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Pervasiveness sunscreen use and knowledge among university students in Riyadh, KSA, 2022-2023

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ABSTRACT

An essential tool for sun protection is sunscreen. Only a few studies on the usage of sunscreen were carried out in Saudi Arabia, despite widespread research on the topic. Our research aims to evaluate the prevalence, behaviors and knowledge related to use of sunscreen among Saudi university students. *Objectives:* Our study aim is to demonstrate the knowledge and use of sunscreen among university students. *Methodology:* A cross-sectional study was carried out among university students, Riyadh Saudi Arabia. After obtaining permission from the college authority, participants were given prevalidated questionnaires about sunscreen knowledge, attitude and practice and were distributed to 600 university students. The Chi-square test and one-way analysis of variance were used to evaluate the data. *Result:* The study included 600 university students who completed the study questionnaire. In which the majority of the participants are between the ages of 21 and 23, making up 42.6% of the total. Participants are divided on whether or not they use sunscreen, with 291 (48.4%) stating they do and 310 (51.6%) saying they do not. *Conclusion:* Our study revealed that Sunscreen use in Saudi Arabian university students is higher than in previous studies, but it is still lower than in other countries.

Keywords: Sunscreen, university students, Saudi Arabia.

1. INTRODUCTION

Because the sun is the primary source of vitamin D, it has both beneficial and harmful consequences and a key contributor to skin cancer (Rutkowski et al., 2017). The primary culprit behind these outcomes is the sun's ultraviolet (UV) radiation. Applying sunscreen is one of the primary ways to shield the skin from the damaging effects of UV radiation. A chemical substance called sunscreen is used to shield the skin from UV rays (Hault et al., 2016;

Alshammrie et al., 2022; Alshayeb et al., 2022). Skin cancers like melanoma and nonmelanoma have been found to be prevented by wearing sunscreen (Green et al., 2011).

Saudi Arabia has a year-round climate that is primarily sunny, with UV indices reaching 12 from April to August (Monthly Weather and Climate Forecast, 2022). The use of sunscreen and other sun protection measures has been the subject of several researches undertaken globally. However, the usage of sunscreen in Saudi Arabia has only been the subject of a small number of researches (Al-Robaee, 2010; Bahakim et al., 2016). According to that research, between 8 and 35 percent of people use sunscreen. Students at universities made up the majority of those who apply sunscreen (Bahakim et al., 2016; Al-Ghamdi et al., 2016). Our study's goal is to evaluate sunscreen use and knowledge among Saudi university students.

2. METHODS

A cross-sectional study was done at institutions in 4-month duration (from November 2022 to January 2023) in universities, located in Riyadh city, the capital of Saudi Arabia. The study population was university students and university students' males and females, were included, excluded non-university. The sample size is 600, and systemic random sampling.

After providing them with information on the study's purpose, participants were given that all university students are fluent in English; questionnaire forms were produced in that language. Two dermatologists evaluated the questionnaire's content validity. The questionnaire was then tested with 60 students. The following sections were included in the final questionnaire: Demography, sunblock use in general, sunblock method of application, sunblock types and sun exposure and skin cancer. In addition to other close ended question will be used to investigate the type of other sun protection methods. The data will be analyzed using SPSS (V 23) and Microsoft Excel to generate tables and charts. P value of ≤ 0.05 will be considered significant. Methods of data collection the interviewer conducted the interview.

Ethical consideration

Ethical approval has been obtained & consent was obtained from participants before data collection emphasizing confidentiality.

3. RESULTS

In Table 1 the data shows that the majority of the participants are between the ages of 21 and 23, making up 42.6% of the total. The second largest group is between the ages of 24 and 26, accounting for 23.1% of the participants. The smallest group is those over the age of 26, with only 13.8% of the participants in this category. The 18–20-year-old group makes up 20.5% of the participants. Overall, the data suggests that the majority of the participants are young adults between the ages of 21 and 26.

Table 1 Descriptive socio-demographic analysis

Variables	n (%)
Age (years)	
18-20	123 (20.5%)
21-23	256 (42.6%)
24-26	139 (23.1%)
More than 26	83 (13.8%)
Gender	
Male	297 (49.4%)
Female	304 (50.6%)
Academic year	
Junior	231 (38.4%)
Senior	370 (61.6%)

n=601

The data shows a nearly equal representation of both male and female participants, with 297 males making up 49.4% and 304 females accounting for 50.6% of the total. This suggests that the sample group is relatively evenly split between males and females.

The data shows that the majority of the participants are juniors, accounting for 61.6% of the total, while seniors make up the smaller portion of 38.4%. This suggests that there are more juniors participating in this study or analysis compared to seniors. The

difference in academic year representation could potentially indicate a trend or preference in participation based on academic standing.

Table 2 Prevalence of sunscreen users among university students

Variables	n (%)
Use of sunscreen	
Yes	291 (48.4%)
No	310 (51.6%)

n=601

In Table 2 the data shows that the use of sunscreen is relatively split among the participants, with 291 (48.4%) saying they use it and 310 (51.6%) saying they do not. This indicates that there is no clear consensus among the participants on the use of sunscreen.

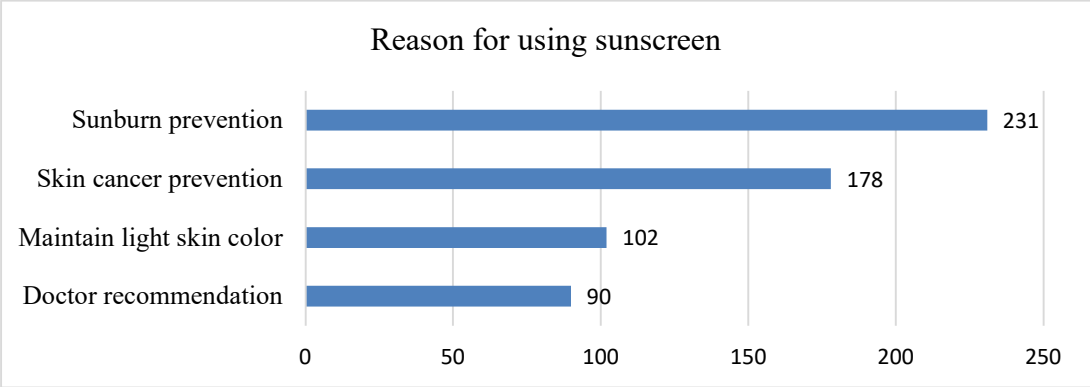

Figure 1 Reasons to apply sunscreen

In Figure 1 the data shows that the most common reason for using sunscreen among the participants is sunburn prevention, with 231 citing this as the reason. The second most common reason is skin cancer prevention, with 178 participants mentioning this. A smaller group of 102 participants use sunscreen to maintain light skin color, while 90 participants reported using it based on a doctor's recommendation. These results suggest that sunburn prevention and skin cancer prevention are important concerns for the participants and that there is a need for more education on the importance of using sunscreen for these reasons. However, it is important to note that the use of sunscreen for vanity purposes, such as maintaining skin color, is still a prevalent reason among some participants.

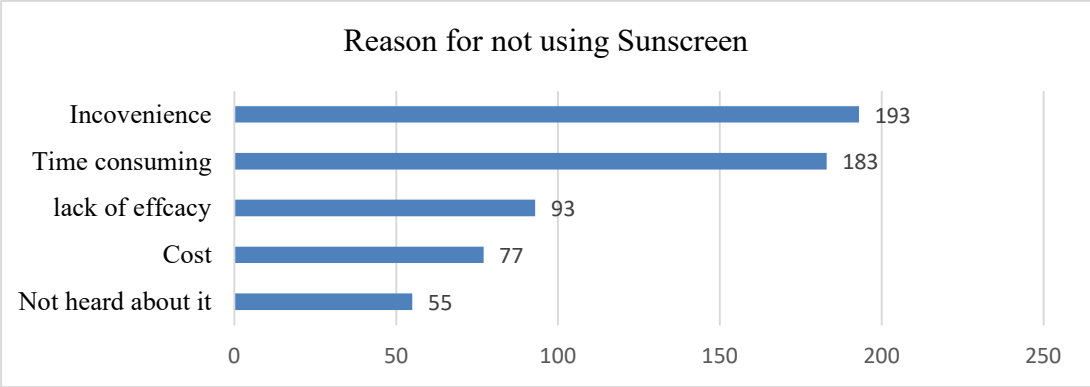

Figure 2 Reasons not to apply sunscreen

In Figure 2 the data shows that the most common reason for not using sunscreen among the participants is inconvenience, with 193 citing this as the reason. The second most common reason is that it is time-consuming, with 183 participants mentioning this. A smaller group of 93 participants reported not using sunscreen due to a perceived lack of efficacy, while 77 participants cited cost as

a factor. A relatively small number of 55 participants reported not having heard about the importance of using sunscreen. These results suggest that convenience and time consumption are major concerns for those who do not use sunscreen.

Table 3 An assessment of the parameters related with the usage of sunscreen

	Sunscreen		
Variables	No n (%)	Yes n (%)	P value
Gender			
Male	190 (64)	107 (36%)	0.04
Female	120 (39)	184 (61%)	
University Level			
Senior	116 (50)	115 (50%)	0.598
Junior	194 (52)	176 (48%)	
Fitzpatrick skin photo type			
I	25 (43)	33 (57%)	0.042
II	76 (46)	89 (54%)	
III	121 (49)	124 (51%)	
IV	53 (58)	39 (42%)	
V	22 (81)	5 (19%)	
VI	13 (93)	1 (7%)	
Number of sunburns			
None	137 (56)	108 (44%)	0.024
One	96 (60)	63 (40%)	
Two	52 (40)	78 (60%)	
Three	16 (36)	28 (64%)	
More than three	9 (39)	14 (61%)	
Usage of alternative sun protection measures			
Staying in shade	91 (46)	106 (54%)	0.032
Wearing sunglasses	112 (48)	121 (52%)	
High sun intensity	28 (62)	17 (38%)	
Protective head cover	46 (64)	26 (36%)	
Umbrella	33 (61)	21 (39%)	
Sunscreen protect from skin cancer			
Yes	217 (47)	249 (53%)	0.016
No	93 (69)	42 (31%)	
Who should use sunscreen			
Fair skin	95 (59)	66 (41%)	0.014
Brown skin	41 (56)	32 (44%)	
Dark brown skin	20 (44)	25 (56%)	
All individuals	154 (48)	168 (52%)	

In Table 3 the data shows that there is a substantial distinction. In the use of sunscreen between males and females, with a higher proportion of females using sunscreen (61%) compared to males (36%). The p-value of 0.04 suggests that this difference is statistically significant, meaning that it is highly improbable to have happened by coincidence. These results suggest that there is a gender disparity in the use of sunscreen, with females being more likely to use it compared to males.

The data shows that there is no significant difference in the use of sunscreen among senior and junior university level students, with a similar proportion of seniors and juniors using sunscreen. The p-value of 0.598 suggests that this variation is not statistically significant, meaning that it is likely to have occurred by chance. These results suggest that the academic level of university students does not significantly impact their use of sunscreen. It is important to promote sun protection among all individuals, regardless of their academic level, to reduce the risk of skin damage from the sun.

The data shows that there is a significant difference in the use of sunscreen among different Fitzpatrick skin photo types, with a higher proportion of individuals with skin photo types I, II and III using sunscreen compared to those with skin photo types IV, V and VI. The p-value of 0.042 suggests that this difference is statistically significant, meaning that it is unlikely to have occurred by chance. These results suggest that individuals with lighter skin are more likely to apply sunscreen compared to those with darker skin.

Moreover, the data shows that there is a substantial distinction in the use of sunscreen among individuals with different numbers of sunburns, with a higher proportion of individuals who have experienced one or more sunburns using sunscreen compared to those who have not experienced any sunburns. The p-value of 0.024 suggests that this difference is statistically significant, meaning that it is unlikely to have occurred by chance. These results suggest that individuals who have experienced sunburns are more likely to apply sunscreen compared to those who have not.

The data shows that there is a significant difference in the use of sunscreen among individuals who use other methods for sun protection, with a higher proportion of individuals who use alternative sun-protection measures also using sunscreen. The p-value of 0.032 suggests that this difference is statistically significant, indicating that it is unlikely to have happened by chance. These results suggest that individuals who use various sun protection strategies, such as keeping in the shade or wearing sunglasses, are more likely to apply sunscreen compared to those who do not use these methods. This highlights the importance of promoting the use of multiple sun protection methods to reduce the risk of skin damage from the sun.

The data shows that there is a significant difference in the use of sunscreen between those who believe that it protects from skin cancer and those who do not. Out of the participants who believe that sunscreen protects from skin cancer, 53% use sunscreen, while 47% do not. On the other hand, out of the participants who do not believe that sunscreen protects from skin cancer, 69% do not use it and 31% use it. The p-value of 0.016 indicates that the difference in the use of sunscreen between the two groups is statistically significant. In conclusion, the belief that sunscreen protects from skin cancer is positively associated with the use of sunscreen.

The results show that there is a substantial distinction in the use of sunscreen based on the belief of who should use it. The majority of participants believe that all individuals should use sunscreen, regardless of their skin color, with 168 (52%) responding in favor of this belief. However, those who believe that only fair skin individuals should use sunscreen made up the largest group of non-users, with 95 (59%) responding in this manner. The p-value of 0.014 suggests that this difference is statistically significant. In conclusion, the results suggest that the belief of who should use sunscreen has an impact on apply of sunscreen among the participants.

Table 4 Analysis of attitude regarding sunscreen use

Variables	n (%)
Season the sunscreen used	
Summer	235 (39.1%)
Winter	57 (9.5%)
Spring	61 (10.1%)
Autumn	22 (3.7%)
All seasons	226 (37.6%)
Apply the sunscreen	
Face only	127 (21.1%)
Face and hands	203 (33.8%)
All over the body	93 (15.5%)
All exposed skin areas	178 (29.6%)
Sunscreen reapplication	
Every 12 hours	183 (30.4%)
Every 8 hours	195 (32.4%)
Every 6 hours	140 (23.3%)
Every 2 hours	83 (13.8%)

n=601

In Table 4 the data shows that the majority of the participants use sunscreen during the summer season, with 235 (39.1%) citing this as the time when they use it most. The second largest group uses sunscreen during all seasons, accounting for 37.6% of the participants. Spring and winter seasons have relatively lower usage, with 61 (10.1%) and 57 (9.5%) participants, respectively, reporting that they use sunscreen during these seasons. The smallest group is those who use sunscreen during the autumn season, with only 22 (3.7%) of the participants reporting this. These results suggest that summer is the season when the majority of the participants prioritize sun protection, but there is still a significant portion of the participants who value sun protection throughout the year.

The data shows that the majority of the participants apply sunscreen to their face and hands, accounting for 33.8% of the participants. The second largest group applies sunscreen to all exposed skin areas, with 178 participants (29.6%) reporting this. A relatively smaller group of 127 participants (21.1%) applies sunscreen only to their face, while 93 participants (15.5%) apply it to all over their body. These results suggest that face and hands are the most commonly exposed and protected areas, while there is still a significant portion of the participants who prioritize sun protection for all exposed skin areas.

The data shows that the majority of the participants reapply sunscreen every 8 hours, accounting for 32.4% of the participants. The second largest group reapplies sunscreen every 12 hours, with 183 participants (30.4%) reporting this. A relatively smaller group of 140 participants (23.3%) reapplies sunscreen every 6 hours, while 83 participants (13.8%) reapply it every 2 hours. These results suggest that there is a general awareness among the participants of the importance of reapplying sunscreen, with a majority reapplying it every 8 hours or more frequently. This indicates a commitment to sun protection, but also highlights a need for education on the optimal frequency of reapplication.

4. DISCUSSION

The importance of assessing of behaviors and modulating them for a person's health is currently a consensus in the scientific community. Numerous researches on the connection between behavior and health and disease have been undertaken (Pais-Ribeiro, 2004). In general, behavior of the human is considered a modifiable determinant of health (Nutbeam, 2000). There is considerable scientific interest in sun protection and risky behaviors, due to the increasing skin cancer prevalence worldwide (Ferreira et al., 2020). One of the most popular sun protection practices is wearing sunscreen. The detrimental effects on the skin from excessive sun exposure have been shown to be cumulative (Godar et al., 2003) and it is estimated that 6 out of 10 skin cancers are associated with excessive sun exposure (Saridi et al., 2005). But disease prevention and health promotion are always subject to healthy practices and routines, such as the provision of competencies for independent decision-making on health needs. Skin cancer ranks ninth among both male and female cancers in Saudi Arabia. Since the number of cases detected in 2010 was approximately 319, accounting for 3.2% of the total cancer incidence in 2010 (Bazarbashi et al., 2017). There is very limited information on Saudi knowledge and behavior regarding sun exposure and protection. In this study, we aimed to assess sunscreen use and knowledge among Saudi university students.

Less than half of the students who took part in the current survey reported using sunscreen, according to the data. This is quite similar to the results of Al-Jasser et al., (2020) who reported that 51 % of students at King Saud bin Abdulaziz University for Health Sciences in Riyadh, Saudi Arabia reported using of sunscreen. However, our results are higher than reported in a previous study conducted among general population in Qassim region which showed that only 8.3% of them reported the applications of sunscreen (Al-Robaee, 2010). Moreover, another cross-sectional study conducted among general population in different regions in Saudi Arabia and showed a prevalence of using sunscreen of 24% (Al-Ghamdi et al., 2016) and another study among Saudi university students showed a prevalence of about 35 % (Bahakim et al., 2016). In our study, the prevalence of using sunscreen is higher than in prior research in the kingdom. Perhaps the younger age and better level of knowledge are to blame for this. On the other hand, this prevalence is lower than reported in some other studies including a study conducted in Brazil reported a prevalence of 63% (Rombaldi et al., 2017) and 69% among students in another study conducted among primary and secondary school children in Switzerland (Ackermann et al., 2016). Moreover, another study among medical students reported a prevalence of using sunscreen of 69.5 % (Memon et al., 2019) and other studies reported a prevalence of 61%

Factors associated with higher prevalence of sunscreen usage including being females, having lighter skin, experience previous sunburns, having multiple methods of sun protection, belief of its effectiveness for protection from skin cancer and belief that all individuals should use sunscreen, regardless of their skin color. This is similar to a previous study which showed that female gender, high economic status, tanning bed use, sunburn history and the usage of additional sun protection strategies are the main factors associated with sunscreen apply (Al-Jasser et al., 2020). Sunscreen was found by different studies to be used more commonly among females and those with higher social class (Al-Robaee, 2010; Bahakim et al., 2016).

The primary reasons for applying sunscreen in this study were protection against sunburn and skin cancer and keeping the skin color bright. This is similar to Al-Robaee, (2010) finding that skin cancer prevention and pigmentation were the most often cited reasons for sunscreen use. Having fairer skin appears to be significant in our community which describes the use of conventional sunscreens for that purpose. In our survey, the most frequent reason for not using sunscreen was inconvenience and lack of effectiveness. Likewise inconvenience and disbelief of the importance of sunscreen were also the leading reasons for sunscreen use in (Al-Robaee, 2010).

Using sunscreen products requires special attention. Even those who engage in sun protection methods fall victim to misconceptions about the proper application of sunscreen products. In our study, the data shows that the majority of the participants reapply sunscreen every 8 hours, accounting for 32.4% of the participants. In another study, the authors showed that about 63% of students did not reapply sunscreen and only 3% admitted to applying it regularly (Almuqati et al., 2018). Other education studies conducted in the USA (Hobbs et al., 2014), Brazil (Urasaki et al., 2016) and Greece (Saridi et al., 2016) also had reported similar results. These results suggest that there is a general awareness among the participants of the importance of reapplying sunscreen, with a majority reapplying it every 8 hours or more frequently. This indicates a commitment to sun protection, but also highlights a need for education on the optimal frequency of reapplication. Most sunscreens were applied towards the hands and face in our study participants. Sunscreen (about 30 mL) is required for effective coverage of the entire body (Mancuso et al., 2017). Around 1-2 tablespoons of sunscreen are considered sufficient to cover the face and neck (Li et al., 2019). Moreover, the data shows that the majority of respondents use sunscreen during the summer, with 235 (39.1%) indicating that they use it the most, but the majority of respondents still value year-round sun protection.

5. CONCLUSION

According to the findings of the current study, the practice of sunscreen among university students is higher than previous studies in Saudi Arabia however; it is still lower than reported in other countries. The study showed that higher prevalence of using sunscreen is among females, those who reported having lighter skin, experience previous sunburns, having multiple methods of sun protection, belief of its effectiveness for protection from skin cancer and belief that all individuals should use sunscreen, regardless of their skin color. The primary reasons for applying sunscreen in this study were protection against sunburn and skin cancer and keeping the skin color bright, however, in our research, the most frequent reason for not applying sunscreen were inconvenience and lack of effectiveness. The results of the current study indicate that there is a need for more education to sun protection and also highlights a need for education on the optimal frequency of reapplication.

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Ethical consideration

Ethical approval from the Institutional review board (IRB) of Almaarefa University College of Medicine (Ethical approval code: IRB09-30122022-119) was met before data collection began and the purpose of the study was clearly explained to the participants. They are assured that data from this study will be used for scientific purposes only, that ethical concerns and legal issues was considered and that participation is completely voluntary. Written & oral informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

Authors' contribution

All authors had substantial contribution to the paper.

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Conflict of interest

The authors declare that there is no conflict of interests.

Data and materials availability

All data sets collected during this study are available upon reasonable request from the corresponding author.

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