

Awareness about Sun Protection among Medical Students

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Abstract:

Background:Sun protection is one of the most important steps of skin care as it is necessary to protect the skin from ultraviolet rays that is known to cause number of harmful effects on the skin in long and frequent exposure.

Objective:To assess the awareness of the medical students regarding sun exposure and its harm,study their sun protection attitudes,practices, their use of sunscreens, and to know if they can share information to other people to encourage such important protective methods and behaviours which are not well established in our community.**Patients and method:**This cross-sectional descriptive study included 300 students both females and males of fourth and fifth grade of College of Medicine in university of Baghdad.**Results:**Most students are aware about the risks of harmful unprotected sun exposure, however not all of them follow the sun protection methods. About one third of the sample use sunscreen regularly. Thereare93% of females use sunscreen while only 25% of males do. Most of the sample who apply sunscreen do not care about reapplying it.The knowledgeabout types, active ingredients, proper use of sunscreen should be improved because most of users do not have enough information.Most of students in our sample areready to give advice to people to use methods of photoprotection including sunscreen to encourage them to protect their skin. **Conclusion:** Most of students know that sun exposure is harmful, and they are aware of its risks. They know that sun protection including the use of sunscreen is necessary especially in our sunny country. Medical students need to be more aware about other methods of sun protection that may be more important than sunscreen.

Key words: Sun protection, sunscreen, ultraviolet radiation, skin cancer prevention, photoprotection.

Introduction:

Sun light is the most common form of ultraviolet radiation(UVR). UVR has three main typesUVC (220–290nm), UVB (290–320nm), and UVA (320–400nm),Some rays are absorbed by earth ozone layer.UVA rays have longest wavelength that can penetrate to the middle layer of skin (dermis). UVB rayshave short wavelength that reach outer layer of skin (epidermis). UVC rays have shortest wavelength. UVC radiation from the sun does not reach the earthbecause it is blocked by the ozone layer in the atmosphere.The amount of exposure to UVA usually remains constant, whereas UVB exposure occurs more in the summer.^[1]

Both UVA and UVB rays can cause skin damage. Simple tanning and sunburn are signs of short-term overexposure, while premature aging and skin cancer are side effects of prolonged UV exposure. ^[2]Regulated sun exposure is beneficial because it helps to produce Vitamin D3, decrease autoimmune diseases, it is beneficial in many skin diseases like psoriasis, vitiligo and increases the serum levels of endorphins. However, excessive sun exposure is related to development of photo ageing, DNA mutations, premalignant skin lesions,immune system

suppression and it is linked to the development of most skin cancers, especially basal cell carcinomas, squamous cell carcinomas, and melanoma.^[2,3,4]

Not all people are affected by UVR in same extent. The risk of skin cancer is strongly related to skin types, being higher in white people who burn easily and tan poorly Fitzpatrick type I & II.^[5]

WHO recommendations place emphasis on ultraviolet index (UVI) to be the guide for knowing the most harmful times of exposure. UVI is a measure of the level of UV radiation it is a scale ranging from zero to eleven, the higher the UVI the greater the potential for damage to the skin and eye. WHO recommend to adopt sun-protective practices during the hours of the day when the UVI is above a given threshold value which is equal to 3, and this duration differs from one area to another? While on one area the UVI may reach a value of above 3 for one hour or so, on another area it may remain above 3 for several hours. The first figure below shows the levels of UVI and safety of exposure and the second one demonstrates UVI values and approximately the hours that may have the highest levels of UVI.^[6]

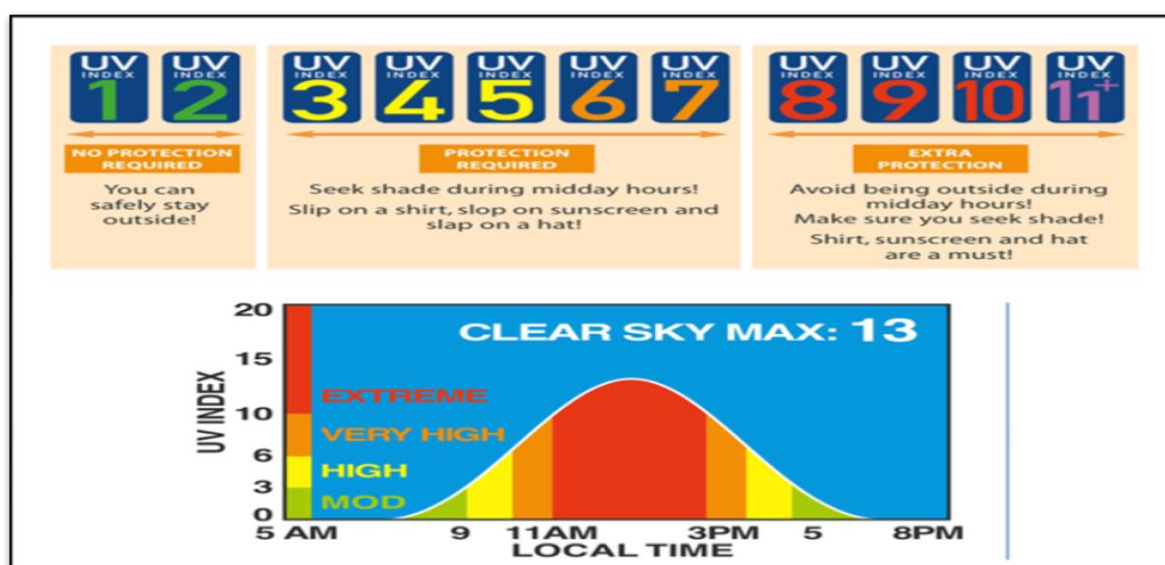


Figure 1: The levels of UVI and safety of exposure and demonstrates UVI values and approximately the hours that may have the highest levels of UVI.

Sun protection strategies include behaviours such as avoiding exposure to sun during peak hours of radiation, seeking shade, protective clothing (tightly woven clothes with long sleeves, wide brim hats, sunprotective glasses) and lastly application of sunscreen. Combination of these measures may provide protection. Sunscreen alone is difficult to be regarded as a satisfactory protection against UVR.^[7] Sunscreens inhibit the effect of UVR on the skin by reflecting, scattering or absorbing such radiation.^[8] Awareness about ultraviolet radiation effect on increasing incidence of skin cancers and its photo damaging caused increase in the use of sun protection strategies including the use of screening agents.^[9]

The SPF (sun protection factor) is a number means how long the sun's UVR would take to redden the skin when using the sunscreen exactly as recommended versus the time needed for that without applying any sunscreen. So, SPF 30 means it would require 30 times longer to redden the skin than if were not applying sunscreen.^[10] An SPF 30 sunscreen allows about 3 % of UVB rays

to reach the skin. An SPF 50 sunscreen allows about 2 % of UVB rays to hit the skin. Under ideal conditions a sunscreen with higher SPF and broad-spectrum coverage gives more protection against sunburn, UVA damage and DNA damage than sunscreen with lower SPF. However, this does not mean forgetting the essential strategies of photoprotection such as seek shades, wearing a hat or covering up with clothing and depending only on high SPF sunscreen. For those who have a risk of skin cancer, a genetic disease like albinism or xeroderma pigmentosum, sunscreen alone may not be adequate for protection and the same thing for heavy exposure such as at high altitude or near the equator.^[11]

FDA recommended using enough amount sunscreen which is 2 mg/cm² means roughly 1/4 teaspoon for face alone, 1/2 teaspoon for face & neck combined and 35 ml for a full adult body.^[12]

Sunscreen contains active ingredients that protect the skin from UV light penetration. The active ingredients vary from organic chemicals to mineral compounds. Sunscreen was first used following the discovery that salicylates reduce the effect of sunburn.^[10]

We have two types of sunscreen chemical and physical. Chemical sunscreens work like a sponge, absorbing the sun's rays. These sunscreens tend to be easier to rub into skin without leaving a white residue which found in physical type and maybe a cosmetic problem. Physical sunscreens (also known as mineral sunscreens) act like a shield, they reflect the sun's rays.^[13] Physical sunscreens consist of zinc oxide and titanium dioxide. Chemical sunscreens consist of UVB blockers like Aminobenzoates, Cinnamates, Salicylates, Octocrylene, and Camphor derivatives, and UVA blockers like Benzophenones, Anthranilate, Avobenzone. Photoprotection involves both primary and secondary protective factors. Primary factors are sunscreens. Secondary factors include antioxidants, DNA repair enzymes and osmolytes, which help to limit skin damage by disturbing the photochemical cascade that caused by UVR.^[7]

Using a sunscreen which is easily removed from the skin achieves little protection, no matter when it is reapplied. For sunscreens that bind moderately or well to skin, such as waterproof sunscreen, they should be applied liberally to exposed parts 15 to 30 minutes before exposure to the sun, followed by reapplication of sunscreen every 1 to 2 hours after exposure begins. Reapplication is also needed after vigorous activity, such as swimming, excessive sweating, towelling, or rubbing.^[14]

The objective of this study to evaluate knowledge, attitude, perception of medical students toward the sun protection habits and the usage of sunscreen because firstly this can help us to assess the community awareness about this subject since there were no studies about it and in the other hand because those medical students could be a good source for information and for spreading knowledge and awareness about this subject in the community that is seems to be necessary because most of dermatologist and health care providers notice the very limited knowledge the people have in this regard that are not enough especially with the noticeably sunny climate of Iraq.

Aim of the study:

The aim of our study is to evaluate awareness about sun protection among medical students in Baghdad college of medicine.

Objectives:

1. Assess the extent of awareness of medical students about the danger of exposure to harmful UVR of the sun and the hazards resulting from this exposure.
2. To assess knowledge of medical student at university of Baghdad about sun protection.
3. To detect the methods that used by the students to protect them self from UVR of the sun.
- 4.To assess the ability of medical students to improve the community knowledge about sun protection.

Patients and method:

A cross sectional descriptive study with analytic component was conducted in the period from 15th of October 2020 to 15th of May 2021. The target population was students of fourth and fifth grade of College of Medicine, University of Baghdad, Baghdad, Iraq. The Sample size was 300 students both females and males. The survey was done by sharing the link of questionnaire form on Telegram groups of fourth and fifth grade. The questionnaire was online, self-administrated and students filled the questionnaire in a private, confidential setting. The questioner was self-administered to limit bias and allow for forthright responses from participants. The survey was stopped when number of responders reaches 300.

Statistical analysis was done by using the statistical package for the social sciences program (SPSS) version 23 was used. Chi square was used. P value <0.05 considered significant.

Result:

A total of 300 students were included the fourth and the fifth grade from college of medicine university of Baghdad. Most of the responses were received from fourth grade 64.3% (193/300) and 35.7% (107/300) from fifth grade. The study included 237 females and 63 males in age range 18 yrs-24 yrs. The most common skin type was oily skin 39.3% (118/300) followed by combined 34% (102/300) then normal skin 18.7% (56/300) and dry skin 8% (24/300) as stated by students. (Table 1).

Table 1: Demographic criteria of the studied group

Parameters		No.	%
Gender	Female	237	79.0
	Male	63	21.0
Type of skin	Oily	118	39.3
	Combined	102	34.0
	Normal	56	18.7
	Dry	24	8.0

A percentage of 96.3% (289/300) of medical students believe that sun exposure is harmful; 96.2% (228/237) females and 96.8% (61/63) males, while only 3.6% (11/300) from male and female do not believe in that. Students who do use sunscreen regularly are 31.7% (95/300) and 47.7% (143/300) of medical students sometimes use sunscreen when they go out while 20.7% (62/300) do not use sunscreen at all.

Regarding the most dangerous period for exposure to the sunlight 42.3% (127/300) of students think it is 2-4pm, 34.3% (103/300) of them answer was 10-2pm, 21.3% (64/300) of them answered 10-4pm and only 2% (6/300) of them think it is 8-10am.

Regarding the side effects of sunlight exposure 8.3% (25/300) of students chose pigmentation, 8% (24/300) of them chose sunburn, 4.3% (13/300) of them chose skin cancer, 4% (12/300) of them chose aging and 1.7% (5/300) of them chose tanning and 73.7 % (221/300) chose all of them. There are 28.5% of males even did not consider sunscreen usage necessary when the question was whether sunscreen use is necessary or not compared to 5.9% of females. There are 53.7% (161/300) of students do not use any method other than sunscreen to protect their selves from UV light of the sun while 46.3% (139/300) of students do use other methods.

Regarding the most important way of protection from UV light 18.3% (55/300) of students think that it is the use of sunscreen, 12% (36/300) of them select avoiding exposure, 8% (24/300) of them select wearing protection clothing, 4% (12/300) of them chose seeking the shades, 55.7% (167/300) chose all protection ways and 2% (6/300) of them follow other ways.

Chemical sunscreen was preferred by 35% (105/300) of students. physical sunscreen was preferred by 13% (39/300), while 52% (156/300) of students do not know the difference between sunscreen types.

Regarding type of SPF 43.3% (130/300) of them prefer SPF 50, 14% (42/300) of them prefer more than 50, 10.3% (31/300) of them prefer SPF 30, 1% (3/300) prefer SPF 15, while 31.3% (94/300) do not know what SPF is. There are 56% (168/300) of students who think SPF 30 is so different from SPF 50 sunscreen, 38% (114/300) of students do not know while 6% (18/300) of them think that the difference is not so much.

Regarding factors they depend upon when they buy sunscreen 26.7% (80/300) of students depend on SPF, 15.7% (47/300) depend on personal experience, 14.3% (43/300) depend on origin, 9.7% (29/300) depend on friends' advice, 6.7% (20/300) depend on internet, 7.7 % (23/300) depend on prescription while 19.3% (58/300) of them they do not buy any.

There are 50.3% (151/300) of students believe that sunscreen protect them from heat, while 21% (63/300) not believe in that and 28.7% (86/300) of them do not know whether sunscreen has anything to do with heat.

Regarding amount of sunscreen, they apply 35% (105/300) of students don't know amount they should apply, 26.7% (80/300) of them apply 1 tsf to the face, 15.7% (47/300) of them apply 1/2 tsf, 13% (39/300) of them apply 1/4 tsf, 6.3% (19/300) of them apply 2 tsf and 3.3% (10/300) of them apply more.

Regarding number of times, they use sunscreen 57% (171/300) use it once a day, 10% (30/300) use it twice and 0.7% (2/300) use it more times, 13.3% (40/300) of them were not sure, while 19% (57/300) of them do not use it at all. Time of application of sunscreen before exposure to sun light: 19% (57/300) apply it 15 min before exposure, 15.7% (47/300) 20 min before, 14% (42/300) 30 min before, 7% (21/300) 5 min before, 7% (21/300) 10 min before and 2% apply it more than 30 min before they go out. 35.3% (106/300) of students do not care about time of sunscreen application before they go out.

The seasonal use of sunscreen was only in summer in 26% (78/300), only) in winter in 3% (1/300, during both summer and winter in 54.3% (163/300), while 19.3% (58/300) do not use at all. The duration of using sunscreen was years in 46.3% (139/300), months in 20.3% (61/300), weeks in 11% (33/300), while 22.3% (67/300) do not use at all. Regarding where they put sunscreen on their body the face was the most common site of applying sunscreen in both males and females 43.3% (130/300) followed by 13.7% (41/300) who apply it on their face and neck, 12.3% (37/300) apply on all exposed parts of the body, 11% (33/300) put on face, neck and hand. While 19.7% (59/300) do not put sunscreen at all.

Regarding side effects experienced to sunscreen, there was nothing in 71.3% (214/300) of students, 11% (33/300) complain from oiliness, 6.7% (20/300) acne, 4% (12/300) allergies, 2.7% (8/300) burning and 4.3% (13/300) other things. About 75.7% (227/300) of students stated that medical knowledge has changed their sun protection behaviour while 24.3% (73/300) have no change in their behaviour. There are 69% (207/300) think it is necessary to use sun protection in our country, 27.7% (83/300) think it is necessary sometimes in the year while 3.3% (10/300) think it is not necessary.

Regarding important content they look for in sunscreen. The students who look for physical sunscreens like zinc oxide and titanium oxide are 17% (51/300). 1% (3/300) of students look for chemical contents like avobenzone, while 79.3% (238/300) of participant do not know about the components of sunscreen. There are 63% (189/300) of medical students think that sunscreen lose its effect after sweating or swimming, 9% (27/300) think that it does not lose its effect and 28% (84/300) they do not know. Medical students who are ready to advise people to use sun protection are 66% (198/300), 23% (69/300) sometimes do, 11% (33/300) do not advise people (Table 2 A, B, C)

Table 2 A: Awareness of the participants in the studied group

Questions		No.	%
1. Do you think that exposure to the sun light is harmful.	Yes	289	96.3
	No	11	3.7
2. Did you use sunscreen when they exposed to sun	Sometimes	143	47.7
	Yes	95	31.7
	No	62	20.6
3. The most dangerous period for exposure to sunlight as you think.	2-4 pm	127	42.33
	10-2 pm	103	34.33
	10-4 pm	64	21.33
	8-10 am	6	2.0
4. The risk of sunlight exposure as participants think	Pigmentation	25	8.3
	Sunburn	24	8.0
	Aging	12	4.0
	Skin cancer	13	4.3
	Tanning	5	1.7
	All above	221	73.7
5. Sunscreen is necessary for protection from harmful UV light from sun?	Yes	268	89.3
	No	32	10.7

6. Do you use other methods to protect yourself from UV light of sun?	Yes	139	46.7
	No	161	53.7
7. The most important way of protection from UVR as you think	Use sunscreen	55	18.3
	Avoiding exposure	36	12.0
	Wearing protection clothing	24	8.0
	Seeking the shades	12	4.0
	Other	6	2.0
	All above	167	55.7
8. Type of sunscreen participant prefer	Chemical	105	35.0
	Physical	39	13.0
	I do not know the types	156	52.0
9. Type of SPF participants prefer	More than 50	42	14.0
	SPF 50	130	43.3
	SPF 30	31	10.3
	SPF 15	3	1.0
	I do not know	94	31.3
10. Do you think that SPF 50 is so different from SPF 30 sunscreen?	Yes	168	56.0
	I don't know	114	38.0
	No	18	6.0

Table 2 B: Awareness of the participants in the studied group

Questions		No.	%
11. Factor's participants depend upon when choosing a sunscreen.	SPF	80	26.7
	Personal experience	47	15.7
	Origin	43	14.3
	Friends' advice	29	9.7
	Prescription	23	7.7
	Internet	20	6.7
	I do not buy any	58	19.3
12. Do you think that sunscreen protect from heat?	Yes	151	50.3
	No	63	21.0
	I don't know	86	28.7
13. Amount of sunscreen applied to the face.	1tsf	80	26.7
	½ tsf	47	15.7
	¼ tsf	39	13.0
	2 tsf	19	6.3
	More	10	3.3
	I do not know	105	35.0
14. How often the participant use sunscreen in a day.	Once	171	57.0
	Twice	30	10.0

	More	2	0.7
	Not sure	40	13.3
	Not use	57	19.0
15. Time the participants apply sunscreen before they exposed to sun.	5 min	21	7.0
	10min	21	7.0
	15 min	57	19.0
	20 min	47	15.7
	30 min	42	14.0
	More than 30 min.	6	2.0
	Not care about time	106	35.3
16. Season in which participants use sunscreen.	Summer	78	26.0
	Winter	1	0.3
	Both	163	54.3
	None	58	19.3

Table 2 C: Awareness of the participants in the studied group

Questions		No.	%
17. For how long participants have been using sunscreen.	Years	139	46.3
	Months	61	20.3
	Weeks	33	11.0
	Not use	67	22.3
18. Where do participants apply sunscreen on their body.	Face	130	43.3
	Face and neck	41	13.7
	Face, neck and hand	33	11.0
	All exposed parts of your body	37	12.3
	Not put	59	19.7
19. Side effects of sunscreens as noticed by our participants.	Oiliness	33	11
	Acne	20	6.7
	Allergies	12	4.0
	Burning	8	2.0
	No thing	214	71.3
	Other side effects	13	4.3
20. Weather medical knowledge increases awareness about sun protection	Yes	227	75.7
	No	73	24.3
21. Necessity of sun protection in Iraq as participants think.	Necessary	207	69.0
	Necessary sometimes in year	83	27.7
	Not necessary	10	3.3
22. Important content participants look for in the sunscreen	Titanium oxide	1	0.3

products.	Zinc oxide	7	2.3
	Both above (physical sunscreens)	51	17.0
	Chemical sunscreens component like avobenzone.	3	1.0
	I do not know about this component	238	79.3
23. Do you think that sunscreen may lose its effect after sweating or swimming?	Yes	189	63.0
	No	27	9.0
	I do not know	84	28.0
24. participants who are ready to advise people about sun protection	Yes	198	66.0
	Sometimes	69	23.0

Sunscreen usage is more practiced by females 93.6% as compared to males where 25.3% of them use sunscreen as shown in (Table 3), and this difference is statically significant. The P value < 0.0001

Table 3: use of sunscreen by different Gender

Gender	Do you use sunscreen			P value
	Yes	No	Sometimes	
Male	1	47	15	< 0.0001
Female	94	15	128	

Discussion:

In our community we frequently noticed that the awareness about sun protection and its importance is lacking despite its necessity because of sunny weather. We tried to assess the level of awareness about this subject among medical students because if they have good knowledge, we can encourage them to pass their information to the community and if not, we should improve their knowledge to help in improving the awareness of the community.

In our sample the number of females was more than males may be because females are more interested in the subject of the study, so they responded more frequent and faster than males. Most of participants (96.3%) are aware that sun exposure can be harmful and (73.7%) of them are aware about the risks of unprotected sun exposure like cancer, aging, pigmentation, sun burn. Of course, as medical students the last percentage should be higher. Regarding the most harmful time of exposure, the responses were variable but most of them chose mid-day time.

About one third of them use sunscreen regularly, one half use it sometimes and one fifth of students never use sunscreen. Sunscreens are more commonly used by females than males and this difference was statistically significant, The P value < 0.0001. There are other studies that find that women more frequently use sunscreen than men. This may be because women have tendency for skin care habits and show greater concern about appearance and carry more fear

from aging of skin. Men experience greater tendency towards being independent, brave, and confident, which leads to adoption of risk behaviour.^[15]

Most of participants know that the use of sunscreen is necessary. Only half of the sample use the other methods protection which may be more important than sunscreen like avoiding exposure, wearing protection clothing, seeking the shades and so on because about half of the sample think that all these methods are important while 18.3% think that sunscreen is the most important. Only 13% prefer physical sunscreen, 35% prefer chemical sunscreen, while approximately half of the sample don't know about types of sunscreens. About half of participants prefer SPF 50 and more, only 10% prefer SPF 30, while 31.3% are not aware about SPF number and weather it makes a difference in protection. More than half of participants think that SPF 50 is so different from SPF 30 sunscreen.

Regarding the factors they depend on in choosing and buying a sunscreen we noticed many variables including SPF, personal experience, origin, friends' advice, prescription and lastly internet, while about fifth of participant do not buy any sunscreen.

As we know that nearly all dermatologists recommend broad-spectrum protection by physical sunscreen with SPF 30, but studies often report that participant prefer using sunscreen with high SPF (50 or more), possibly because they think that it provides an additional margin of safety.^[11]

We already noticed in our community that many women think that sunscreen protect from heat so they do apply sunscreen during cooking or baking bread which could be unhealthy practice because of the occlusive and irritant effect of some sunscreen. Surprisingly half of the participants think that sunscreen protect against heat. Actually, there is no enough studies that support that, but in a study done previously results suggest that application of sunscreen does not impair heat dissipation or affect body core temperature.^[16]

In our sample areas of application of sunscreen more commonly the face only followed by face and neck then to a lesser extent all exposed areas. In a study done in India included 2037 volunteers above 18 years, 78% of the volunteers applied sunscreen only on the face.^[17]

The amount of sunscreen most of participants use is generally enough for face and neck. The sunscreens should be applied to all sun exposed areas in a concentration of 2mg /cm² about thirty minutes before exposure to sun. It should be reapplied at least every 2 hours and after vigorous activity like swimming, excessive sweating or towelling.^[18,19] In our sample most of them are not taking care about repeated use of sunscreen only 10% apply it twice, however most of them aware that sweating, swimming, and vigorous activity affect the stability of the product on the skin.

Regarding the time the participants apply sunscreen before they exposed to sun, about half of them apply it 15 minutes or more before exposure. Near half of participants have been using sunscreen for years. We noticed that only half of the participants used to apply sunscreen in both summer and winter. Even on cloudy day 80% of UVR reach the earth, so there is risk of UV induced damage, so it is required to use sunscreen throughout the year whether summer or winter including rainy and cloudy days.^[20]

In another study to assess general knowledge about sunscreen, about 86% of the subjects knew that sunscreen can help in preventing sunburn, and 70% reported that sunscreen can help in preventing skin cancer. However, only 32% of respondents knew that sunscreen should be applied 30 min before sun exposure, and only 30% knew the appropriate reapplication recommendation. Only 18% of respondents knew the required amount of sunscreen to skin surface and as we find in our study SPF was the most important factor, they depend on in choosing sunscreen.^[21]

Regarding side effects of sunscreen application three quarters of participants do not suffer from any side effects. 11% complained of oiliness that may be because of oil containing products or because most of the participants in our sample have seborrheic and combined skin, followed by acne in 6.7%, allergy 4% that may be because of active or additional ingredients and a few of them (2%) complain of burning. Three quarters of the sample said that studying medicine increased their awareness about necessity of sun protection. Fortunately, most of the participants think that sun protection is necessary in our country.

Large number of participants 79.3% do not know about the important component (active ingredients) of sunscreen. A good percentage of participants (66%) are ready to advise people about sun protection and 23% are sometimes ready to do that.

Medical students are source of information and a lot of people especially relatives and friends trust them, so if they participate in encouraging such important behaviours of skin protection, this will gradually increase awareness about sun protection among people in the community.

Conclusion

Most of students know that sun exposure is harmful, and they are aware of its risks. They know that sun protection including the use of sunscreen is necessary especially in our sunny country and they are ready to give advice to people about that.

Medical students need to be more aware about other methods of sun protection that may be more important than sunscreen. They also need to improve their information about types, ingredients, proper use of sunscreen and what SPF exactly mean.

Recommendations:

1. Larger population study is required.
2. Improving the knowledge about sun protection methods including sunscreen among medical students is necessary to improve the whole community awareness about sun protection.

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