
Knowledge, attitudes, and practices towards Sunscreen use among a sample of school adolescents in Erbil city: A cross-sectional study

Received: 15/5/2025

Accepted: 22/6/2025

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Abstract

Background and objective: Adolescents are vulnerable to the risks of radiation, yet sunscreen use among this group remains inconsistent globally. This study aims to assess knowledge, attitudes, and practices regarding sunscreen use among adolescents in Erbil city

Methods: The study was conducted in Erbil City, Kurdistan Region, Iraq, from 27th October 2024 to 11th May 2025. This cross-sectional study was conducted on 400 students selected from ten public and private primary and high schools. Data were collected through a self-administered questionnaire. SPSS version 27 was used for the purpose of data analysis. Participants were chosen using stratified random sampling.

Results: Age of the participants ranged from 13-18 years with a mean \pm SD of 15.395 ± 1.397 years, 48.2% of the participants reported using sunscreen, 45.2% of the participants applied it once a day, and 32.5% of the participants reporting that their parents influenced their sunscreen use, followed by media.

There was highly statistical significant association ($P = 0.001$) between age groups of the participants to their knowledge, attitudes, practices, showed that that the age group (15 years and less) had higher (KAP) than the age group (16 years and more).

Conclusion: The findings highlight a gap in knowledge, attitudes, and practices concerning sunscreen use. Educational interventions as school based educational sessions, age and gender-based orientation sessions are recommended to address these gaps by improving knowledge of proper sunscreen practices and correcting misconceptions.

Keywords: Adolescents, Attitudes, Knowledge, Practices, Sunscreen, Sun Protection Factor, Skin cancer.

Introduction

Sunlight containing Ultraviolet Radiation (UVR) can be a risk factor for

causing skin cancer and damaging the skin layer (1). While these risks are well-documented, sunscreen

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use inconsistent, particularly among adolescents, who are at a pivotal age for forming lifelong health habits (2). Erbil's hot climate and year-round intense sunlight expose residents to high UV radiation, highlighting the importance of sun protection, which is often neglected (3). Early protection from UV radiation helps prevent sunburn, skin aging, and future skin cancer (4). Adolescents are likely to spend time outdoors in social and recreational settings, especially during weekends and summer breaks, increasing their exposure to harmful UV rays (5). Sunscreen also known as sunblock is any cream, spray, or lotion applied to the skin to help protect it from the sun's harmful rays. Sunscreens may also be present in moisturizers, lip balms, and some make-up products, for example, foundations (6). Studies worldwide indicate that while awareness of skin cancer and UV-related risks may exist, adolescents often lack comprehensive knowledge about effective sun protection (7). Many young people believe sunscreen is only necessary during sunny days or in beach settings, failing to recognize that UV rays can penetrate clouds and cause damage year-round (8). Parents are generally influencing the sun protection behaviors of their children, including sunscreen use, the role of family and community in shaping health practices cannot be overlooked. Adolescents may rely on the behaviors and attitudes modeled by parents and peers, which

can either encourage or dissuade sunscreen use (9). Access to information about how to effectively use sunscreen may play a role in proper sunscreen application (10). Educating parents on sun protection is crucial, as their awareness can reduce their children's future skin cancer risk and help establish lifelong healthy behaviors (11). The World Health Organization recommends starting habits for protection from UVR in the early life of children and teaching these habits as part of routine preventive health services for effective sun protection, which is the simplest and most feasible way to prevent skin cancer (12).

In Erbil, despite some awareness campaigns, the actual usage of sunscreen among the adolescents remained inconsistent and there is limited base-line data on this important problem in our community, accordingly; this study was conducted aiming to assess knowledge, attitudes, and practices regarding sunscreen use among adolescents in Erbil City.

Subjects and methods

Study design: A cross-sectional study was conducted among a sample of adolescents in Erbil City, Kurdistan Region, Iraq, to assess their knowledge, attitudes, and practices (KAP) regarding sunscreen use. The study period extended from October 27, 2024, to May 11, 2025. Erbil is located in the northern part of Iraq, characterized by a semi-arid climate with high levels of

UV radiation, particularly during summer months. The city comprises diverse neighborhoods with varying socioeconomic conditions, which were considered in the sampling process to ensure a representative study population.

Inclusion and Exclusion: The study targeted adolescents residing in Erbil City. Ten schools contain five public schools and five private schools. Eligible participants included male and female adolescents aged 13 to 18 years, as they represent the age group most relevant to evaluating knowledge, attitudes, and practices toward sunscreen use. Adolescents younger include (10, 11, 12) were excluded due to limited autonomy in decision-making regarding sunscreen use, Adolescents aged 10–12 years (elementary school students), while those older than 18 were not included to maintain a focus on the adolescent demographic.

Participants were required to have resided in Erbil for at least six months to ensure familiarity with local practices and environmental factors. Schools within the city and its districts served as the primary sampling frame, providing a representative sample of Erbil's adolescent students.

Data collection: Data were collected using a structured, self-administered questionnaire, which was formulated by the researcher under the guidance of the supervisor. It was reviewed by 15 experts of different specialties, most of

them were Community Medicine specialist, to ensure content validity and was pretested on a small group of students (n=30) as pilot test to check for clarity and understanding.

Sampling method: A stratified random sampling method was employed to ensure representation from both public and private schools across Erbil City. The sampling frame included a list of eligible schools obtained from the Erbil Directorate of Education. Schools were first stratified by type (public, private) and educational level (Preparatory, High school). From each stratum, schools were randomly selected. A total of ten schools (five public and five private) were selected. Participants were selected from schools across different location of Erbil City to ensure adequate representation.

Within each selected school, a list of students in the eligible age groups was obtained, and participants were randomly selected proportionally to the school size. Informed consent was obtained from all participants and school administrations prior to data collection. Using modified bloom's-cut off classification for knowledge classified into poor (0-50 scores), fair (51-75 scores), and good (76-100 scores), for attitude it was classified into negative (0-50 scores), neutral (51-75 scores), and positive (76-100 scores) and for the practice scores, it was classified into poor (0-50 scores),

fair/moderate (51-75 scores), and good practice (76-100 scores).

Sample size: Using Epi Info software version 7.2, the sample size was calculated with an assumed adolescent population size in Erbil City, an expected response rate of 50%, a 5% margin of error, and a 95% confidence interval. This calculation resulted in a required sample size of 385 participants. To account for potential non-responses, the sample size was increased to 400 adolescents. Those students who were not able to participate for any reason, it was compensated from the same school.

Ethical considerations: The research proposal was approved by the scientific committee of the department of Community Medicine and verbal consent was obtained from the school administrations, in addition to verbal approval from the students including those below 18 years too.

Statistical analysis: The data analyzed using SPSS version 27. For quantitative data, frequencies and percentages were used in form of tables and figures, while Chi square association test was applied for categorical variables. Statistical significance was set at a P-value of ≤ 0.05 .

Results

In this cross-sectional study, 400 participants were enrolled; their age ranged from 13-18 years with a mean \pm SD of 15.4 ± 1.4 years, among them 54.0% were aged 15 years and less, while 46.0% of them were aged more than 16 years, with an equal distribution between public (50.0%) and private (50.0%) schools.

54.0% of participants aged 15 years or less while 46.0% was aged 16 years or more. Female participants accounted for a higher proportion (55.0%) than males (45.0%).

Around 48.25% reported using sunscreen, and 51.75% stated they did not use it.

Parents and social media were the main sources of sunscreen information among the participants, accounting for 31.0% and 30.25%, respectively. Other sources included friends 18.0% and school/teachers 9.75%, (Figure 1).

Majority (84.25%) of participants knew about sunscreen expiry dates, a notable minority 15.75% were unaware of it, and 86.25% of participants acknowledged the importance of using sunscreen even on cloudy days, while 13.75% believed it was unnecessary. (Less than half 48.2%) of participants reported using sunscreen, while 51.75% stated they did not use it, (Table 1).

Table 1. Knowledge, attitude, practice of Sunscreen uses among the participants

Variables	Frequency	Percentage (%)
Knowledge section		
Participants' knowledge about expiry date of sunscreen		
Yes	337	(84.2)
No	63	(15.75)
Frequency of reapplication of sunscreen		
Every hour	7	(1.7)
Every 2 hours	93	(23.2)
Every 4 hours	89	(22.2)
Once a day	157	(39.2)
Don't know	54	(12.5)
Attitude section		
Importance of using sunscreen even on cloudy days		
Yes	345	(86.2)
No	55	(13.7)
Importance of sunscreen in preventing skin problems like sunburn or skin cancer		
Yes	364	(91.0)
No	36	(9.0)
Practice section		
Using of sunscreen		
Yes	193	(48.25)
No	207	(51.75)
Frequency of using sunscreen*		
Daily	193	(48.25)
Weekly	12	(3.0)
Monthly	5	(1.25)
Only during summer	164	(41.0)
Going out to party or an event	26	(6.5)
Wearing hats	103	(25.75)
Wearing sunglasses	75	(18.75)
Wearing long-sleeved clothing	56	(14.0)
Seeking shade	29	(7.25)
Nothing	137	(34.25)
Total	400	(100.0)

*: Including multiple answers (choices)

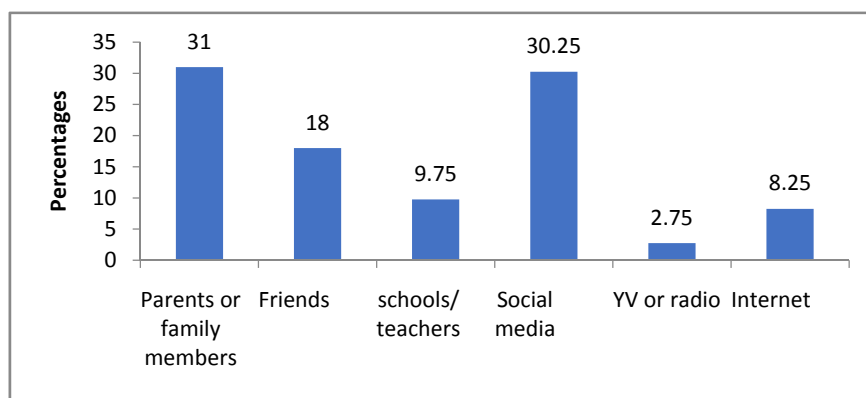


Figure 1. Source of knowledge of the participants about Sunscreen

A highly significant statistical association was observed between participants' sunscreen knowledge levels and both age and gender ($P = 0.001$). Adolescents aged 15 years or younger exhibited a higher prevalence of good knowledge compared to those aged 16 years and older. Moreover, male participants were more likely to possess good knowledge, whereas a greater proportion of female participants demonstrated poor knowledge, (Table 2).

There was a highly significant

association between participants' attitudes toward sunscreen use and both their age and gender ($P = 0.001$). Younger adolescents (15 years and less) were more likely to have positive or neutral attitudes compared to older adolescents (16 years and more), who showed a higher prevalence of negative attitudes. Likewise, male participants exhibited more positive attitudes than females, who were more inclined toward negative attitudes regarding sunscreen use, (Table 3)

Table 2. Association of knowledge of the participants to their age groups and gender

Variables	Knowledge levels			P-value
	Poor	Fair	Good	
Age groups in years				$P = 0.001$
15 years and less	109 (27.2)	14 (3.5)	93 (23.2)	
16 years and more	118 (29.5)	11 (2.7)	55 (13.7)	
Total	227 (56.75)	25 (6.25)	148 (37.0)	
Gender				$P = 0.001$
Male	73 (18.2)	11 (2.7)	96 (24.0)	
Female	139 (34.7)	4 (1.0)	77 (19.2)	
Total	212 (53.0)	15 (3.75)	173 (43.25)	

Table 3. Association of attitudes of the participants to their age groups and gender

Variables	Attitude levels			P-value
	Negative attitude	Neutral attitude	Positive attitude	
Age groups in years				$P = 0.001$
15 years and less	94 (23.5)	33 (8.2)	89 (22.2)	
16 years and more	106 (26.5)	17 (4.2)	61 (15.2)	
Total	200 (50.0)	50 (12.5)	150 (37.5)	
Gender				$P = 0.001$
Male	82 (20.5)	6 (1.5)	92 (23.0)	
Female	145 (36.2)	5 (1.2)	70 (17.5)	
Total	227 (56.7)	11 (2.7)	162 (40.5)	

There was a highly significant association between participants' sunscreen use practices and both their age and gender ($P = 0.001$). Younger adolescents (15 years and less) were more likely to demonstrate good or moderate practices, whereas older

adolescents (16 years and more) showed a higher tendency toward poor practice. Similarly, males reported better sunscreen use practices compared to females, who were more frequently associated with poor practice levels, (Table 4)

Table 4. Association of practices of the participants to their age groups and gender

Variables	Practice levels			P-value
	Poor practice	Fair / Moderate practice	Good practice	
Age groups in years				
15 years and less	23 (5.7)	154 (38.5)	39 (9.7)	P = 0.001
16 years and more	38 (9.5)	127 (31.7)	19 (4.7)	
Total	61 (15.2)	281 (70.2)	58 (14.5)	
Gender				
Male	79 (19.7)	17(4.2)	84 (21.0)	P = 0.001
Female	142 (35.5)	9 (2.2)	69 (17.2)	
Total	221 (55.2)	26 (6.5)	153 (38.2)	

Discussion

In this study, considerable number of the participants had a good knowledge about sunscreen and recognized its importance, though a few had not. A study in Tirana- Albania, revealed that while 38.5% of adolescents had some awareness of the effects of sun exposure, the overall level of knowledge among more than half of the participants was inadequate (13). This difference could be due to sample size, sampling technique and some confounding factors.

In this study males were significantly more knowledgeable about sunscreen use than females. A study in Iran showed that the females 'mean score of knowledge was higher compared to males (14). This difference could be due to sun protection programs because in early childhood may not equally benefit everyone when applied to the general population. As children have certain molecular-level alterations predisposing them to increased complications of exposure to sunlight; regardless of the level of UVB exposure.

Over half of the participants believed sunscreen prevents sunburn, about a quarter linked it to reducing skin cancer risk, and a small minority used it to avoid tanning. Less than half reported applying sunscreen once daily, and only a few reapplied every two hours or after swimming or sweating. Some were unsure about the recommended frequency. A study in Turkey showed

the similar results, where 43.4% use sunscreen (15). This similarity could be due to cultural habits, environmental and religious factors.

Most of participants applied sunscreen to their face, while only a few reported using it on their arms, legs, or the entire body. Another study in Malatya- Turkey female students used sunscreen mostly in the facial area, male students used it mostly in the trunk and back (16). This similarity could be due to cultural habits, and insufficient knowledge and practice about sunscreen use.

Parents and social media were the primary sources of sunscreen information, followed by friends and school. Most participants agreed sunscreen should be used even on cloudy days, though a few disagreed. Weather and outdoor activities were top influences on sunscreen use, followed by skin type, family, peer influence, and cost. The majority viewed sunscreen use as important for skin health and preventing skin problems, while just over a quarter disagreed. A study in Thailand showed results, where 93% of adolescents knew the effects of sunlight, and also showed that the source of knowledge were online social media (17). These similarities could be due to sampling technique, socio demographic characteristic like age, gender and environmental factors. More than half considered sunscreen affordable, while about a quarter found it expensive, and a few thought

it very expensive.

Nearly half of participants used sunscreen; the rest did not, among users, some applied it daily, while others used it weekly, monthly, or only during summer or events. Most applied sunscreen before going outside, and fewer during outdoor sports, swimming, or beach visits. A study in Indonesia showed a similarity in attitudes, more than half of the participants had a positive attitude in using sunscreen (2). This similarity could be due to age, gender, religious factors and other confounding factors. In this study most applied sunscreen to the face; fewer used it on arms, legs, or the whole body. Additional sun protection methods included hats, sunglasses, and long sleeves, though some used no extra protection and less than half reapplied sunscreen after swimming or sweating. Parents were the most influential, followed by social media, with fewer citing friends, teachers, or doctors. A study in Mosul, Iraq showed that quarter of the participants incorrectly answered that once-a-day application of sunscreen is effective whereas 59.7% accurately understood that sunscreen products should be reapplied every 2 hours even on cloudy days. About three-quarters of the participants (73.2%) thought that damage to the skin brought about by the sun can be avoided and a similar fraction (78.5%) assumed that clothes play a role in protecting the skin against the sun.

However, only 48.4% of the participants thought that staying in the shade is an efficient strategy to get protection from the sun. Finally, 67.5% of the participants stated that they encourage parents to use sunscreen products on their children (18). These differences could be due to sample size, sampling technique, the educational level of the participants, and some confounding factors.

Study limitation

This study had certain limitations including social barriers, inadequate support from school administrations and self-reported data bias.

Conclusion

This study identified a significant association between age and sunscreen use. Younger adolescents demonstrated greater awareness and more consistent use of sunscreen than their older counterparts. This suggests a clear age-related gap in sun protection behavior, gender differences also emerged. These findings necessitate the need for more public health interventions to improve sunscreen habits among adolescents through school-based education sessions, media campaigns, and targeted orientation sessions by gender/age).

Competing interest

The authors declare that they have no competing interests.

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