



Case Report

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Knowledge, Attitude, and Practice of High School Students in Jabriel Township Regarding Sunscreen Use A Cross-Sectional Descriptive-Analytical Study

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Abstract

Background: Exposure to ultraviolet (UV) radiation poses significant health risks, including skin cancer, premature aging, and ocular damage. Sunscreen use is one of the most effective preventive strategies against UV-related harm. However, the level of awareness and protective behaviors among adolescents in developing countries remains insufficiently studied.

Objective: This study aimed to assess the knowledge, attitude, and practice (KAP) of high school students in Jabriel Township regarding sunscreen use, and to examine the relationships between these variables and demographic characteristics.

Methods: A cross-sectional descriptive-analytical study was conducted among 240 high school students from six schools in Jabriel Township. A stratified random sampling method was employed. Data were collected using a structured, validated questionnaire (Cronbach's alpha = 0.74) consisting of four sections: demographics (7 items), knowledge (10 items), attitude (9 items), and practice (9 items). Data analysis was performed using SPSS version 26, employing descriptive statistics, Pearson correlation, and chi-square tests at a significance level of 0.05.

Results: The majority of students (78.17%) demonstrated moderate knowledge, 66.52% had a moderate attitude, and 68.26% exhibited moderate practice regarding sunscreen use. No statistically significant relationships were found between knowledge, attitude, and practice ($P > 0.05$). Similarly, demographic variables showed no significant association with KAP scores.

Conclusion: Despite moderate knowledge levels, students'

attitudes and practices regarding sunscreen use remain suboptimal. Targeted health education programs are recommended to bridge the gap between knowledge and protective behavior among adolescents.

Keywords: Knowledge; Attitude; Practice; Sunscreen; UV radiation; High school students; Cross-sectional study

Introduction

Ultraviolet (UV) radiation from solar exposure constitutes one of the most pervasive and preventable environmental health hazards globally. Classified into UVA (315–400 nm), UVB (280–315 nm), and UVC (100–280 nm) wavelengths, solar UV radiation is causally linked to a spectrum of adverse health outcomes including squamous and basal cell carcinomas, cutaneous melanoma, photoaging, cataracts, and immunosuppression [1,2]. The World Health Organization (WHO) estimates that over 1.5 million new skin cancer cases are diagnosed annually, with UV radiation implicated in the vast majority of non-melanoma skin cancers [3]. Sunscreen represents the most widely studied and recommended photoprotective agent. Regular application of broad-spectrum sunscreens with Sun Protection Factor (SPF) ≥ 15 has been shown to significantly reduce the cumulative UV dose reaching the dermis, thereby attenuating the carcinogenic, mutagenic, and photoaging effects of chronic solar exposure [4,5]. Despite compelling evidence, population-based adherence to sunscreen use remains suboptimal, particularly among adolescents and young adults, who are known to engage in extended outdoor activity and exhibit high-risk sun-seeking behaviors [6]. Adolescence constitutes a critical window for health behavior formation. Habits established during this period, including those related to photoprotection, tend to persist into adulthood and cumulatively determine lifetime UV burden [7]. Epidemiological data suggest that a significant proportion of lifetime UV exposure occurs before the age of 18, underscoring the importance of early preventive education [8]. Furthermore, the skin of adolescents may demonstrate heightened susceptibility to UV-induced carcinogenesis, as the latency period for UV-induced malignancy can span decades [9].

In Afghanistan, and particularly in Herat province, the combination of high-altitude geography, arid climate, and intense solar irradiance creates conditions of elevated ambient UV exposure. Despite this environmental context, research exploring sun-protective behaviors among Afghan youth remains virtually absent from the published literature. Social and cultural factors, including prevailing norms around skin tone preferences, limited access to dermatological education, and low parental literacy, may further modulate photoprotection behaviors in this population [10].

The Knowledge-Attitude-Practice (KAP) framework provides a structured methodological approach to understanding the gap between health literacy, behavioral intention, and actual practice within a defined population. Prior KAP studies conducted in neighboring and comparable socioeconomic contexts have documented significant deficits in sunscreen knowledge and practice among school-aged populations, suggesting that educational attainment alone does not guarantee protective behavior [11,19].

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The primary objective of this study was to assess the level of knowledge, attitude, and practice of high school students in Jabrieh Township, Herat, Afghanistan regarding sunscreen use, and to evaluate the associations between these KAP domains and selected demographic variables.

Materials and methods

Study design and setting

This was a cross-sectional descriptive-analytical study conducted among high school students in Jabrieh Township, Herat. The quantitative research design was selected to enable precise measurement of knowledge, attitude, and practice variables through a structured questionnaire. The cross-sectional design was appropriate given the study's aim to assess the current status of students' awareness and behavior without direct intervention.

Study population

The study population comprised 1,570 high school students enrolled in six schools within Jabrieh Township: Jabrieh Boys' High School (600 students), Arman High School (258 students), Meraj High School (203 students), Hedayat High School (136 students), Toleh Novin High School (140 students), and Kateb High School (233 students).

Sampling method and sample size

Stratified random sampling was employed to ensure proportional representation from all six schools. Students were first stratified by school, and then a proportional number of students were selected from each school using simple random sampling. The minimum required sample size was calculated using the Raosoft online calculator (http://www.raosoft.com/sample_size.html) with the following parameters: population size = 1,570; margin of error = 5%; confidence level = 90%; and response distribution = 50%. The minimum sample size was determined to be 230 students. A total of 240 students were ultimately enrolled, exceeding the minimum requirement to enhance statistical precision and generalizability.

Data collection instrument

Data were collected using a structured self-administered questionnaire consisting of four sections: (1) Demographic information (7 items), including age, grade, residence, marital status, and parental literacy; (2) Knowledge assessment (10 items) evaluating awareness of UV radiation effects and sunscreen use; (3) Attitude assessment (9 items) measuring perceptions and beliefs about sun protection; and (4) Practice assessment (9 items) examining actual sun-protective behaviors.

Instrument validity and reliability

Content validity was established through a forward-backward translation process (English to Farsi and back) by two domain experts, ensuring semantic equivalence. The questionnaire was subsequently reviewed by the research supervisor for content adequacy. A pilot study was conducted with 30 participants from the study population, and internal consistency was assessed using Cronbach's alpha, yielding a coefficient of 0.74, indicating acceptable reliability.

Inclusion and exclusion criteria

Inclusion criteria: (1) Currently enrolled high school students at one of the six participating schools in Jabrieh Township; (2) Voluntary

informed consent to participate. Exclusion criteria: (1) Withdrawal of consent during the study; (2) Incomplete or invalid questionnaire responses that would compromise data integrity.

Data analysis

Data were analyzed using IBM SPSS Statistics version 26. Descriptive statistics (frequencies, percentages, means, and medians) were used to characterize demographic variables and KAP distributions. Pearson's correlation coefficient was employed to assess bivariate relationships between knowledge, attitude, and practice scores. Chi-square tests were used to examine associations between demographic variables and KAP categories. The significance level was set at $P < 0.05$ for all analyses.

Ethical considerations

Ethical approval was obtained from the Research Committee of the Faculty of Medicine, Herat University (Protocol No. 10, dated 1404/10/18). All participants were informed about the study objectives and procedures prior to enrollment. Participation was entirely voluntary, and students could withdraw at any time without consequence. All collected data were anonymized and treated confidentially, used exclusively for research purposes. No personally identifiable information will be disclosed in the study findings.

Results

Demographic characteristics

A total of 240 questionnaires were distributed, of which 230 were included in the final analysis. The majority of participants (90.4%) were aged 15-20 years. The distribution across grades was approximately equal (10th: 34.3%, 11th: 32.2%, 12th: 33.5%). Most students resided in urban areas (91.7%) and were unmarried (95.2%). Parental literacy levels were notably low, with 77.8% of mothers and 67.8% of fathers classified as illiterate (Table 1).

Knowledge assessment

Students demonstrated moderate overall knowledge regarding UV radiation and sunscreen use. Notably, 80.4% correctly identified that vitamin D is absorbed through the skin, and 79.6% recognized

Table 1: Demographic Characteristics of Participants (n = 230).

Variable	Category	n	%
Age group	< 15 years	9	3.9
	15-20 years	208	90.4
	> 20 years	13	5.7
Grade	10 th	79	34.3
	11 th	74	32.2
	12 th	77	33.5
Residence	Urban	211	91.7
	Rural	19	8.3
Marital status	Single	219	95.2
	Married	11	4.8
Mother's education	Illiterate	179	77.8
	12 th grade graduate	35	15.2
	Bachelor's	11	4.8
	Master's	5	2.2
Father's education	Illiterate	156	67.8
	12 th grade graduate	54	23.5
	Bachelor's	14	6.1
	Master's	6	2.6

the harmful effects of prolonged UV exposure. However, only 17.8% correctly identified that sunbathing is harmful to health, indicating a prevalent misconception. Knowledge about practical sunscreen application (e.g., applying 20 minutes before sun exposure) was reported by only 57.0% of respondents (Table 2).

KAP level distribution

When categorized into low, moderate, and high levels, the majority of students fell into the moderate category across all three domains: 78.17% for knowledge, 66.52% for attitude, and 68.26% for practice. The proportion with high/positive scores was lowest for attitude (12.61%) and highest for practice (18.70%) (Table 3).

Correlation between KAP variables

Pearson correlation analysis revealed weak negative and non-significant correlations between all three KAP domains. The correlation between knowledge and attitude was $r = -0.048$ ($P = 0.701$), between knowledge and practice was $r = -0.056$ ($P = 0.850$), and between attitude and practice was $r = -0.033$ ($P = 0.713$). Chi-

square analysis similarly confirmed the absence of significant associations (Tables 4 and 5).

Association between demographics and KAP

Chi-square analysis was performed to examine associations between demographic variables (age, grade, residence, marital status, mother's education, and father's education) and each KAP domain. No statistically significant associations were identified (all P -values > 0.05), as summarized in the table below (Table 6).

Discussion

This study assessed the knowledge, attitude, and practice of high school students in Jabriel Township regarding sunscreen use. The findings reveal that while students possess moderate general knowledge about UV radiation hazards, their practical knowledge and protective behaviors remain inadequate.

The high proportion of students (80.4%) who correctly identified skin-based vitamin D absorption and the harmful effects of prolonged

Table 2: Knowledge of Students Regarding Sunscreen and UV Radiation (n = 230).

Knowledge Items	n	%	n	%	n	%
	Correct	Correct	Incorrect	Incorrect	Don't Know	Don't Know
1. Low UV is beneficial for vitamin D	115	50	62	27	53	23
2. Prolonged UV exposure is harmful	183	79.6	28	12.2	19	8.3
3. Vitamin D is absorbed through skin	185	80.4	20	8.7	24	10.4
4. Sunbathing is harmful to health	41	17.8	184	80	5	2.2
5. UV can cause eye disorders	162	70.4	20	8.7	48	20.9
6. Unprotected skin ages faster	156	67.8	54	23.5	20	8.7
7. Short-term sun without protection is safe	166	72.2	48	20.9	16	7
8. Skin cancer can be fatal	129	56.1	58	25.2	43	18.7
9. Sunscreen should be applied 20 min before going out	131	57	49	21.3	50	21.7
10. Correct sunscreen use is sufficient protection	166	72.2	43	18.7	21	9.1

Table 3: Distribution of Knowledge, Attitude, and Practice Levels.

Domain	Low/Negative n	%	Moderate n	%	High/Positive n	%
Knowledge	18	7.86	179	78.17	32	13.97
Attitude	48	20.78	153	66.52	29	12.61
Practice	30	13.04	157	68.26	43	18.7

Table 4: Pearson Correlation Between Knowledge, Attitude, and Practice.

Variable Pair	Pearson r	P-value	Significance
Knowledge-Attitude	-0.048	0.701	Not significant
Knowledge-Practice	-0.056	0.85	Not significant
Attitude-Practice	-0.033	0.713	Not significant

Table 5: Chi-Square Test Results for KAP Associations.

Independent Variable	Dependent Variable	P-value
Knowledge	Attitude	0.72
Knowledge	Practice	0.877
Attitude	Practice	0.732

Table 6: Chi-Square P-values: Demographics vs. Knowledge, Attitude, and Practice.

Demographic Variable	vs Knowledge P	vs Attitude P	vs Practice P	Significant?	n
Age	0.567	0.69	0.936	No	230
Grade	0.627	0.586	0.249	No	230
Residence	0.229	0.549	0.289	No	230
Marital status	0.267	0.787	time	No	230
Mother's education	0.17	0.223	0.797	No	230
Father's education	0.991	0.892	0.918	No	230

UV exposure (79.6%) suggests that basic health information has reached this population, possibly through school curricula or media. However, the finding that only 17.8% recognized sunbathing as harmful indicates a significant knowledge gap, potentially reflecting cultural attitudes that associate sun exposure with health benefits without recognizing dose-dependent risks.

The moderate attitude scores (66.52%) and the relatively high proportion of students with negative attitudes (20.78%) suggest that knowledge alone is insufficient to shape positive health beliefs. This disconnect between knowledge and attitude is consistent with health behavior theories, such as the Health Belief Model, which posits that perceived susceptibility, severity, and barriers mediate the relationship between knowledge and behavior change. The practice assessment revealed that 53.5% of students never applied sunscreen to all exposed body parts, and 56.5% never reapplied sunscreen after two hours. These findings highlight a substantial gap between awareness and action, which may be attributable to factors such as product cost, availability, cultural norms, or perceived low risk.

The absence of significant correlations between KAP domains (all $P > 0.05$) is a notable finding. While many studies report positive associations between knowledge and practice, the present results suggest that in this population, increasing knowledge alone may not translate into improved behaviors. This finding underscores the need for multimodal interventions that address not only cognitive factors but also behavioral, environmental, and economic barriers to sun protection.

The lack of significant associations between demographic variables and KAP scores indicates that sunscreen-related behaviors in this population are not strongly influenced by age, grade level, residential setting, marital status, or parental education. This homogeneity may reflect the relatively uniform socioeconomic conditions and cultural context within the study area.

Limitations of this study include its cross-sectional design, which precludes causal inference; the reliance on self-reported data, which may be subject to social desirability bias; and the restriction to a single geographic area, which limits generalizability. Future studies should consider longitudinal designs, objective measures of sunscreen use, and multi-site sampling.

Conclusion

This study demonstrates that high school students in Jabriel Township possess moderate knowledge about UV radiation and sunscreen use but exhibit suboptimal attitudes and practices. The absence of significant relationships between KAP domains and between demographic variables and KAP scores suggests that knowledge acquisition alone is insufficient to drive behavioral change in this population.

These findings highlight the need for comprehensive, context-specific health education programs that go beyond information provision to include practical demonstrations, peer-led initiatives, and strategies to address economic and cultural barriers to sunscreen use. School-based interventions, integrated into existing health education curricula, may represent an effective approach to improving sun-protective behaviors among adolescents in this region.

Recommendations

Based on the findings of this study, the following recommendations

are proposed: First, school-based educational interventions should be developed to improve both knowledge and practical skills related to sunscreen application and sun-protective behaviors. Second, awareness campaigns should target common misconceptions, particularly regarding the risks of unprotected sun exposure. Third, strategies to improve sunscreen accessibility and affordability should be explored in collaboration with public health authorities. Fourth, future research should employ longitudinal designs and include behavioral observation to better understand the determinants of sun-protective practices among adolescents.

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