularization activities for male students to emphasize that the risk of ultraviolet exposure does not differ by gender. These measures will bridge the gap between knowledge and practice, enable future physicians to protect their own health, let them act as advocates for skin cancer prevention, and drive improvements in the overall health level of the whole society.

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