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Awareness and Practices Towards Sun Exposure and Use of Sun Protection Among the General Population in Ajman, UAE: A Cross-Sectional Study

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ABSTRACT

Objectives: The awareness and practices towards sun exposure and the use of sunscreen on skin health are overlooked. We assessed their association with skin health, with the attitude towards sun exposure and the use of sunscreen on skin health. Likewise, we determined the association between awareness and practices and between awareness and attitude toward sun exposure. ***Methods:*** A cross-sectional study, of 384 eligible adults, was conducted in Thumbay Medicity, Ajman, UAE. Interviewers administered questionnaires to willing participants during the months of January 2022 to December 2022. Results were calculated using the chi-square method to establish associations between variables. P values less than or equal to 0.05 were considered statistically significant. ***Results:*** Gender, nationality, marital status, and employment were found to be significant in relation to the level of knowledge. An association between practices and knowledge revealed participants who always use sunscreen (72.9%) had the most adequate knowledge. Moreover, participants who reapplied sunscreen had more adequate knowledge (75.4%) compared to participants who did not reapply sunscreen (53.4%). Association between practices and attitude revealed that participants who often use sunscreen had the most positive attitude (63.5%) as well as participants who never used sunscreen had the most negative attitude (78.9%). Concerning attitude and sociodemographics, gender, nationality, and knowledge were found significant in regards to positive attitudes towards sun protection. ***Conclusions:*** Despite having a fair amount of awareness about sun protection and the harmful effects of the sun on the skin, our study revealed that the community of Ajman, UAE had a predominantly negative attitude and used sun protection at a low rate. This makes a health public awareness campaign crucial.

Keywords: sun protection; sun exposure; sun protection factor (SPF); sunscreen; attitude; knowledge; practices.

INTRODUCTION

Skin is the body's largest organ that covers the external surface of the body. Its functions include: protection, sensation, excretion, thermoregulation, and metabolism, which play a part in the health of the skin [1]. Ultraviolet radiation from sun exposure is the arch nemesis of skin health. Being the main determinant of skin cancer, perhaps the most plausible, UV radiation catalyzes many skin cancer developments; basal cell carcinoma being the most common, but also includes squamous cell carcinomas and certain melanomas [1]. Without respect to cancers, there are various other detrimental effects of UV radiation, such as photoaging and sunburn [1].

It has been noted that the rate of sunscreen use by the general public is low despite reasonably adequate knowledge of the hazards associated with sun exposure [2]. In addition, compared to women within the general public, the rate of men with adequate sunscreen usage is substantially lower, likely due to societal standards [3]. Men experience a higher level of social pressure to conform to certain ideals such as appearing more independent, brave, self-confident, etc., which subsequently leads to the adoption of risk behaviors [3].

Sunlight exposure is an important aspect on a daily basis, especially in the UAE's hot climate [2]. It was found that around 70% of the UAE population uses the recommended amount of SPF [2]. There is a general lack of awareness among society which is likely due to the lack of articles published in the UAE involving this topic, and a small handful within neighboring regions [1, 2, 3]. Needless to say, it is with sincere regards that hopefully this publication will spread awareness of the dangers of sun exposure, alleviate the gaps of knowledge & rectify misconceptions and colloquial myths, substantiate protection habits to preserve skin health, and reduce the prevalence of sun exposure-related skin disorders. Futuristically, this research aims to bridge the gap in terms of interventions and preventative measures.

Our primary objective is to assess the awareness and practices towards sun exposure and the use of sunscreen on skin health. Our secondary objectives were to assess the attitude toward sun exposure

and the use of sunscreen on skin health and to determine the association between awareness and practices as well as between awareness and attitude towards sun exposure.

MATERIALS AND METHODS

Study Design and Setting

A cross-sectional study was conducted among the general population of Ajman, UAE, specifically those attending Gulf Medical University and Thumbay University Hospital Ajman (including staff and students), over the course of 8 months.

Participants

Men and women, of any nationality, between the ages of 18 and 50 were included. Children, the elderly, and those who do not give informed consent were excluded. Convenience sampling was used during data collection.

Study size

We used the following equation to calculate the sample size, with p = 0.5, q = 0.5, Z = 1.96 and L = 0.05. We expected 50% awareness which gave us a total of 384 participants. When the 10% expected non-response rate is included, it adds up to a total sample size of 422 participants.

Bias

The study was conducted using a self-administered questionnaire. A pilot study was conducted among 5 participants before the research. Interviewers administered questionnaires to willing participants during the months of January 2022 to December 2022. The questionnaire included questions to assess the knowledge, attitude, and practices of the participants regarding sun exposure and sun protection. A scoring system was used to evaluate the knowledge and attitude of the participants.

Variables

The variables included were the participants' demographic data such as age, gender, nationality, marital status, and occupation, as well as the participants' skin type and history of skin conditions.

Data sources/measurement

To assess the knowledge of the participants, the following variables were used: the definition of SPF, the optimal SPF to use, the body parts to protect from the sun, the benefits of sunscreen, the harmful effects of the sun (using a true or false format), the duration of sun exposure, and the most detrimental time of exposure. Similarly, to assess the attitude of the participants, statements related to the participants' beliefs regarding sun exposure were given such as only needing sunscreen when exposed to direct sunlight, changes in sun protection habits, sunlight, and its effect on health. Statements related to the participants' habits when it comes to sun protection were also given, for example, wearing hats outside, using maximum protection sunscreen, staying in the shade, covering up with clothes, keeping out the sun between 11 am and 3 pm, staying inside and wearing sunglasses. Finally, the participants' practices were assessed using the following variables: frequency of use of sun protection, methods of sun protection used, choice of sun protection method, SPF used, and frequency of reapplication.

Quantitative variables

After receiving approval from the Institutional Review Board (IRB) (Ref. no. IRB/COM/STD/49/SEPT-2022) of Gulf Medical University (GMU), we validated the questionnaire by experts then we received permission from the medical director of Thumbay Hospital. Afterward, we conducted the pilot study and then the study itself. Ethical approval was obtained from the IRB of GMU. Informed consent was obtained from all participants prior to the study. Confidentiality, privacy, and anonymity of the data have been maintained. No drugs or placebo were used in the research. The collected data will be stored in the Department of Community Medicine for 3 years following the study. Only the IRB members, research investigators, supervisors, and statisticians will have access to the data.

Statistical methods

The data was entered into Microsoft Excel and then transported to SPSS version 28 for further analysis. The results will be displayed as tables and graphs. Descriptive and inferential statistics were used to analyze the data. The chi-square test was also used to find the association between the different variables, with $p < 0.05$ considered statistically significant.

RESULTS

We collected data from a total of 315 participants out of the estimated 422. Reasons for non-participation include: lack of awareness, time constraints, complexity of the study, lack of personal relevance, inconvenient location or timing, privacy concerns, cultural or religious beliefs, and previous negative experiences.

Most of our participants were 18-20 years old, female, from the Eastern Mediterranean region, single, and unemployed. Most of the participants had the skin type "sometimes burns, often tans" and did not have any skin diseases.

TABLE 1: Sociodemographic.

Variable	Frequency	%	Total
Age			
≤ 20	160	51.1	313
> 20	153	48.9	
Gender			
Male	102	32.5	314
Female	212	67.3	
Nationality			
African Region	13	4.2	311
Region of the Americas	12	3.9	
Southeast Asian Region	80	25.7	

Variable	Frequency	%	Total
European Region	9	2.9	
Eastern Mediterranean Region	168	54.0	
Western Pacific Region	29	9.3	
Marital Status			
Single	234	75.5	310
Married	76	24.5	
Occupational Status			
Employed	94	31.6	297
Unemployed	203	68.4	

TABLE 2: Frequencies of Skin Description.

Variable	Frequency	%	Total
Skin Type			
Always burns, never tans	14	4.6	306
Usually burns, tans with difficulty	28	9.2	
Sometimes burns, often tans	86	28.1	
Rarely burns, tans very easily	65	21.2	
Very rarely burns, tans very easily	74	24.2	
Never burns, deeply pigmented	39	12.7	
Skin Disease			
No	274	89.8	305
Yes	31	10.2	

The majority of the participants had a correct knowledge of the definition of SPF (67.9%) and agreed that 30-50 is the optimal SPF to use (53.5%). Most participants agreed that the face was the most important body part to protect from the sun and agreed that the benefit of sunscreen is to "protect from harmful UV rays". Most participants spent a maximum of 1-3 hours per day in the sun.

According to most of the participants (80.4%), 10:00 AM to 2:00 PM is the most detrimental time of exposure. Overall, most participants had adequate knowledge regarding sunscreen products and the harmful effects of the sun on the skin (56.7%) which was determined by a knowledge score of 9 and above. There were 126 participants with inadequate knowledge scoring 8 and below (43.3%).

Age group and skin type were insignificant, while gender, nationality, marital status, and employment were significant. Females (65.6%) exhibited a higher level of knowledge than males (37.9%). Participants from the South Asian region had the highest level of knowledge with 66.2% having adequate knowledge while those from the Eastern Mediterranean region had the lowest level of knowledge with 52.5% having inadequate knowledge. Single participants showed a more adequate knowledge (61.9%). Moreover, married participants showed a more inadequate knowledge (60.9%).

It was determined that most of the participants (154) had a negative attitude with a score of 49 and below (51.9%) while 48.1% (143) of participants had a positive attitude with a score of 50 and above. The highest possible value a participant could score in attitude was 70 and the lowest was 14. Statistically, the median attitude score was 49 out of 70 and the interquartile range was 53-45.5.

Age, marital status, and skin type were found to be insignificant in association with attitude, while gender, nationality, and employment were significant. Females were found to have a more positive attitude (57.6%) compared to males. Participants from the South East Asian region had the highest positive attitude (60.3%) compared to the Eastern Mediterranean region which had the highest negative attitude (57.2%). There was also almost no difference between the attitudes of employed and unemployed participants.

Table 3 shows the association between attitude and knowledge which was found to be significant (<0.001). Participants with adequate knowledge exhibited a more positive attitude (58.8%) compared to participants with inadequate knowledge.

TABLE 3: Association Between Attitude and Knowledge.

	Attitude		P value
	Negative (49 and below) Frequency (%)	**Positive (50 and above)** Frequency (%)	
Knowledge			
Inadequate	78 (65)	42 (35)	
Adequate	66 (41.3)	94 (58.8)	<0.001
Total	144 (51.4)	136 (48.6)	

Most of the participants always use sun protection (24.4%), followed by occasionally (22.4%), often (21.2%), sometimes (19.6%), and never (12.5%) being the least frequently observed (Table 4). Sunscreen was the most used out of all the different sun protection methods (77.1%). The choice of sun protection method was mostly based on the SPF value (52.9%) and least commonly based on the recommendation of a friend (16.9%). Most participants using sunscreen, use an SPF between 30-50 (45.4%). 77% of the participants who use sunscreen, do not reapply it during the day.

TABLE 4: Practices of Sun Protection.

Variable	Frequency	Percentage	Total
How often do you use sun protection?			
Never	39	12.5	
Occasionally	70	22.4	
Sometimes	61	19.6	312
Often	66	21.2	
Always	76	24.4	

The association between practices and knowledge was found to be significant in terms of frequency of use of sun protection and reapplication rates, but insignificant in terms of SPF value (Table 5). Participants who always use sunscreen had the most adequate knowledge (72.9%) compared to participants who occasionally use sunscreen. Participants who reapplied sunscreen had a higher adequate knowledge (75.4%) compared to participants who did not reapply sunscreen.

TABLE 5: Association Between Practices and Knowledge.

	Knowledge level		P value
	Inadequate (8 and below) *Frequency (%)*	**Adequate (9 and above)** *Frequency (%)*	
How often do you use sun protection?			
Never	19 (57.6)	14 (42.4)	< 0.001
Occasionally	41 (61.2)	26 (38.8)	
Sometimes	29 (51.8)	27 (48.2)	
Often	18 (28.1)	46 (71.9)	
What SPF do you use?			
< 30	19 (54.3)	16 (45.7)	0.382
30 - 50	45 (38.8)	71 (61.2)	
50 - 70	27 (37.4)	45 (62.5)	
> 70	2 (25)	6 (75)	
I don't know	10 (45.5)	12 (54.5)	
Do you reapply sunscreen during the day?			
No	90 (46.6)	103 (53.4)	0.003
Yes	14 (24.6)	43 (75.4)	

The association between practices and attitude was found to be significant in terms of frequency of sun protection use, but insignificant in terms of SPF value and reapplication rates (Table 6). Participants who often use sun protection had the most positive attitude (63.5%) compared to participants who never use sun protection.

TABLE 6: Association Between Practices and Attitude.

	Attitude		P value
	Negative (49 and below) *Frequency (%)*	**Positive (50 and above)** *Frequency (%)*	
How often do you use sun protection?			
Never	30 (78.9)	8 (21.1)	< 0.001
Occasionally	35 (55.6)	28 (44.4)	
Sometimes	35 (59.3)	24 (40.7)	
Often	23 (36.5)	40 (63.5)	

	Attitude		P value
	Negative (49 and below) *Frequency (%)*	Positive (50 and above) *Frequency (%)*	
What SPF do you use?			
< 30	18 (48.6)	19 (51.4)	0.683
30 - 50	53 (44.5)	66 (55.5)	
50 - 70	34 (50)	34 (50)	
> 70	3 (42.9)	4 (57.1)	
I don't know	14 (60.9)	9 (39.1)	
Do you reapply sunscreen during the day?			
No	93 (48.4)	99 (51.6)	0.503
Yes	27 (43.5)	35 (56.5)	

DISCUSSION

The UAE sees moderate to high UV indexes for most days of the year. Therefore, the population needs to be aware of the importance of sun protection and the effects of sun exposure.

Our assessment of the participant's knowledge levels revealed that females had a higher level of knowledge than males. This finding is consistent with other similar studies [2, 16, 30], and it can be expected because women tend to seek out information regarding the health of their skin. Interestingly, an association between knowledge level and nationality was noted, with Southeast Asians having the highest level of adequate knowledge, and participants from the Eastern Mediterranean region having the highest level of inadequate knowledge.

Participants with inadequate knowledge had more of a negative attitude, meanwhile, participants with adequate knowledge were found to have more of a positive attitude. This is likely because those who have inadequate knowledge are less likely to branch out and gain insight regarding the unknown versus those who are knowledgeable. Results showed an association between gender and attitude, with more of a negative attitude in men compared to women. These findings line up with existing data, stating that women are more likely to use sunscreen [2, 16, 30]. In terms of societal standards, women tend to be more mindful of the factors that contribute towards aging which is likely why they possess higher levels of positive attitudes regarding sun protection.

Once again, there was an association between nationality and attitude, with the highest negative attitude being in participants from the Eastern Mediterranean region, while Southeast Asian participants had the most positive attitude. One may think that countries that are exposed to the sun in large amounts would be more knowledgeable in regards to the respective side effects, but this has proven to be untrue because when there exists high exposure, it is accompanied by high levels of avoidance.

Regarding the use of sun protection, the vast majority of participants used sunscreen to some extent, with 24.4% always using it and 63.2% having variable use. Only 12.5% of participants never used sunscreen. Variability in sunscreen use may be due to the high cost of sunscreen, neglecting skin health, or simply, forgetfulness. In comparison to other studies, a Saudi Arabian study of 1,376 participants found that 57.3% use sun protection [1]. Another Saudi Arabian study of 1,011 students reported that 51% use sunscreen [10]. Studies from abroad reported generally similar frequencies of sunscreen use, with the exception of a couple of outliers: South Brazil with 63.3% use [16], Swiss with 69% use [17], a study from the USA with 30% use [22], and a second study from the USA with 34.4% use [30].

Our study participants reported their preferences from a list of multiple types of sun protective measures: sunscreen, sunglasses, avoidance of direct sun exposure, seeking shade, and clothing (in descending order). Usually, many different forms of sun protection are used in conjunction with sunscreen. It was likely that sunscreen was preferred due to the direct impact it has on sun protective measures. Additionally, the consensus among various studies from different countries is that sunscreen is the most commonly used type of sun protection [10, 17, 22, 37].

Our study found that the choice of sunscreen was mainly influenced by SPF value, followed by the recommendation of a dermatologist, the recommendation of a pharmacist, the media, and the recommendation of a friend. The SPF value as a choice can reflect the individual's own judgment on the beneficence of a certain product. Recommendations from trusted sources (healthcare professionals) are generally good practice for making such decisions. A Saudi Arabian study also found that SPF value played a role in the choice of sunscreen, with participants preferring an SPF >30 [1]. However, an Australian study of 78,032 students found that the use of maximum protection sunscreen had decreased from 1993 to 1999 [4].

In fact, 45.4% of our respondents preferred SPF values of 30-50 and 26.9% preferred SPF values of 50-70, while 14.8% preferred SPF <30 and only 3% preferred SPF >70. The remaining 10% did not have a preference.

Two separate Saudi Arabian studies both concluded that participants preferred sunscreen with SPF >30 [1, 10]. The decision to opt for sunscreens with lower SPF values may be due to the cost of sunscreens with maximum SPF. It is recommended that sunscreen be reapplied throughout the day. Only 23% of our respondents follow this recommendation, with variable reports on the number of times they reapply their sunscreen.

As expected, our study found an association between the frequency of sun protection use and participant's knowledge level. 57.6% of participants who never used sunscreen and 61.2% of participants who occasionally used sunscreen had inadequate knowledge. Meanwhile, 71.9% of participants who often used sunscreen and 72.9% of participants who always used sunscreen had adequate knowledge.

Additionally, participants' attitudes seemed to influence the frequency of sun protection use. Of participants who never used sunscreen, 78.9% had a negative attitude. In the group that occasionally used sunscreen, it was 55.6%, and in the group that sometimes used sunscreen, it was 59.3%. On the other hand, in the group that often used sunscreen, 63.5% had a positive attitude, and in the group that always used sunscreen, 58.1% had a positive attitude. Participant attitude was not found to have any significance on the choice of SPF value and the frequency of reapplication.

While this study provides valuable insight into the knowledge, practices, and attitudes toward sun exposure and sun protection among the general population of Ajman, UAE, several limitations must be taken into account when interpreting the findings. Firstly, the study setting was limited to a Medicity in Ajman, UAE and therefore it is not representative of the whole population and cannot be generalized. Additionally, the study was conducted using a self-reported questionnaire filled out by the participants, so the information given may not be an objectively accurate evaluation of the knowledge and attitude of the individual. The convenience sampling method was used during data collection, which may be a source of bias. During data collection, a language barrier was faced, which made it difficult to get many responses, and may have biased the participants' answers. Finally, the sample size was not achieved unfortunately: a total of 315 responses out of the 422 calculated was collected.

CONCLUSION

The study found that although more than half of the participants had adequate knowledge and used sunscreen to some extent, more than half the participants had a negative attitude toward sun protection. Participants with inadequate knowledge were less likely to use sunscreen, and vice versa for those with adequate knowledge. Furthermore, those with adequate knowledge tended to have a positive attitude, and vice versa for those with inadequate knowledge.

Additionally, significantly higher knowledge levels were found in women, along with Southeast Asians, single and unemployed individuals. Regarding sun protection practices, only an eighth of the participants never used sun protection, while almost a quarter always used it and the vast majority had variable use of sunscreen.

Despite having a fair amount of awareness about sun protection and the harmful effects of the sun on the skin, our study revealed that the community of Ajman, UAE had a predominantly negative attitude and used sun protection at a low rate. This makes a health public awareness campaign crucial.

RECOMMENDATIONS

Based on the results, recommendations are as follows:

- There should be more health orientation and educational campaigns to increase awareness of sun exposure and protection, which would provide adequate knowledge regarding skin care, the effects of sun exposure, and the effectiveness of sunscreen.
- Implementing sun protection courses in schools can help build up the habit of sun protection use from a young age. This will encourage the youth alongside their families to maintain sufficient sun protection habits.
- Setting sun exposure-related policies by the UAE can help prevent risks of sun exposure and raise awareness.
- Our findings can help dermatologists identify groups that would potentially benefit from counseling and advice about the risks of sun exposure and the advantages of sun protection.

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