

## Assessment of Knowledge, Attitude, and Practices Related to Sun Exposure among University Students of Rawalpindi and Islamabad

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### ABSTRACT

**Objective:** To assess the knowledge and attitude towards sun exposure related practices among university students of twin cities.

**Study Design:** Quantitative analytical cross-sectional study.

**Place and Duration of Study:** A Quantitative analytical cross-sectional study was carried out in the university students of Rawalpindi and Islamabad Pakistan, from Jan till Apr 2022.

**Methodology:** Total participants were 317. Participants were university students, who were studying during 2021-2022 under registered universities within the twin cities. The data was gathered through online Google Forms. IBM SPSS version 25 was used for analysis.

**Results:** 42.5% participants exposed themselves to the sun doing outdoor activities for over 90 days a year, while 49.3% did so for 1-2 hours a day. 29% of the people got painful burns at least once or twice this year. Only 20% participants took shelter in shade or used umbrellas, 14.5% used hats. 20.4% never used sunscreen, while 22.6% did, and among them, 44.3% were unaware of the SPF they used. 48% do not like using sunscreen. 65.4% believed sun protection creams were the best way to protect themselves. 81.1% think at least 30 minutes of sun a day are advisable for adequate Vitamin D levels. ( $p < 0.05$ )

**Conclusion:** It was found that people do have knowledge about the importance of shade and clothing material, such as hats, to avoid the harmful effects of sun exposure but they do not practice it. When it comes to sunscreen, most do not use it and those who do, do not possess significant knowledge about its SPF.

**Keywords:** Knowledge, Practices, Skin cancer, SPF, Sun exposure, Sunscreen.

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### INTRODUCTION

By causing immune-suppression, oxidative stress, and DNA mutations in the skin, UVR harms the skin & causes actinic keratosis, aging, and DNA damage.<sup>1,2</sup> When given the essential instruction on avoiding excessive sun exposure early in childhood, sun protection behavior is a proven intervention for slowing the aging process of the skin & preventing skin cancer.<sup>3</sup> The main components of sunscreen are active substances that either function as UVR absorbers or as agents that deflect or scatter radiation. These active components, which include chemical and mineral substances like TiO<sub>2</sub>, can lower the risk of melanoma & squamous cell carcinoma.<sup>4,5</sup> There are now three primary forms of skin cancer due to the huge rise in skin cancer incidence over the past ten years.

The main reversible risk factor for skin cancer is sun exposure. Sunscreen has been found to lower the chance of developing some skin malignancies, including melanoma and squamous cell carcinoma.<sup>6</sup> The main environmental risk factor for developing

skin cancer is UVR exposure. In order to lessen the harmful effects of ultraviolet radiation (UVR), sunscreens are utilised, although little is known regarding their use in the UK.<sup>7</sup> Photoaging is an early ageing process of the skin brought on by sun exposure. Sunscreen works well as a primary form of photo-protection to shield the skin from the risks posed by ultraviolet (UV) rays. However, sunscreen is frequently applied incorrectly, which lowers the protection it provides.<sup>8</sup> The key public health guidelines for preventing skin cancer are to reduce UVR exposure and adopt the essential skin protection behaviours (such as wearing sunscreen, hats, long-sleeved clothes, and sunglasses).<sup>9</sup>

The many preventative measures recommended include using sunscreens appropriately, avoiding UV exposure by seeking shade, being indoors during the UV radiation's peak hours, and donning protective clothes. Unfortunately, compliance with these recommendations has been disappointingly low, and several obstacles have been noted, including ignorance of the risks associated with skin cancer, false beliefs about

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those risks, difficulty starting behavioural changes, and socioeconomic factors like the time and money required, among others.<sup>10</sup>

Almost all public and private health care facilities in the twin cities of Islamabad and Rawalpindi are receiving a significant number of patients with heat or sun exposure related diseases. University students are exposed to harmful UV-A and UV-B radiation during transportation and whilst walking to classes or taking part in outdoor activities.

There has been a severe lack of sun exposure prevention/protection practices, which has led to multiple sun related disorders. Also there has been paucity of research in this area in the current setting. This study was carried to assess the knowledge, attitudes and practices about sun exposure and sunscreen usage in medical students of Islamabad and Rawalpindi Pakistan.

**METHODOLOGY**

A Quantitative analytical cross-sectional study was carried out in the university students of Rawalpindi and Islamabad Pakistan. The study was conducted during year January till April 2022.

The sample size came out to be 317, calculated via Rao soft with 95% confidence level.

**Inclusion Criteria:** Only those who were studying during 2021-2022 under registered universities were included, irrespective of gender.

**Exclusion criteria:** Students of other cities and junior students were excluded.

Nonprobability convenient sampling technique was used in this study. The data was gathered through an online survey (google forms) using the English version of the close-ended questionnaire.<sup>11</sup>

For data entry and analysis, we used IBM SPSS version 25. Summary statistics were produced using frequencies, percentages, mean and chi-square test of significance. *p*-value < 0.05 was taken to be significant.

Ethical approval from Ethical review board of Army Medical College was taken to conduct the study (ERC/ID/224). All principles and values were considered while taking our responses. Which included Informed consent, voluntary participation, anonymity, and confidentiality.

**RESULTS**

Majority of participants have intermediate skin colour then followed by fair and very fair. The

Fitzpatrick skin type system categorizes skin type based on how much melanin is present and can help predict the risk of sunburn, according to the following:

- Type 1 burns without tanning.
- Type 2 burns and does not tan easily
- Type 3 burns first then tans.
- Type 4 burns a little and tans easily.
- Type 5 easily tans to a darker colour & rarely burns
- Type 6 never burns but tans darker.

Majority of the skin types were type 5(33.3%) and type 4 (29.9%).

**Table-I: Demographics**

Variables	Frequency (n)	Percentage
<b>Gender</b>		
Male	187	58.8%
Female	131	41.2%
<b>Age</b>		
16-20	116	36.4%
21-25	170	53.4%
26-30	13	0.04%
31-35	7	0.022%
36-40	11	0.034%
41-45	1	0.003%
<b>Marital Status</b>		
Unmarried	292	91.8%
Married	26	8.1%
<b>Field Of Education</b>		
Medicine	192	60.4%
Engineering	46	14.5%
Business	20	6.3%
Arts and Humanities	15	4.7%
Computer sciences	14	4.4%
Law	9	2.8%
Agriculture	3	0.9%
Others	19	5.9%
<b>Year Of Study</b>		
First year	56	17.6%
Second year	76	23.9%
Third year	45	14.2%
Fourth year	114	35.8%
Fifth year	27	8.5%

(Total n = 317)

Almost 29% of the people got painful burns at least once or twice this year and almost 13% of the people got skin burned more than twice. Only 20% of the people take shelter in shade or use umbrellas for sun protection as opposed to 13.5% of the people who never take any measures against sun protection (*p*-value<0.001). 14.5% of the population under observation have used a hat or cap as a measure to protect skin from the sun exposure which was statistically significantly associated with gender (*p*-value<0.000). Only 22.6% of the students use a sun

block or sunscreen when doing outdoor activities, 20.4% of the students have never used sunscreen, while female participants 30.5% almost always used it ( $p$ -value<0.02). 12.9% of the students always avoid midday hours whereas 13.5% of the people hardly ever or never avoid these hours. Out of all the students who use sunscreen, 44.3% of them are still unaware of the type of sun protection factor they use ( $p$ -value <0.00).

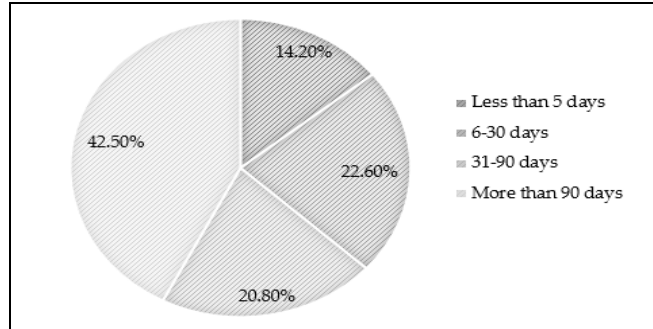
**Table-II: Sun exposure awareness**

Response	Percentage (%)
<b>Sun protection cream prevents skin cancer</b>	
Yes	65.4%
No	34.6%
<b>No risk of radiation effects in the shade</b>	
Yes	45%
No	55%
<b>Dark clothing protects from the sun more than light clothing</b>	
Yes	29.2%
No	70.8%
<b>Babies &lt;1 yr. should not be exposed to direct sunlight</b>	
Yes	65.1%
No	34.9%

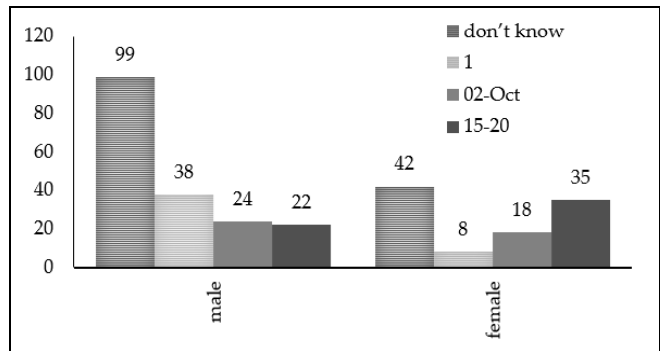
Around 44% of the students like staying in the sun. Only 6.9% of the population of students strongly disagree and do not like the idea of staying in the sun. Most (48%) of the students agree that they do not like using sunscreen ( $p$ -value<0.00). 61% of the students agreed that it's worth taking the trouble to use sunscreen. More people (45.9%) preferred to be in the shade than the sun ( $p$  value<0.001), while only 4.4% disagreed with the statement. Majority of the participants agreed (35.5%) that they were worried about getting spots and wrinkles from sun exposure, while 26.1% strongly agreed. There was a positive response over participants worrying that they might get skin cancer from staying in the sun ( $p$ -value<0.03).

92.5% participants thought that ultraviolet radiation causes accelerated skin aging and skin cancer, while only 7.5% believed that it does not. 65.4% of the participants believed sun protection creams to be the best way to protect yourself from the harmful effects of the sun, while 34.6% believed the contrary. A clear majority agreed (42.1%) that it is easy to protect yourself from the sun by wearing hat and clothes. The results were more balanced about participants thinking there is no risk of radiation effects if they stay in the shade, with 55% leaning more towards the statement being false (45%) ( $p$ -value 0.01).73% of participants did not believe that there is any need to use sunscreen/sun

block once/if your skin is tan ( $p$ -value 0.00). Majority of the participants (70.8%) agreed that dark clothing protects you from the sun more than light clothing, while 29.2% think this is false ( $p$ -value 0.03).



**Figure-1: Outdoor exposure [days per year]**



**Figure-2: Use of creams with different SPF (Sun Protection Factor)**

## DISCUSSION

Islamabad and Rawalpindi have a subtropical climate, with four seasons. It has been estimated that Islamabad receives about 3691.<sup>11</sup> hours of sunshine yearly, with an average of 121.3 hours of sunshine per month.

In our study most of the participants (42.5%) expose themselves to the sun doing outdoor activities for more than 90 days a year, which could be a personal preference or a current requirement, since our population consists of university students.

A research conducted in North America showed that "Public health authorities recommend easily implemented prevention practices for sun safety, notably, reducing UVR exposure by limiting time in the sun when UVR is high ( at midday, lower latitudes, higher elevations, and close proximity to the summer solstice), using shade, wearing protective clothing, and applying/reapplying broad-spectrum sunscreens with a minimum sun protection factor (SPF) 15".<sup>12</sup>

**Table-III: Association of gender with different variables**

Variable	Male	Female	All	$\chi^2$ p-value
<b>Sun protection measure (use of umbrella)</b>				
Always	46(24.6%)	18(13.7%)	64(20.1%)	18.766 ≤0.001*
Usually,	57(30.5%)	35(26.7%)	92(28.9%)	
Sometimes	33(17.6%)	46(35.1%)	79(24.8%)	
Hardly ever	20(10.7%)	20(15.3%)	40(12.6%)	
Never	31(16.6%)	12(9.2%)	43(13.5%)	
<b>Sun protection measure (use of hat/cap)</b>				
Always	36(19.3%)	10(7.6%)	46(14.5%)	66.493 ≤0.000*
Usually	72(78.3%)	16(12.2%)	88(27.7%)	
Sometimes	41(21.9%)	24(18.3%)	65(20.4%)	
Hardly ever	21(11.2%)	28(21.4%)	49(15.4%)	
Never	17(9.1%)	53(40.5%)	70(22.0%)	
<b>Sun protection measure (use of sunscreen/sunblock)</b>				
Always	32(17.1%)	40(30.5%)	72(22.6%)	11.461 ≤0.02*
Usually	43(23.0%)	34(24.0%)	77(24.2%)	
Sometimes	45(24.1%)	28(21.4%)	73(23.0%)	
Hardly ever	22(11.8%)	9(6.9%)	31(9.7%)	
Never	45(24.1%)	20(15.3%)	65(20.4%)	
<b>Sun protection measure (use of dark clothing)</b>				
False	124(66.3%)	101(77.1%)	225(70.8%)	4.334
True	63(33.7%)	30(22.9%)	93(29.2%)	≤0.037*
<b>Sun protection measure (effects of radiation if stay in shade)</b>				
False	89(47.6%)	86(65.6%)	175(55.0%)	10.148
True	98(52.4%)	45(34.4%)	143(45.0%)	≤0.001*

Regarding the usage of umbrellas or taking shelter in shade, 55.1% males and 40.5% females always or usually practice this. In a previous study in Pakistan, it was found that Females were more likely than males to use an umbrella to shelter themselves from the sun when taking photos, with 57.2 percent of female users reporting doing so, while 14.5 percent of male users said they used hats.<sup>13</sup> Our results show an improvement in male usage of umbrellas, as currently more than half follow this practice, and their usage surmounts the usage among females, the results were like a study done in China.<sup>14</sup> Wearing of hats, however, remains a primarily male sun protection practice. Complementary to our research where the usage of protective clothing and finding shade prevails over usage of suns protection creams and sunblock research conducted in Texas showed that Texans favour using protective gear and shade over using sunscreen. But given that many Texans fail to regularly employ shade and protective gear, it is especially alarming that sunscreen is an underused preventive tool.<sup>15</sup>

Sunscreen usage was less among both males (25.8%) and females (14.5%). This is similar to the results from a study in Saudi Arabia, where it was

highlighted that regular use of sunscreen was merely 23.7%, with 41.4% of the participants reporting they had never used it,<sup>16</sup> while contrary to study done in India and a United Kingdom, which say 58% of the volunteers applied sunscreen before going out.<sup>17,18</sup> There are further differences in sunscreen usage according to the sex of the participant. Only 17.1% males in our study always use sunscreen, while 30.5% women always use it contrary to the research done in eastern India.<sup>19</sup> 24.1% males reported to never using any sun protection cream at all, while only 15.1% females reported this. This is supported by a study conducted in Saudi Arabia and Bahrain in which most sunscreen users were found to be female.<sup>20</sup>

48.1% females reported using SPF 15-50, while an alarmingly low 15.5% males practice this. This clearly highlights that SPF awareness and usage is greater in the female population. However, the overall usage in both males and females of SPF of at least 15 is still unsatisfactory (28.9%). This is very low compared to a study conducted in Malta, where 74% of the participants reported using sunscreen of SPF of at least 15.<sup>21</sup>

Application of sunscreens to the exposed parts of the skin may help in protecting the skin from harmful UV rays.<sup>22</sup> Therefore, even while shade decreases direct UV exposure, diffuse UV radiation can still reach the skin of those who are in the shade by entering via the side openings of the shade structure, leaving them vulnerable to indirect UV radiation.<sup>23</sup> Younger age, lower levels of education, being single, and darker complexion types were found to be associated with avoiding preventative measures like remaining in the shade or using sunglasses in Germany.<sup>24</sup> According to a Turkish survey, students choose using sunscreen, wearing sunglasses, and remaining in the shade as their primary means of sun protection.<sup>25</sup>

Majority of both males and females agreed to worrying about getting cancer and wrinkles/spots from sun exposure. They also agreed that it is easy to protect oneself by wearing hats and clothes. This may be influenced by the culture of Pakistan, where most people usually stay covered.

Most students exhibited good knowledge regarding the hazards of sun exposure, with 92.5% believing ultraviolet radiation to cause accelerated aging and skin cancer. This was also the case when a study was conducted earlier in Pakistan.<sup>13</sup>



Majority of participants (70.8%) believed light clothing is more sun protective than dark clothing. This is like the results of the previous study in Pakistan where 83.5% students thought that light-coloured clothing compared to dark-coloured clothing offers better protection against the sun.<sup>1</sup> Hence, there is a deep need to educate the population regarding this.

The results of our study have shown that even where the participants have displayed satisfactory sun awareness, they are often lacking in practicing protection against sun exposure. There hasn't been much progress in this area, which shows that strong information doesn't always translate into good practice. It's critical to close the knowledge-practice gap.

#### ACKNOWLEDGMENT

We are thankful to our supervisor for continuous guidance and support throughout our study.

#### RECOMMENDATIONS

- Encourage regular usage of sun protection creams and sunblock.
- Educate the population regarding sun protection factor variables and which ones to use.
- It is recommended to carry out further studies involving other age groups and locations of the country, also including rural areas.

#### LIMITATIONS OF STUDY

Our study was limited by the participants' recall bias and their inability to accurately estimate the frequencies of their practices. Furthermore, since only university students were surveyed, the mean age of the population was low. Furthermore, this survey was conducted via Google Forms, hence only those individuals having this facility and were physically capable of using it, could participate.

#### CONCLUSION

Our research concludes that the target population does have knowledge about the importance of shades and the usage of clothing materials, such as hats, to avoid the harmful effects of sun exposure, and they also practice it. However, when it comes to sun protection creams, most of the population does not use it, and among those who do use it, they lack significant knowledge about its sun protection factor (SPF). Moreover, whereas the knowledge of sun exposure is roughly the same among males and females, females appear to have a slightly better attitude towards sun exposure and have more sun protective habits.

**Conflict of Interest:** None.

#### Author's Contribution:

Following authors have made substantial contributions to the manuscript as under:

AS: supervision, Conception, Design, Data, analysis, revising, & approval for the final version to be published

SFM: Co-Supervision, Drafting of Article, intellectual Content, & approval for the final version to be published.

UK: Study design, data analysis, drafting the manuscript, critical review, approval of the final version to be published

NS: Critical review, drafting the manuscript, approval of the final version to be published.

AA & HG: Conception, study design, drafting the manuscript, approval of the final version to be published.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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