ORIGINAL ARTICLE

Bridging the Gap Between Outdoor Athletes and General Public on Sunscreen Awareness & Usage

Anannya S[1], Sharada R G[1], Sneha Thirugnana Sambandam[2],Guntamukkala Geeta Sai[1], Afthab Jameela Wahab[1]

[1] Department of Dermatology, Venereology and Leprosy, Saveetha Medical College, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, Tamil Nadu, India
[2] Department of Sports Medicine, Saveetha Medical College, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai, Tamil Nadu, India

ABSTRACT

Introduction: Even though the general population is adequately informed on sun safety precautions and how to prevent skin cancer, individuals still neglect to take preventative measures when they are outdoors. This study aimed to compare sunscreen awareness & usage between outdoor athletes and general public. **Methods:** The study was multi-center, cross-sectional questionnaire study. The authors compared the participants' sunscreen awareness, knowledge, and practices between the general population and athletes. **Results:** 100 participants were included in the study. The mean age of the participants was 19 years in Group A (n=50) and 23 years in Group B (n=50). Cricket and football players predominated among the 9 different sports in Group B. Sunburn history was reported by 22 in Group A and 16 in Group B. While 82% of Group A included sunscreen as a part of their daily skincare routine, only 42% of Group B agreed on the same. The participants reported that the primary reasons for sub-optimal usage included forgetfulness, greasiness, and lack of sweat-proof formulation. Sunscreen users among both groups stated beauty/fairness as the main encouraging factor for sunscreen usage, followed by skin problems (group A) and sunburn in the past (group B). Less than 40% participants in both groups understood proper sunscreen use (quantity, time of application before going outdoors, frequency of reapplication) in different settings. **Conclusion:** Post completion of our survey, 90% of Group A and 72% of Group B admitted to being more inclined and motivated to use sunscreen regularly.

Malaysian Journal of Medicine and Health Sciences (2024) 20(SUPP13): 24-28.doi:10.47836/mjmhs.20.s13.6

Keywords: sunscreen awareness, skin care, athlete, photoprotection, spf

Corresponding Author:
Sneha Thirugnana Sambandam, MBBS
Email: sneha.sambandam@gmail.com
Tel : +91 7829125695

INTRODUCTION

Sunscreens are compounds that shield the skin from UV (ultra violet) radiation from the sun by absorbing, reflecting, scattering, or in other manners deflecting UV photons so that the skin's components are not exposed to them (1,2). Sunscreens are an essential component of daily life since they help prevent sunburn, lip or skin damage, freckles, discoloration, aging, skin cancer, phototoxic or photoallergic drug reactions, photosensitive disorders, and photo aggravated dermatoses.

Sun exposure to UV radiation may cause sunburns to the skin. UV rays damage skin by increasing the amount of inflammatory cells and decreasing the amount of antigen-presenting cells in the dermis. UVB damages DNA strands and causes sunburn. It results in pyrimidine dimer mutations, which are linked to skin malignancies other than melanoma. While photocarcinogenesis results from damage to cells and DNA, photoaging can cause drooping and wrinkles (3,4,5). It is commonly recognized that ultraviolet radiation can lead to sunburn, early aging of the skin, the development of skin cancer and cataracts, immunological suppression, and the activation of latent viruses. The most serious harm is caused by UVB radiation, which has a wavelength between 290 and 320 nm. This radiation can cause both long-term and acute harm, such as cancer. It directly affects the proteins and DNA of cells (2).

Photoprotection can be sought by seeking shade, applying sunscreens, wearing protective clothing (loose-fitting dark colored fabric has good UPF), using hats and sunglasses, using makeup (makeup with a pigment

content of three to four SPF) and by utilizing windshields. People still don't take precautions when they're outside, even with all of the information accessible to them about sun safety and how to avoid getting skin cancer.

Outdoor athletes are more likely to develop skin cancer and photoaging due to increased UV exposure. The study's average athlete trained outside for three hours each day, four days a week, or roughly 500 hours of sun exposure each year in contrast to study by Wysong et al (2) where collegiate athletes spent 1000 h/ annually outdoors. Very limited research has been conducted on usage of sunscreen in Indian population. Previous studies that evaluated sunscreen usage in India compared evaluated the usage among the general population and medical fraternity but not among outdoor athletes (6,8). The present study aims to evaluate and to compare knowledge, awareness and practices of sunscreen usage between outdoor athletes and general public.

MATERIALS AND METHODS

The study was a cross-sectional, multi-center questionnaire survey conducted by Saveetha University. Study was conducted in June 2023 after obtaining approval from Saveetha Medical college institutional ethical committee (Approval number – 676/03/2023/ PG/SRB/SMCH). Both males and females aged above 18 years and below 40 years, residing in Chennai who expressed their willingness to participate were included in the study. The athletic population included athletes who trained and competed in outdoor sports. They should have played the sport recreationally or professionally outdoors on at least four days a week. They should also have also played the sport for a minimum of two years. The participants included as general population were individuals who were not engaged in playing sports either recreationally or professionally. Exclusion included individuals with comorbidities that increased the individual's susceptibility to developing sunburns.

The sample size was established at 100 based on a prior investigation that assessed the general population's knowledge and attitudes in India. Two hundred participants (100 outdoor athletes and 100 general population) participants were invited to take part in the online (estimating a 50% response rate) survey through links sent via email. Participants expressed their willingness to take part in the study by completing the online questionnaire. A questionnaire was designed for the purpose of this study and it was validated through conduction of a pilot study. The results from the participants were screened based on the inclusion criteria and exclusion criteria and results were analyzed.

Online survey platform used was Google forms. SPSS 23.0 was used for analysis after Microsoft Excel was used for data collection and compilation. For the continuous variables, frequency, percentage, means, and standard deviations (SD) were computed; for the categorical variables, ratios and proportions were computed. The chi-square test or the Fisher exact test, if appropriate, were used to evaluate the differences in proportions between the qualitative variables. A statistically significant P value was defined as one that was less than 0.05.

RESULTS

Out of the 130 complete responses received from the online survey, responses from 100 participants met the inclusion and exclusion criteria (50 in each group). Most participants in the general population were medical/ engineering students a mean age of 19 years. Cricket and football players predominated among the 9 different sports in Group B, and many district-level athletes were predominant in Group B. Mean age of the participants in Group B was 23 years.

Descriptive analysis showed that 22 individuals in the general population group and 16 in the outdoor sports group had history of developing sunburn. While only 40% of the general population were aware that sunscreen can be used from 6 months of age, while 70% of athletes were aware of this information.

Around 92% participants among general population have used sunscreen before and 4% had never used it, while it was 50% users and 50% non-users of sunscreen among outdoor athletes (Table I). Among sunscreen users, 82% included sunscreen as a component of their daily skincare regimen in Group A, only 42% agreed on the same in Group B. Most common formulation of sunscreen used in both groups were creams, lotions and gels (Figure 1). The main reason reported for sub-optimal usage included forgetfulness, greasiness, and lack of sweat-proof formulation (Figure 2).

Table I: Prevalence of sunscreen usage in General Population and Outdoor Athletes

Sunscreen	General Population	Outdoor Athletes
Users	46	25
Non-users	4	25

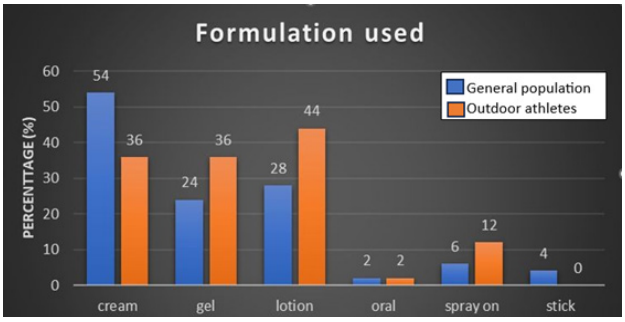

Figure 1: Formulation of sunscreen used in general population and outdoor athletes

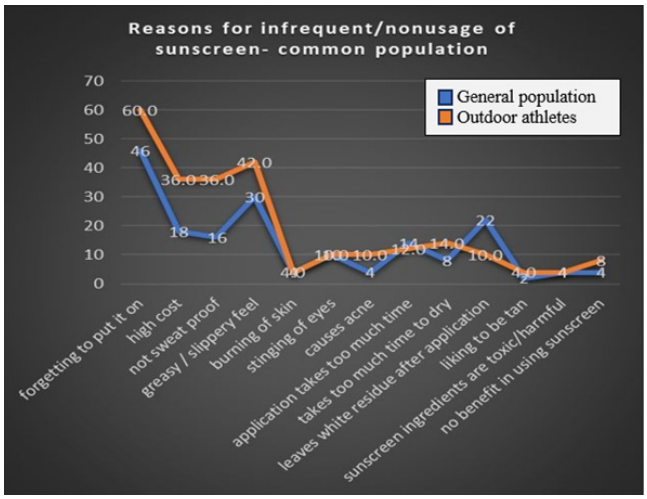

Figure 2: Reasons for non-compliance in sunscreen usage in general population and outdoor athletes

Sunscreen users among both groups stated beauty/ fairness as the main encouraging factor for sunscreen usage, followed by skin problems in the general population and sunburn in the athletic group. Both groups responded similarly to a question on purchase details. Both groups reported that they most frequently purchased from Online Marketplace, like Amazon and pharmacies.

Results showed that less than 40% of the participants in both groups understood proper sunscreen use (quantity, time of application before going outdoors, frequency of reapplication) in different settings. Majority (more than 50% of population) of both groups were aware that sunscreen must be used before going outside. While 30% among the general population applied sunscreen 30 minutes before stepping out, only 4% of the outdoor athletes practiced the same routine. Both groups reported that the most common sites of application of sunscreen are the face, neck, and arms, in that order.

The results displayed that 44% of the general population used two finger breadths of sunscreen product on the face (which is the appropriate quantity to be used), while only 26% of the athletes used the appropriate quantity. 46% of the general population and 44% of the outdoor athletes were aware of the active ingredients in the sunscreens they personally used.

DISCUSSION

There has been an increase in the frequency of dermatological malignancies, according to several research. Numerous factors, including high doses of UV radiation entering the atmosphere due to ozone depletion, living and traveling in sunny climates, leading an increased amount of time outside, excessive sunbathing, using sun beds, participating in outdoor sports, and using appliances and devices that emit UV radiation in homes and businesses, can be blamed for this (6,7).

In study by Wang et al, a movement in societal beauty standards toward a more tan appearance as desirable is shown by the 39% who "desired to be tan", however participants in both groups showed no such inclination in this study. Notably, 85% of coaches said they never or very seldom discussed using sunscreen (9).

Athletes abroad preferred spray-on or lotion formulations whereas a higher preference to cream formulation was noted in this study. Among general population, majority of the previous studies showed that cream and gel preparations were preferred which is similar to the results obtained from this study. An average of 90% of the subjects in this study knew that sunscreen use could prevent sunburn and skin cancer which contrasts the results of a previous study (70%) (10).

Hamant et al (11), noted 58% (A) and 71% (B) had adequate knowledge regarding quantity of sunscreen required, time of application before going outdoors, frequency of reapplication while in our study less than 40% in both groups. At the end of the questionnaire, 90% of the general population participants reported that they were more motivated to use sunscreen on a daily basis while 72% of the outdoor athletes reported the same.

Unprotected UV radiation exposure has been identified as the single most significant environmental risk factor for the development of skin cancer, despite the fact that a number of characteristics, including aging, Fitzpatrick skin type, and male sex, have been linked to an elevated risk of the disease (12–15). Using sunscreen and other photoprotective techniques including donning a hat, sunglasses, and finding shade can help prevent and mitigate these harmful effects and variables (16–21).

Outdoor sports players often exceed prescribed exposure limits, are exposed to significantly more UV radiation, and have a higher risk of getting skin cancer (22-26). Consequently, people who regularly participate in outdoor recreational activities ought to receive coaching regarding effective sun protection techniques and pertinent mobile technology that could make compliance easier (27–30). Athletes may find it easier to remember to wear appropriate protective gear before and during outdoor sports if they have access to smartphones and wearable technologies with apps that teach UVR avoidance. To more precisely assess the role of UVR exposure in skin cancer, more research on UVR exposure using more recent technology is still required. The limitations of this study include patient reported outcomes which may cause recall bias. The study's inclusion criteria also limited the geographical distribution to a small area which is a limitation. In addition, the mode of conduction of survey (online) could have affected the results obtained. Future research can focus on estimating the prevalence of sunscreen

usage among all athletic population, Furthermore, studies can adopt evaluating the participants in person through thorough clinical examination. Randomized control trials could be conducted to truly evaluate the effectiveness of using sunscreen among outdoor athletes.

CONCLUSION

Sunscreens provide photoprotection, which shields the skin from UV radiation' harmful effects and helps avoid more serious problems like cancer and sunburns. This study evaluated the awareness, knowledge as well as practices of usage of sunscreen among outdoor athletes and general population and compared the results obtained. Proper and sustained daily usage of sunscreen was shown to be significantly lower among outdoor athletes, contrary to the general population. Post completion of our survey, 90% of the general population and 72% of the outdoor athletes admitted to being more inclined and motivated to use sunscreen regularly.

ACKNOWLEDGEMENT

We would like to thank Saveetha Medical College and Hospital for providing necessary resources for conducting the study.

REFERENCES

1. Wang SQ, Dusza SW. Assessment of sunscreen knowledge: a pilot survey. Br J Dermatol. 2009;161(Suppl 3):28-32. doi:10.1111/j.1365-2133.2009.09446.x.
2. Wysong A, Gladstone H, Kim D, Lingala B, Copeland J, Tang JY. Sunscreen use in NCAA collegiate athletes: identifying targets for intervention and barriers to use. Prev Med. 2012;55(5):493-6. doi:10.1016/j.ypmed.2012.08.020.
3. Sander M, Sander M, Burbidge T, Beecker J. The efficacy and safety of sunscreen use for the prevention of skin cancer. CMAJ. 2020;192(50):E1802-8. doi:10.1503/cmaj.201085.
4. Gabros S, Nessel TA, Zito PM. Sunscreens and Photoprotection. [Updated 2023 Jul 17]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan.
5. Moloney FJ, Collins S, Murphy GM. Sunscreens: safety, efficacy and appropriate use. Am J Clin Dermatol. 2002;3(3):185-91. doi:10.2165/00128071-200203030-00005
6. Gupta M. Assessment of knowledge, attitudes and practices about sun exposure and sunscreen usage in outpatients attending a dermatology clinic in North India. J Pak Assoc Dermatol. 2018;28(4):521-5.
7. Alsudairy FK, Alharbi TI, Qadi AB, Almutairi SM, Asiree HH. Awareness of sun exposure and use of sunscreen among adults in Saudi Arabia, 2018. Int J Med Dev Ctries. 2019;3(4):389-94. doi:10.24911/IJMDC.51-1546172361
8. Fabris RM, Martignago BCF, Fabris RT, Durres ESM, Blanco LFO. Assessment of knowledge of skin cancer prevention and its relation with sun exposure and photoprotection amongst gym academy members on the south of Santa Catarina, Brazil. An Bras Dermatol. 2012;87(1):36-43. doi:10.1590/S0365-05962012000100004
9. Senel E, Sьslь I. Knowledge, attitudes, and behaviors regarding sun protection, effects of the sun, and skin cancer among Turkish high school students and teachers. Dermatol Sin. 2015;33(4):187-90. doi:10.1016/j.dsi.2015.03.001
10. Al Robaee AA. Awareness to sun exposure and use of sunscreen by the general population. Bosn J Basic Med Sci. 2010;10(4):314-8. doi:10.17305/bjbms.2010.2678
11. Rabbani MG, Akter O, Hasan MZ, Samad N, Mahmood SS, Joarder T. COVID-19 knowledge, attitudes, and practices among people in Bangladesh: telephone-based cross-sectional survey. JMIR Form Res. 2021;5(11):e28344. doi:10.2196/28344
12. Geoffrey K, Mwangi AN, Maru SM. Sunscreen products: rationale for use, formulation development and regulatory considerations. Saudi Pharm J. 2019;27(7):1009-18. doi:10.1016/j.jsps.2019.08.003
13. Latha MS, Martis J, Shobha V, Shinde RS, Bangera S, Krishnankutty B, et al. Sunscreening agents: a review. J Clin Aesthet Dermatol. 2013;6(1):16-26.
14. Snyder A, Valdebran M, Terrero D, Amber KT, Kelly KM. Solar ultraviolet exposure in individuals who perform outdoor sport activities. Sports Med Open. 2020;6(1):42. doi:10.1186/s40798-020-00272-9
15. Sethi A, Kaur T, Malhotra SK, Gambhir ML. Moisturizers: the slippery road. Indian J Dermatol. 2016;61(3):279-87. doi:10.4103/0019-5154.182427
16. More BD. Physical sunscreens: on the comeback trail. Indian J Dermatol Venereol Leprol. 2007;73(1):80-5. doi:10.4103/0378-6323.31890
17. Li H, Colantonio S, Dawson A, Lin X, Beecker J. Sunscreen application, safety, and sun protection: the evidence. J Cutan Med Surg. 2019;23(4):357-69. doi:10.1177/1203475419856611
18. Nash JF, Tanner PR. Relevance of UV filter/sunscreen product photostability to human safety. Photodermatol Photoimmunol Photomed. 2014;30(2-3):88-95. doi:10.1111/phpp.12113
19. Gilaberte Y, Carrascosa JM. Sun protection in children: realities and challenges. Actas Dermosifiliogr. 2014;105(3):253-62. doi:10.1016/j.ad.2013.05.004
20. Agarwal SB, Godse K, Patil S, Nadkarni N. Knowledge and attitude of general population toward effects of sun exposure and use of sunscreens. Indian J Dermatol. 2018;63(4):285-91.

doi:10.4103/ijd.IJD_609_17
21. Memon MM, Manzoor M, Ashrafi MM, et al. Prevalence and predictors of the use of sunscreen amongst medical students: a multi-center cross-sectional study. Cureus. 2019;11(6):e4926. doi:10.7759/cureus.4926
22. Agbai ON, Buster K, Sanchez M, et al. Skin cancer and photoprotection in people of color: a review and recommendations for physicians and the public. J Am Acad Dermatol. 2014;70(4):748-62. doi:10.1016/j.jaad.2013.11.038
23. Cestari T, Buster K. Photoprotection in specific populations: children and people of color. J Am Acad Dermatol. 2017;76(3 Suppl 1):S110-21. doi:10.1016/j.jaad.2016.09.039
24. Putri IA, Ardiana D, Tehupuring SEJ. The relationship between sunscreen application and severity of melasma. Med Health Sci J. 2022;6(2):1-6. doi:10.33086/mhsj.v6i02.3177
25. Moyal D. The development of efficient sunscreens. Indian J Dermatol Venereol Leprol. 2012;78(1):31-4. doi:10.4103/0378-6323.97353
26. Al-Mutairi N, Issa BI, Nair V. Photoprotection and vitamin D status: a study on awareness, knowledge and attitude towards sun protection in general population from Kuwait, and its relation with vitamin D levels. Indian J Dermatol Venereol Leprol. 2012;78(3):342-9. doi:10.4103/0378-6323.95451
27. Sarkar R, Garg VK, Jain A, Agarwal D, Wagle A, Flament F, et al. A randomized study to evaluate the efficacy and effectiveness of two sunscreen formulations on Indian skin types IV and V with pigmentation irregularities. Indian J Dermatol Venereol Leprol. 2019;85(2):160-8. doi:10.4103/ijdvl.IJDVL_932_17
28. Alzahrani NA, Fathi TT, Mortada HH, et al. 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(1):105-14. doi:10.18203/issn.2455-4529.IntJResDermatol20181397
29. Srinivas CR, Sekar CS, Jayashree R. Photodermatoses in India. Indian J Dermatol Venereol Leprol. 2012;78(Suppl 1):S1-8. doi:10.4103/0378-6323.97349
30. Rai R, Shanmuga SC, Srinivas CR. Update on photoprotection. Indian J Dermatol. 2012;57(5):335-42. doi:10.4103/0019-5154.100472
IJD_609_17

21. Memon MM, Manzoor M, Ashrafi MM, et al. Prevalence and predictors of the use of sunscreen amongst medical students: a multi-center cross-sectional study. Cureus. 2019;11(6):e4926. doi:10.7759/cureus.4926
22. Agbai ON, Buster K, Sanchez M, et al. Skin cancer and photoprotection in people of color: a review and recommendations for physicians and the public. J Am Acad Dermatol. 2014;70(4):748-62. doi:10.1016/j.jaad.2013.11.038
23. Cestari T, Buster K. Photoprotection in specific populations: children and people of color. J Am Acad Dermatol. 2017;76(3 Suppl 1):S110-21. doi:10.1016/j.jaad.2016.09.039
24. Putri IA, Ardiana D, Tehupuring SEJ. The relationship between sunscreen application and severity of melasma. Med Health Sci J. 2022;6(2):1-6. doi:10.33086/mhsj.v6i02.3177
25. Moyal D. The development of efficient sunscreens. Indian J Dermatol Venereol Leprol. 2012;78(1):31-4. doi:10.4103/0378-6323.97353
26. Al-Mutairi N, Issa BI, Nair V. Photoprotection and vitamin D status: a study on awareness, knowledge and attitude towards sun protection in general population from Kuwait, and its relation with vitamin D levels. Indian J Dermatol Venereol Leprol. 2012;78(3):342-9. doi:10.4103/0378-6323.95451
27. Sarkar R, Garg VK, Jain A, Agarwal D, Wagle A, Flament F, et al. A randomized study to evaluate the efficacy and effectiveness of two sunscreen formulations on Indian skin types IV and V with pigmentation irregularities. Indian J Dermatol Venereol Leprol. 2019;85(2):160-8. doi:10.4103/ijdvl.IJDVL_932_17
28. Alzahrani NA, Fathi TT, Mortada HH, et al. 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(1):105-14. doi:10.18203/issn.2455-4529.IntJResDermatol20181397
29. Srinivas CR, Sekar CS, Jayashree R. Photodermatoses in India. Indian J Dermatol Venereol Leprol. 2012;78(Suppl 1):S1-8. doi:10.4103/0378-6323.97349
30. Rai R, Shanmuga SC, Srinivas CR. Update on photoprotection. Indian J Dermatol. 2012;57(5):335-42. doi:10.4103/0019-5154.100472