Medical and Pharmaceutical Journal

Volume 1, Issue 2- 2022

Perception, knowledge, and attitude of solar radiation diseases and use of sunscreen among Al Zawia Medical University Students in Libya

Ebtesam A. **Beshna**[1*]; Samah **Amir**[1]; Ramadan T. **Swead**[2]; Khoulah A. **Aldoubali**[1]; Ayah M. **Ashour**[1]; Samar **Benzaed**[3] and Abdurrahim A. **Elouzi**[4].

Author Affiliations

[1]Department of Pharmaceutics and Industrial Pharmacy, Faculty of Pharmacy, Zawia, University, Zawia-Libya.

[2]Department of Pharmaceutics and Industrial Pharmacy, Faculty of Pharmacy, Sabratha University, Sabrath- Libya.

[3]Department of Medicinal and Pharmaceutical Chemistry, Zawia University, Zawia- Libya.

[4]Department of Pharmaceutics, Faculty of Pharmacy, Tripoli University, Tripoli-Libya.

***Corresponding Author:**

Ebtesam A. Beshna

Department of Pharmaceutics and Industrial Pharmacy, Faculty of Pharmacy, Zawia University, Zawia-Libya.

Email: e.beshna@zu.edu.ly

ORCID: 0000-0001-8955-762X

DOI: 10.55940/medphar202223

Dates

Received: 07 May 2022;

Accepted: 27 Jul 2022

Abstract:

Human exposure to solar radiation has significant public health implications. Sunlight's UV radiation can injure skin cells and alter the appearance of the skin. Long-term impacts of sun exposure include delayed pigmentation, reduced vitamin D synthesis, changed immunological responses of the skin, and others. The immediate consequences of sun exposure include severe skin changes like sunburn. Sun protection is a fundamental preventative step against skin cancer and skin damage brought on by excessive sun exposure. Sunscreens function to block ultraviolet (UV) rays from the environment from reaching the skin. They help shield skin exposed to sunlight from sunburn and other negative consequences by reflecting or absorbing UV radiation.

The study aimed to determine and evaluate the awareness and knowledge of UV radiation diseases, the prevalence of sunscreen use, and attitudes and perceptions toward their use among University Medical Students in Zawia (Libya). A specially prepared, self-structured survey was given to 100 participants to obtain data. The majority (74%) of the participants were Pharmacy students, 16% were Medicine students, and only 10% were Dentistry students. The results showed that 93% of participants had awareness or knowledge of sun diseases, but only 7% lacked information about radiation diseases. 71% of participants applied sunscreen, whereas 29% did not apply sunscreen.

The study concludes that students at Zawia Medical University have adequate knowledge and are aware of the harmful effects of solar radiation exposure. Sunscreens are a crucial component of sun safety practices. The study also identified the necessity for personal health education and training for our society that emphasizes the critical role of sunscreen and recommended application techniques.

Keywords: Skin Neoplasms, Sunburn, Sun screening Agents, Vitamins.

Introduction

A proven carcinogenic ultraviolet radiation (UVR) had a role in developing skin malignancies. The major environmental risk factor for the incidence and progression of basal cell carcinoma is exposure to solar UVR, particularly ultraviolet B (UVB). High-grade UVR exposure, whether cumulative or intermittent, may encourage the unchecked proliferation of skin cells. In addition to UVR exposure, Additional environmental variables also exist that contribute to the development of basal cell carcinoma (BCC). It is believed that DNA damage caused by UVR toxicity contributes to the developing skin malignancies. UVR has the potential to activate several oncogenes while inactivating tumor suppressor genes and causing abnormal growth and survival of keratinocytes, which are responsible for repairing such injuries. Moreover, growing data shows that immune cells' inflammatory reactions in the tumor microenvironment play a critical role in the development of skin tumors. Solar UV radiation causes genotoxic effects by destroying a wide range of bio-organic molecules, including DNA, proteins, and other tiny molecules like folate [1]. UV rays would cause folate deficits, resulting in life-threatening birth deformities such as neural tube defects [2]. The link between hyperpigmentation and folate metabolism is intricate, as evidenced by studies of the photosensitivity of folate under various circumstances in vitro and in vivo [2].

Overexposure to the sun will weaken the skin's elasticity and increase the likelihood of wrinkles. However, some cases, such as melanoma, may be associated with the most serious event .

Melanoma is the most dangerous type of skin cancer [3]. It is known that most melanomas develop in locations not exposed to sunlight, and having red hair, more moles, and prior sunburns all enhance the chance of developing the fatal condition [3]. 80% of the visible signs of aging in the skin from UV exposure may be accounted for, including dry appearance, scalping, and wrinkling [4].

Over a century ago, James Cleaver in San Francisco revealed deficient DNA repair in Xeroderma pigmentosum cells. Xeroderma pigmentosum was first characterized by Moriz Kaposi in Vienna in 1874. As a result, a mechanistic connection between exposure to the sun, somatic mutations, skin cancer, and DNA damage was subsequently established. An uncommon, autosomal recessive DNA repair condition called Xeroderma pigmentosum (XP) is characterized by skin and mucous membrane malignancies brought on by sun sensitivity and UV radiation [5].

Some doctors prefer to prescribe sunscreens; the purpose of sunscreens is to prevent ultraviolet (UV) radiation from reaching the skin when exposed to it. They assist in preventing sunburn and other harmful effects of this radiation,

especially in those exposed to the sun for long periods or who reside in sunny areas by absorbing or reflecting the UV radiation on the skin exposed to sunlight [6]. all forms of skin cancer, with skin color and type having a significant impact on the likelihood of developing skin cancer. Genetically determined phenotypic traits such as pale skin, light red hair, and eye color are linked to higher susceptibility to UV radiation and are connected with the highest risk of melanoma. According to statistics from the USA, white women and men are around 20 and 32 times more likely to get melanoma than their black counterparts [7].

Several reports predicted that skin cancer would become more common as the population ages. Although natural and artificial ultraviolet UV is harmful, most skin malignancies may be avoided by exposure to radiation, promoting sun safety among the general population [8,9]. The two main themes are routine sunscreen application and physical sun protection measures, such as clothes, hats, sunglasses, and a shade [8]. In Canada, sunscreens are licensed and controlled by Health Canada, and since 1928, sunscreens have had enormous economic success in the United States [8].

The cosmetics industry offers sunscreen in a variety of cosmetic forms. Sun protection measures satisfy the individual needs of a wide range of clients worldwide, who often come from various cultural backgrounds. Some cultures view the primary reason for using sunscreen as guarding against the tanning effects of sunlight [6,8].

Actually, customers in western nations use these sun protection to shield themselves from the effects of sunshine while at the beach, while others may use them as directed by a doctor when taking medications that cause photo-sensitization [6,8].

Aim of the study:

This study aimed to determine and evaluate the awareness and knowledge of UV radiation diseases and the prevalence of sunscreen use attitudes and perception toward their use among University MedicalStudents in Zawia (Libya).

Materials and methodology:

The study was conducted with undergraduate students from the Medical College at AL Zawia University in Libya between February and March of 2022. A cross-sectional research design was used, and 150 self-structured questionnaires were distributed to the students, with the objective of obtaining information on their knowledge of sun protection. A total of 100 participants completed the questionnaire and were enrolled in the study. Prior to participating, students were informed of

the study's objective and asked to provide consent.

The questionnaire consisted of two sections. The first section collected data on social demographics, such as age, faculty, specialization, academic year, and skin type. The second section contained a series of questions related to sun protection.

The questionnaire aimed to gather information on various aspects, including the participants' knowledge about UV radiation disorders, their awareness of sunscreen usage, their motivations for using or not using sunscreen, and the key variables influencing their decisions. The data collected was input accurately, and only the surveys that were completed were considered for analysis. Those who declined to participate were excluded from the study.

Data collection

In this cross-sectional study, just 100 questionnaires were recorded. About 50 patients were excluded because they did not complete the questionnaire, had special issues regarding completing the test, or had no response.

Questionnaire forms were created in Arabic for all students at the university to get a faster response. The final questionnaire included the following sections: First, three questions assessed socio-demographic characteristics like gender, age, and specialty. Second, one question was about knowledge or awareness of the diseases caused by sun radiation or sun-related hazards. Third, there were five questions about behaviors for protection from the sun, sunscreen application, and other methods of protecting against the sun. The survey took approximately 10 minutes for participants to complete.

Result:

One hundred participants completed the questionnaire and were included in the final analysis. Of the participant characteristics of the students, 73% were female, and 27% were male, while the mean age was 20–25 years old. The majority (74%) of the sample participants were Pharmacy students, 16% were Medicine students, and only 10% were Dentistry students, Table 1.

Table 1: Baseline characteristics of all respondents (n = 100).

Characteristics	Number (n%)
Female	73%
Male	27%
Pharmacy students	74%
Medicine students	16%
Dentistry students	10%
Mean age	20 – 25 years

The results from table 2 showed that (N=93) 93% of participants had awareness or knowledge of sun diseases; nevertheless, only 7% lacked information about radiation diseases were excluded in many parts of the research; on the other hand, out of these 93 participants 60 of

them (64.5%) had information about sun radiation diseases, and only 18% of participants have had the awareness that the solar radiation might cause skin cancer. 6% of participants knew about the pigmentation caused by long exposure to the sun and 4% about sunburns, whereas 2% of participants knew about freckles, spot-dark, and wrinkles that might be affected by sun exposure.

Table 2: Knowledge-related variables.

Awareness or knowledge of sun radiation diseases.				**N(%)**		
Known				93(93%)		
Unknown				7(7%)		
Awareness or knowledge of the following:						
N (%) out of 93 participants	Skin cancer	Freckles	Spot-dark	Sunburns	Pigmentation	Wrinkles
17 (18%)	✔					
2 (2%)		✔				
2 (2%)			✔			
4 (4%)				✔		
6 (6%)					✔	
2 (2%)						✔
60 (64.5%)	✔	✔	✔	✔	✔	✔

Contrariwise, Table 3 demonstrated that 71 of participants (71%) applied sunscreen, whereas 29% did not apply sunscreen. 73% were applied all the time, though only 27%were applied during sunny summer days.

Moreover, 62% of the majority of that applied sunscreen once daily, 24% applied twice daily, and only 14% applied more than twice daily.

Table 3: Using sunscreen with numbers of students.

Variables	**N(%)**
Apply Sunscreen	71(71%)
Do not apply Sunscreen	29(29%)
How often do you?	
All the time	52 (73%)
Summer season	19 (27%)
Winter season	0
Frequency /times daily	
Once daily	44 (62%)
Two times daily	17 (24%)
More than two times daily	10 (14%)

Table 4 also showed that 59% of participants used sunscreen on more than one property, while 4.2% used sun protection factor

SPF_{50}, and 18% used SPF_{100}. Follow 11% for moisturizing and 7% for whitening.

Table 4: Properties associated with sunscreen use.

Properties	N (%)
Use SPF_{50}	3 (4.2%)
Use SPF_{100}	13 (18%)
More than one property	42 (59%)
For whitening	5 (7%)
For moisturizing	8 (11%)

Table 5 exhibits the specific brands of sunscreen used by participating students. From this table, you can see that Uriage® was the most used; the percentage of the user was 38%, followed by LaRoche® and Aven® with percent 27% and 15%, respectively. The presence of a user of Bioderm cream was as same as SVR®, which was 7%. The other 6% of participants applied more than one brand.

Table 5: Specific brands of sunscreen use.

Brands	N(%)
Uriage®	27 (38%)
LaRoche®	19 (27%)
Aven®	11 (15%)
Bioderm®	5 (7%)
SVR®	5 (7%)
Other brands	4 (6%)
Total Number of participants ho use sunscreen	71(100%)

Discussion:

Although sunscreen preparations are considered the primary protection against the negative effects of radiation, life is impossible without sunlight. Moreover, sunlight is required for all biological functions. However, sunlight also has many adverse effects on the skin due to limited knowledge and performance of people concerning sun exposure and protection, which alarmed us to conduct this study urgently.

In this study, the majority of participants were females (72%), followed by males (27%), and 74% of the sample participants were pharmacy students, while 16% were medicine students, and only 10% were dentistry students. The study was conducted between February and March, during half of the school year, while most of the students in the faculty of pharmacy were girls, For that reason, there was an increase in the number of females to males ratio in our sample.

The results of this study indicate that 93% of undergraduate medical students were highly aware of the damaging effects of chronic sun exposure on the skin, whereas only 7% lacked such awareness. This finding contrasts with those of other studies, and it suggests that undergraduate medical students possess comprehensive

knowledge regarding sun exposure and its consequences [9].

Out of the 93 participants, 60 (64.5%) were knowledgeable about sun radiation diseases, 17 (18%) about skin cancer, 6 (6%) about pigmentation, and 4 (4%) about sunburns, while 2 (2%) knew about freckles, spot-darkening, and wrinkles. These results are consistent with those of another study, which found that participants had adequate knowledge of skin cancer risk factors and sun protection measures [10]. Another survey reported that sunburns and skin cancer prevention, as well as the preservation of light skin color and the avoidance of dark patches, were among the top reasons for using sunscreen [11].

Most participants in this study were also well-informed about the properties and frequency of sunscreen application. Specifically, 71% of them reported using sunscreen, whereas 29% did not. Of those who used sunscreen, 52 (73%) applied it all the time, while only 19 (27%) used it on sunny summer days. Moreover, 44 (62%) of the participants applied sunscreen only once daily, 17 (24%) twice daily, and only 10 (14%) more than twice daily. These results are similar to those of another study that found that most people only use sunscreen on sunny days and in the summer. However, studies suggest that sunscreen should be used even on cloudy days, as there is still a significant amount of UV radiation that can penetrate through inclement weather and clouds [11].

29% of participants did not use sunscreen in this study. The main reasons for not doing so were lack of belief in its significance, inconvenience of application, or cost. Having lighter skin appears to be a motivator for sunscreen use in our culture, which may explain its widespread usage for this reason. Lack of efficacy and cost are the most common reasons for not using sunscreen [11]. Another interesting finding was that people do not use sunscreen because they are lazy, tired, or don't have time, and 27% believe they do not need it [10].

Reapplication of sunscreen has been the subject of several studies. The use of sunscreen is optimized by applying it twice. According to the findings, the median participant applied between 13% and 100% more sunscreen with a second application compared to a single application at the same skin location [12].

In this study, 42 (59%) of participants used sunscreen for multiple purposes, 3 (4.2%) used SPF50 sunscreen, and 13 (18%) used SPF100 sunscreen. Moisturizing was indicated by 8 (11%), and lightening by 5 (7%) participants (see Figure 1). Similar to other studies, SPF and broad-spectrum UVA/UVB protection

were the most important factors for personal sunscreen use and for recommending sunscreens to patients, according to previous studies [13] as show in (figure 1). SPF value decreases with inadequate application, according to all research. This suggests that a high-SPF sunscreen, such as one with a rating of over 50, is preferable to compensate for insufficient application (12). Another study found that individuals who did use sunscreen did so to avoid tanning (79%), sunburn (65%), skin allergies (23%), irritation (29%), and whitening (25%) [14]. In other research, the most important reasons for using sunscreen in this study were to prevent sunburn, maintain a light skin color, avoid skin cancer, and prevent dark spots [11,13].

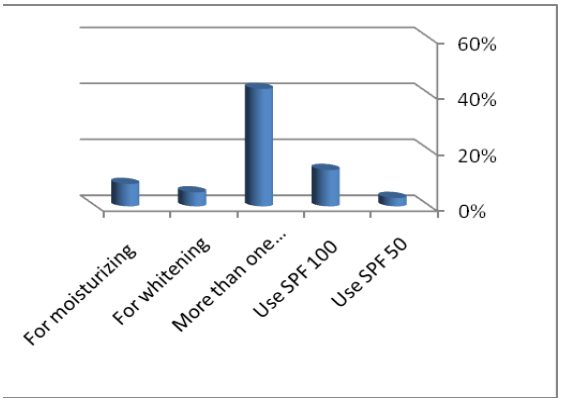

Figure 1: Used sunscreen properties.

Figure 2 shows the different brands or types of sunscreen used in our study: Uriage 27(38%), the most common type, followed by LaRoche19 (27%), then Aven, and others. Customers can easily obtain Uriage and LaRoche because they are available in almost every pharmacy or market in our country. For the cost, all the sunscreen is probably the same.

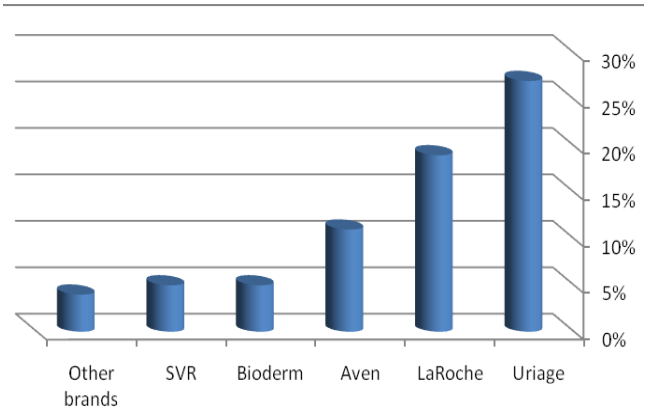

Figure 2: Different brands used.

Conclusion:

Sunscreens are used to protect the skin from the harmful effects of the sun. However, the proper application and frequency of use should be known to avoid any complications. This is the major role of pharmacists as a member of the healthcare system. This study shows that students at Zawia Medical University in Libya have adequate knowledge and are aware of the harmful effects of exposure to solar radiation. Most participants were female, which could be explained by the fact that many men perceive skincare and sunscreen products as feminine. However, over one-third of individuals did not apply sunscreen due to the uncomfortable way it felt on their skin. By using the appropriate

sunscreen, this sensation might be lessened.

Future research is expected to broaden the scope of the survey in terms of both sample size and the nature of the questions. This will provide more insight into UV index and sun protection knowledge.

Acknowledgment:

The authors would like to express their sincere gratitude to the medical students in Zawia, Libya, who participated in this research. Your willingness to take part in this study has made it possible to generate important insights into the awareness and behaviors related to sun exposure and sunscreen use. We appreciate your valuable contribution to this study and hope that the results will benefit future research in this area. Thank you for your time, effort, and participation.

Ethical approval:

Ethical approval for this study was obtained from the Medical University in Zawia, Libya in 2021. All participants were informed about the purpose and potential risks of the study, and they provided their written informed consent before participating in the research. The confidentiality and anonymity of the participants were maintained throughout the study.

Author contributions:

Each author contributed to the research and writing of the manuscript. E A. **B**; K A. **A**; and A. M. **A** contributed equally to the study design, data collection, data analysis, and manuscript writing. S. A. contributed to the data analysis, and manuscript writing. R T. **S** and S. **B** contributed to the data collection. A. A. **E** contributed to the study design and manuscript writing. All authors reviewed and approved the final version of the manuscript.

References:

1. Maddodi N, Jayanthy A, Setaluri V. Shining light on skin pigmentation: the darker and the brighter side of effects of UV radiation. Photochemistry and photobiology. 2012;88(5):1075-82. DOI: 10.1111/j.1751-1097.2012.01138.x
2. Jablonski NG, Chaplin G. Human skin pigmentation as an adaptation to UV radiation. Proceedings of the National Academy of Sciences. 2010 ;107(supplement_2):8962-8. DOI: 10.1073/pnas.0914628107
3. Holick MF. Sunlight and vitamin D for bone health and prevention of autoimmune diseases, cancers, and cardiovascular disease. The American journal of clinical nutrition. 2004;80(6):1678S-88S. DOI:10.1093/ajcn/80.6.1678S
4. Amaro-Ortiz A, Yan B, D'Orazio JA. Ultraviolet radiation, aging and the skin: prevention of damage by topical cAMP manipulation. Molecules. 2014 ;19(5):6202-19. DOI: 10.3390/molecules19056202

5. DiGiovanna JJ, Kraemer KH. Shining a light on xeroderma pigmentosum. Journal of investigative dermatology. 2012;132(3):785-96. DOI: 10.1038/jid.2011.426
6. Zaid AN, Al-Ramahi R. Knowledge and attitudes of Palestinian university students toward the use of sunscreens. Asian Journal of Pharmaceutical and Clinical Research. 2012;5(3):120-2.
7. Fajuyigbe D, Young AR. The impact of skin colour on human photobiological responses. Pigment cell & melanoma research. 2016;29(6):607-18. DOI: 10.1111/pcmr.12511
8. Li H, Colantonio S, Dawson A, Lin X, Beecker J. Sunscreen application, safety, and sun protection: the evidence. Journal of cutaneous medicine and surgery. 2019;23(4):357-69. DOI: 10.1177/1203475419856611
9. Govindarajulu SM, Srinivas RT, Kuppuswamy SK, Prem P. Information about sun exposure, protection, awareness and behavioural patterns of medical students in Kolar. TURKDERM-Turkish Archives of Dermatology and Venereology. 2020;54(4):124-31. DOI: 10.4274/turkderm.galenos.2020.38455
10. Alzahrani NA, Fathi TT, Mortada HH, Bukhari DA, Ashor NM, Mleeh NT, Abduljabbar MH, Hariri JO. Awareness, knowledge and behavior of medical personnel regarding skin cancer, sun-related hazards and sunscreen utilization at King Abdulaziz University Hospital, Jeddah. Int J Res Dermatol. 2018;4(2):105.
11. AlJasser MI, Aljumah A, Alzaydi M, Alassaf A, Alassafi S, Alassafi MT, Almedlej M, Masuadi E. Sunscreen use among a population of Saudi University students. Dermatology research and practice. 2020;2020. DOI: 10.1155/2020/4732721
12. Sander M, Sander M, Burbidge T, Beecker J. The efficacy and safety of sunscreen use for the prevention of skin cancer. Cmaj. 2020 Dec 14;192(50):E1802-8. DOI:10.1503%2Fcmaj.201085
13. Song H, Beckles A, Salian P, Porter ML. Sunscreen recommendations for patients with skin of color in the popular press and in the dermatology clinic. International Journal of Women's Dermatology. 2021 ;7(2):165-70. DOI:10.1016/j.ijwd.2020.10.008
14. Agarwal SB, Godse K, Patil S, Nadkarni N. Knowledge and attitude of general population toward effects of sun exposure and use of sunscreens. Indian journal of dermatology. 2018;63(4):285 DOI:10.4103%2Fijd.IJD_609_17

To cite this article: Beshna E. A.; Amir, S.; Swead R. T., *et al.,* Perception, knowledge, and attitude of solar radiation diseases and use of sunscreen among Al Zawia Medical University Students in Libya. Medical and Pharmaceutical Journal. 2022: 1(2): 74-83