Original Article

PUBLIC AWARENESS OF SUN EXPOSURE HARMFUL EFFECTS AND PHOTOPROTECTION PRACTICE

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ABSTRACT

The damaging effects of sun exposure on the skin have been known for a long time. Identifying a lack of understanding, as well as the damaging effects of ultraviolet light, can help move the focus away from irreparable damage and toward prevention. This study aimed to evaluate public awareness and practice regarding ultraviolet radiation's (UVR) harmful effects. An online structured questionnaire was constructed included demographic data, protection practice, and awareness. A total of 708 questionnaires was returned. The Results indicated that areas of lack of awareness are present but in general, it was reasonable, it was evident that the demographic data has it is own impact on the level of awareness. The use of sunscreen was not satisfactory since almost one-third (28.5%) of the sample did not use it. It is Concluded that though the awareness level was acceptable, yet a gap of knowledge regarding lip photoprotection and the risk of cancer. Also, further education and motivation are crucial to encourage photoprotection.

Key words: Awareness, UVR, Photoprotection, Lip cancer, Skin cancer, UVR harmful effects.

Introduction

Ultraviolet radiation (UVR) is a form of electromagnetic nonionizing radiation, which has a wavelength that ranges between 100-400nm. Though there are different sources for UVR, the main source is sun exposure. UVR is subdivided based on the wavelength into UV-A, UV-B, and UV-C. Both UVA and UVB can pass to earth in different ranges [1, 2]. Even though UVR is significantly absorbed by the environment, the cumulative exposure along with other sources may produce harmful effects. A wide range of literature has been published on the health hazards of such radiation. Non-cancerous and cancerous health effects have been reported causing health and economic burden. Adverse effects of UVR on the human eye, skin, and autoimmune diseases have been well documented in the literature [3-10]. UVR is reported to be a main influential factor in cutaneous malignant melanoma, basal cell carcinoma, squamous cell carcinoma, and lip cancer [3, 4]. Location determines the risk of UVR injury, for example, the eyes, facial skin, and lips are at high risk of UVR injury. The risk of face and lips cancers was connected to outdoor time, occupation, and lifetime solar exposure [11, 12]. The solar exposure varies depending on solar zenith angle and season (Backes) [11]. The nose and forehead receive the highest radiation followed by the oral region [11, 13]. Thus, protection against UV exposure such as hats, protective clothes, lipstick with sunscreen, and sunscreen is recommended [11-14].

Lack or gap of knowledge among the public can increase the risk and decrease protection practice compliance. Proper information dissemination can not only enlighten the community but also guide them to correct UV protection. It also assists in maintaining the society members' wellbeing consequently, a significant role in life quality and economics. Studying the awareness of the community about UVR is crucial for health education. This study aimed to assess the knowledge about UVR and the effect of demographic data and photoprotection practice on awareness.

Materials and Methods

This study was conducted on adult participants. All participants in this investigation were volunteers and agreed to complete the questionnaires and consent. Each patient will answer the questionnaire independently.

All subjects will complete a two-part survey. The first part included demographical, level of education and occupation, and sun protection practice. The second part contained a questionnaire to measure participants' awareness and knowledge about UVR using three Likert scales as follows: agree, I do not agree and I do not know.

Statistical analysis

The data was collected, coded, and entered. All statistical analyses were performed using SPSS (IBM SPSS Statistics for Windows, Version 22.0. Armonk, NY: IBM Corp). The internal consistency was measured using Cronbach's alpha. Descriptive statistics were performed: frequency distribution tables, one-way ANOVA, and P-values. A P-value of equal to or less than 0.05 was considered statistically significant

Results and Discussion

A total of 708 participants completed questionnaires were received. Most of the respondents were female (70.9%). **Figure 1** presents the participants' sociodemographic data and sample characteristics. Almost half of the respondents (48.5) had sunburn ranging from mostly to rarely participants. Yet, 44.2% never use sunscreen, 54.8 never used lip balm with SPF and 78.7% never reapply lip balm with SPF **(Figure 2)**.

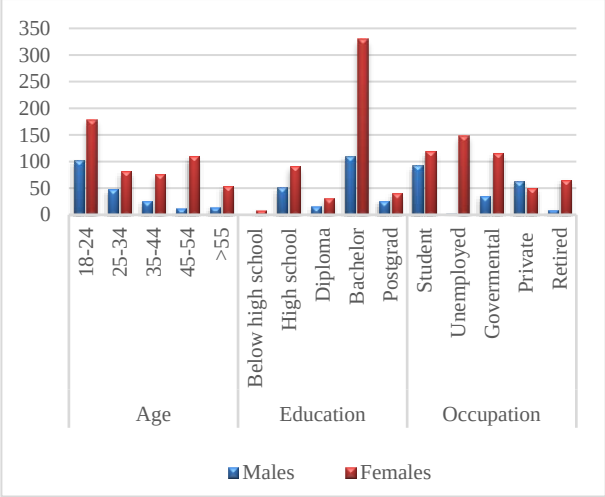

Figure 1. Participants' sociodemographic data and sample characteristics.

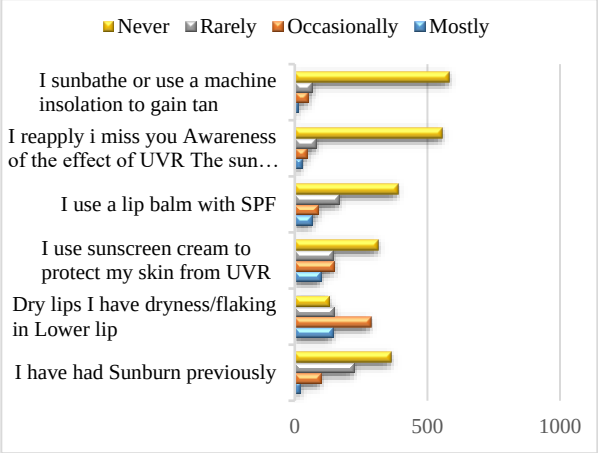

Figure 2. Sample compliance with UVR protection and previous exposure to UVR side effects.

The majority of respondents are aware of UVR, although just 61.9 percent of those polled were aware that it changes by geography and 55.8% by season. Most of the respondents are aware of UVR, though 61.9% of those polled were aware that it changes by geography and 55.8% by season. Almost two-thirds (67.4%) of the sample believed that covering the body can reduce skin cancer risk and 67.4% and that UVR can cause skin cancer. Four hundred eighty (67.8%) acknowledged that excessive sun exposure can cause skin wrinkles and 75% agreed that it causes skin pigmentation. More than half of the respondents (61.4) thought that avoiding afternoon sun exposure can reduce UVR risk and 80.8% that the highest UVR intensity is noon. On the other hand, only 30.9% and 35.3 % considered that excessive exposure to sun and alcohol drinking increases lip cancer risk respectively. While more than half of the sample (60.1%) stated that smoking increases lip cancer risk. When considering sunscreen cancer risk reduction 47% agreed that it reduces it for the lip and 68.2% for the skin. Most of the participants thought that UVR is very harmful (44.2%) or has some bad effects (40%).

Of sample 202 (28.5%) never used sun protection. Twenty-two percent (156) of them believed it is not needed, 6.6% (47) identified the cost as the main cause and 11% (78) stated that there is no time. The majority 42.7% (302) stated that they forget it and 17.7% (125) are using other measures. As regards to causes of using sunscreen 18.4% (130) specified that they are using it to prevent sunburn, 28.1% (199) used it as a moisturizer, 7.6% (54) to slow down skin aging, and only 8.3% (59) to prevent cancer. While 64 (9%) individuals used it because they heard it is good.

The mean awareness was 1.7269, SD= .47891.There was a significant difference in awareness between males (M = 1.9442, SD = .50174) and females (M = 1.6378, SD = .01962); t(df) = 8.076, p = 0.000. A one-way ANOVA revealed that there was a statistically significant between groups difference in education, occupation, and education at p >.05. ANOVA analysis of the impact of being affected with UVR side effects (lip peeling and dryness and sunburns) was significant at p >. 05. Adhesion to sun protection wearing significantly affected the awareness **(Table 1)**.

Table 1. Influence of compliance with sun protection guidelines on awareness of UVR side effects

Variable	Sum of square	Df	Mean square	F	Sig.
Application of sunscreen					
Covering the body by pants long, sleeved shirts long hats, umbrella...etc) when exposed to the sun, reduces skin cancer risk	15.660	3	5.220	7.667	.000
	479.334	704	.681		
	494.994	707			
Excessive exposure to sunlight may lead to wrinkles (premature	36.240	3	12.080	17.584	.000

aging) over time it	483.640	704	.687		
	519.880	707			
Excessive exposure to sunlight may lead to skin cancer over time	17.077	3	5.692	7.485	.000
	535.392	704	.761		
	552.469	707			
Excessive exposure to sunlight may lead to skin pigmentation over time	31.805	3	10.602	17.721	.000
	421.156	704	.598		
	452.960	707			
Excessive exposure to sunlight increases the possibility of lip cancer	17.810	3	5.937	7.414	.000
	563.693	704	.801		
	581.503	707			
Avoiding exposure to the afternoon sun in summer reduces the possibility of skin or lips damage/cancer.	13.509	3	4.503	5.678	.001
	558.350	704	.793		
	571.859	707			
Lip balm with SPF is designed to reduce the incidence of damage or lip cancer	29.981	3	9.994	11.448	.000
	614.573	704	.873		
	644.554	707			
The use of skin sunscreen helps to reduce skin injury or cancer.	32.987	3	10.996	15.705	.000
	492.893	704	.700		
	525.880	707			
Application of lip balm with SPF					
Ultraviolet intensity varies with different seasons the year	10.476	3	3.492	3.822	.010
	643.189	704	.914		
	653.665	707			
Ultraviolet intensity changes with change of geographic location	18.888	3	6.296	7.212	.000
	614.585	704	.873		
	633.473	707			
Covering the body with pants long, sleeved shirts long hats, umbrella...etc), reduces skin cancer risk	11.988	3	3.996	5.824	.001
	483.006	704	.686		
	494.994	707			
Excessive exposure to sunlight may lead to wrinkles (premature aging) over time it	12.092	3	4.031	5.588	.001
	507.788	704	.721		
	519.880	707			
Excessive exposure to sunlight may lead to skin cancer over time	18.000	3	6.000	7.903	.000
	534.469	704	.759		
	552.469	707			
Excessive exposure to sunlight may lead to skin pigmentation over time	14.679	3	4.893	7.860	.000
	438.281	704	.623		
	452.960	707			
Avoiding exposure to the afternoon sun in summer reduces the possibility of skin or lips damage/cancer.	10.644	3	3.548	4.451	.004
	561.215	704	.797		
	571.859	707			
Lip balm with SPF is designed to reduce the incidence of damage or lip cancer	15.036	3	5.012	5.605	.001
	629.518	704	.894		
	644.554	707			
The use of skin sunscreen helps to reduce skin injury or cancer.	10.441	3	3.480	4.754	.003
	515.439	704	.732		
	525.880	707			
Re-apply lip balm with SPF					
Covering the body with pants long, sleeved shirts long hats, umbrella...etc), reduces skin cancer risk	8.959	3	2.986	4.325	.005
	486.035	704	.690		
	494.994	707			
Excessive exposure to sunlight may lead to skin cancer over time	6.299	3	2.100	2.706	.044

	546.170	704	.776		
	552.469	707			
Excessive exposure to sunlight may lead to skin pigmentation over time	8.530	3	2.843	4.504	.004
	444.431	704	.631		
	452.960	707			
The use of skin sunscreen helps to reduce skin injury or cancer.	6.110	3	2.037	2.759	.041
	519.770	704	.738		
	525.880	707			

Scheffe post hoc showed that young participants age group 18-24 and 25-34 demonstrated a significantly higher awareness level of UVR harmful effect than other age groups particularly those above 45 years. Those with an educational level higher than high school were more aware of UVR especially bachelor and postgraduate degrees. A significantly higher level of awareness among students than unemployed individuals. As regard sun protection behavior, those who had poor compliance with sun protection guidelines and those who never or rarely got side effects such as sunburns showed significantly less levels of awareness of UVR hazards. In addition, significantly higher levels of awareness corresponded with participants that did not suntan **(Table 2)**.

Table 2. The impact of tanning on awareness of UVR hazards

Variable	Sum of square	Df	Mean square	F	Sig.
Excessive exposure to sunlight may lead to skin pigmentation over time	11.559	3	3.853	5.336	.001
	508.321	704	.722		
	519.880	707			
Excessive exposure to sunlight may lead to skin cancer over time	10.108	3	3.369	4.373	.005
	542.361	704	.770		
	552.469	707			
The use of skin sunscreen helps to reduce skin injury or cancer.	8.217	3	2.739	3.725	.011
	517.663	704	.735		
	525.880	707			
How often do you sunbathe to get a tan?	137.739	3	45.913	93.610	.000
	345.293	704	.490		
	483.032	707			
How long do you sunbathe	179.377	3	59.792	37.522	.000
	1121.843	704	1.594		
	1301.220	707			

The UVR health hazards have been well documented in the literature presenting a substantial source of morbidity, mortality, and economic impact. Thus, the importance of community awareness about UVR cannot be overlooked. This research was designed to study the level of awareness, gaps of knowledge, and factor affecting it. WHO has launched the INTERSUN program for this purpose and released several publications to raise awareness [15].

Our results indicated that there is still some lack of compliance concerning sun protection. UVR risks are well documented, and the use of sunscreen has been advocated as a cost-effective prevention strategy. Similar results have been reported among female university students, the population in Qassim, Saudis, and even South African adolescences and children [16-21]. Lack of awareness is reported to be connected to hazards knowledge and amount of sun exposure [22]. However, in some reports risk awareness was not a factor for compliance [17, 21, 23]. Compliance was also reported to increase in the school environment and decrease during summer and stormy weather [19, 20]. Sunscreens use, on the other hand, may cause over-exposure to sunlight. Thus, more emphasis on guidelines and risks should be disseminated among communities particularly those who are at risk such as outdoor workers, areas with high UVR scores, and those with knowledge gaps.

Similar to others, our investigation demonstrated that demographic data age, gender, education, and occupation may play a significant role in knowledge and awareness [21, 22, 24]. In contrast to others, the younger age group in our investigations had better knowledge and awareness [21, 22]. The results also indicated that older age and unemployed were less to follow sun protection guidelines and to know about hazards. Moreover, educational level was positively associated with knowledge and awareness. Seriocomic status is known to affect and predict health status among the

population [25, 26].

The present study found that about 2.8 % of the participants had a previous sunburn. A low percentage when compared to other reports of Brazil, Danish, and the united states [23, 27, 28]. Similar to the US population sunburn was more common among young age but the difference was not statistically significant (Dawn). Sunburns are reported to affect all skin types and races including those with low cancer risk (Dawn). The low percentage could be explained by the hot climates and the long summer that favors after sunset time or indoor activities.

More than one-fourth of the participants don't use sun protection. For those who do use sun protection the main reason for use was found to keep the skin healthy and hydrated followed by prevention of sunburn. On the contrary to Al Robeea were the reason for using sunlight protection was to avoid skin discoloration. The most common cause for not using sunscreen, according to this study, is forgetting. Other cited reasons include a lack of it, the cost of sunscreen, and discomfort when it is applied to the skin [17, 21].

Conclusion

The purpose of this study was to determine UVR awareness among the public, as well as the impact of demographic data and photoprotection practices on their awareness. The findings indicated a reasonable awareness but poor use of sunscreen protection. The gap of knowledge was mostly related to UVR intensity and variations. There was also a deficient of information regarding lip cancer and protection. Reinforcement of knowledge and awareness should be implanted particularly among those above 45 years and high school education or below.

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Conflict of interest: None

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Ethics statement: The College of Dentistry Research Center, King Saud University, Riyadh, Saudi (IRB Approval of Research Project No. E-21-5788) approved the study proposal.

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