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Behavior Analysis of Using Sunscreen to Protect Skin from the Sun

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Abstract: Excessive exposure to UV rays can increase the risk of skin cancer, premature aging, and other skin problems. As such, raising awareness of the risks of UV rays is a priority in an effort to encourage more proactive behavior in protecting the skin from the negative effects of sunlight. The aim of the study was to analyze the factors that influence individual behavior in sunscreen use as part of skin protection practices from sun exposure, and how these factors vary by cultural, social, and economic context. An analytical survey with a *cross sectional* approach was conducted in this study with a total of 180 correspondents consisting of adolescents aged 12-16 years from several junior high schools in Jambi City. The results showed that the factors that influence individual behavior in using sunscreen include knowledge, socioeconomic and cultural factors. This study can make a significant contribution to efforts to prevent skin cancer and protect the skin from damage due to UV exposure.

Keywords: Behavior; Skin Protection; Sunscreens

Introduction

UV risk awareness is becoming increasingly important in the modern era, as sun exposure increases and awareness of its negative impact on skin health is recognized (Jewett et al., 2020; Tribby et al., 2020). Overexposure to UV rays can increase the risk of skin cancer, premature aging, and other skin problems (Alli et al., 2023; Chaudhry et al., 2021). Awareness of these dangers is further reinforced by studies Hunkin et al. (2020) and McKenzie et al. (2023) that show a strong association between UV exposure and increased skin health risks. This raises awareness of UV risk to a priority in an effort to encourage more proactive behavior in protecting the skin from the negative effects of sunlight (Akdeniz et al., 2020; Chaudhry et al., 2021; Rocholl et al., 2020). The behavior of using sunscreen in an effort to protect themselves from the sun is influenced by several factors, including social economic and cultural factors. Culture and social norms have a significant impact on sunscreen use behavior to protect the skin from the sun (Aygun & Karayağız, 2021; Hammad & Gaber, 2022). In many cultures, there is a perception of beauty that is often related to skin color (Tamminga & Lipoff, 2021). For example, in some cultures, fair skin is considered a symbol of beauty and high social status, while dark skin may be considered less attractive or associated with low-status outdoor work (Jakobsen et al., 2022; Kwan et al., 2020; Miller et al., 2021). As a result, in these societies, there is a drive to maintain or achieve lighter skin (Chinta et al., 2023; Garcia & Winduwati, 2023). Some individuals tend to use certain products to prevent or reduce skin pigmentation due to sun exposure.

Perceptions of skin beauty and health have a major influence on the behavior of using sunscreen to protect

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the skin from the sun (Mumtazah et al., 2020). In the context of beauty, healthy and well-groomed skin is often considered a valuable asset. Proper skin care, including the use of sunscreen, is considered an important step in maintaining beautiful and youthful skin (Harmasari et al., 2023; Infante et al., 2021; Sotoudeh et al., 2020). Therefore, individuals who care about their appearance tend to pay more attention to sunscreen use as part of their skincare routine (Akdeniz et al., 2020; Rocholl et al., 2020). In the context of beauty, healthy and well-groomed skin is often considered a valuable asset. Proper skincare, including the use of sunscreen, is considered an important step in maintaining beautiful and youthful skin. As such, individuals who care about their appearance tend to pay more attention to sunscreen use as part of their skincare routine (Raymond-Lezman & Riskin, 2023; Yang et al., 2023). In addition, perceptions about skin health also play an important role in raising awareness of the importance of UV protection (Hammad & Gaber, 2022; Niu et al., 2021). As more information becomes available about the risk of skin cancer, premature aging, and other skin problems caused by sun exposure, more individuals are encouraged to use sunscreen regularly as a preventive measure (Lyford et al., 2022; Saeidi et al., 2022; Trenerry et al., 2022).

The research on Behavioral Analysis of Sunscreen Use to Protect Skin from Sunlight promises a multidisciplinary approach that blends various behavioral theories and innovative research methods. By integrating a comprehensive Behavioral Theory and taking into account contextual factors such as cultural, social, and economic, this study aims to reveal a deeper relationship between sunscreen use behavior and its influencing factors. This holistic analytical approach not only offers a deeper understanding of skin health behaviors, but also provides a basis for the development of evidence-based interventions to increase awareness and adherence to sunscreen use. As such, this study can make a significant contribution to skin cancer prevention and skin protection from UV damage. Research on sunscreen use behavior still has gaps that need to be filled to deepen our understanding of the factors that influence individual adherence to skin protection practices. One significant research gap is a deeper understanding of the influence of social and cultural norms on sunscreen use. Much remains to be understood about how specific social and cultural norms influence individual perceptions and behaviors related to skin protection. In addition, studies that integrate multidisciplinary approaches from fields such as psychology, sociology and public health could provide more comprehensive insights into the factors that influence sunscreen use. In addition, further research is also needed to explore the effectiveness of various intervention strategies in increasing awareness and adherence to sunscreen use, including the use of information technology and community-based approaches.

Method

An analytic survey study with a *cross-sectional* approach was conducted. A total of 180 adolescent children aged 12-16 years were used as respondents. These teenagers were taken from 18 junior high schools in Jambi city randomly with age requirements and 10 students were randomly taken from each school. The study used a questionnaire containing several questions related to sunscreen use behavior.

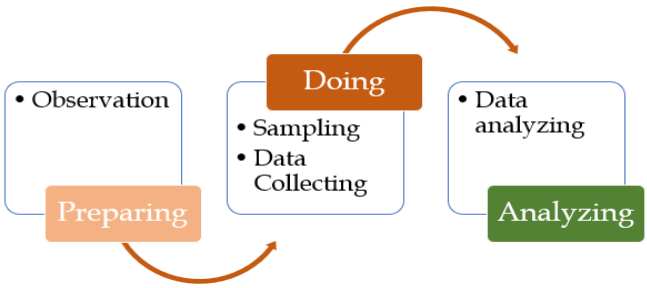

Figure 1. Research Schema

Result and Discussion

From the research that has been done, there is a social cultural influence on the behavior of using sunscreen in protecting the skin from sun exposure. Of the 195 potential respondents, only 180 people were willing to fill out the questionnaire. Details can be observed in the following distribution Table 1.

Table 1. Frequency Characteristics of Respondents Involved in the Analysis of Sunscreen Use Solar Behavior towards Junior High School Students in Jambi City

Characteristics	Frequency n=180	Percentage (%)
Gender		
Male	57	31.70
Female	123	68.30
Age		
12-14	83	46.10
14-16	97	53.90
Length of Outdoors Activity		
2-4 hours	69	38.30
5-7 hours	106	58.90
>7 hours	5	2.80

Data on the general characteristics of 180 respondents showed that the majority of respondents

were female, namely 123 people (68.3%) while 57 people (31.7%) were male respondents. Respondents were on average 14-15 years old consisting of junior high school students in grades VIII and IX. The average length of outdoor activity is 6 hours. The graph of sunscreen use behavior can be observed that respondents who have good behavior towards the use of sunscreen to protect themselves from the sun are mostly female adolescents, namely 67 people (37.2%) while the male gender is less 13 people (7.2%). For moderate behavior, slightly more female respondents (16.1%) while men (13.9%). The behavior of using sunscreen that is not appropriate or not good is 46 people consisting of 19 male respondents and 27 female respondents.

In the graph of good sunscreen use behavior, it can be seen that it is the percentage with the most total when compared to moderate or poor sunscreen use behavior. This indicates that teenagers, especially girls, have shown behavior with proper sunscreen use. Although the percentage is not too much, it already represents most of the samples in the population. In addition (Hujjah & Siahaan, 2022; Maharani & Tarcisia, 2024; Prasetia & Erwiyani, 2021) also conducted similar research and obtained results on increasing adolescents' knowledge about sunscreen. The results of the questionnaire (data not shown) obtained, the majority of girls began to be *aware* of the use of sunscreen (*sunscreen / sun protective*) or knowledge about sunscreen they get through social media. This is in line with research Durand et al. (2022) and Irwanto et al. (2020) which shows the influence of social media on the use of skincare, in this case *infuencers* or *beauty vloggers* have a significant influence in influencing the views of the public, especially teenagers who are currently actively using social media.

In addition to social media, the interview results show that the perception of beauty standards is a strong impetus for teenagers to compete to get their version of "beautiful" which of course is influenced by social culture. Beauty standards in Indonesia are still oriented towards several countries with the majority of smooth white skin such as Korea and Japan (Garcia & Winduwati, 2023; Rohmiatika, 2023). This encourages the use of sunscreen to avoid darkening the skin color caused by sun exposure. The same thing was found in research Julian et al. (2020) and Seo et al. (2023) in America which has beauty standards with "darker" skin which is considered exotic and has more attractiveness so that it has an inverse impact on the behavior of adolescents there in the use of sunscreen which tends to decrease due to wanting skin with a darker color. In addition, research Garza et al. (2021) and Joshi et al. (2022) showed that social media interventions are promising for skin cancer prevention and are increasing day by day. Dermatologists should keep up to date with the latest dermatological content on social media and review its development to target the right audience with accurate information.

Further research is needed to evaluate the effectiveness and true impact of social media on meaningful and lasting behavior change in skin cancer prevention. In the context of sunscreen use, an individual's attitude towards UV skin protection will influence their propensity to use sunscreen (Miller et al., 2021; Zhao et al., 2023). A positive attitude towards skin protection will increase the likelihood of an individual using sunscreen regularly. Regular use of sunscreen can reduce the negative impact of ultraviolet (UV) rays.

UV rays result in photoallergic, phototoxic, and photoaging reactions as well as carcinogenesis, including dangerous melanoma (Castro-Maqueda et al., 2021; Reis-Mansur et al., 2023). Excessive exposure to ultraviolet radiation, both natural and artificial, is still the cause of skin health problems today. In fact, half of all cancers diagnosed worldwide are skin cancers (Ottwell et al., 2021; Sotoudeh et al., 2020). Around three million non-melanoma skin cancers and 132,000 new melanoma cases are diagnosed each year worldwide (Jewett et al., 2020; Young et al., 2019). One of the main factors that increase the risk of melanoma is sunburn, especially in childhood. Studies show an association between the practice of *sunscreen* use and a decrease in malignant melanoma cases (Alli et al., 2023; Jewett et al., 2020).

The results showed that in addition to respondents' knowledge about sunscreen, which was mostly obtained from social media, their perceptions of beauty standards, the environment, culture, and social norms prevailing in society also influenced their behavior when using sunscreen. For example, respondents with good, moderate, or poor behavior initially followed the use of sunscreen from their family members or closest people, so they learned to follow it. This is in line with research Raymond-Lezman et al. (2023) and Seo et al. (2024) which explains that the surrounding environment affects a person's behavior towards decision making (in this case *sun protective*), for example parents who give praise to their children who have darker skin which is the standard of beauty in their country so that it influences children in the behavior of using *sun protection*.

Encouragement from parents or family members who understand sunscreen causes good or moderate sunscreen use behavior analysis results. In contrast, respondents with poor sunscreen use behavior claimed that family members or the environment in which they lived never mentioned or discussed the issue of sunscreen, so there was little or no knowledge and awareness of the importance of sunscreen use. For countries with "dark skin" beauty standards, this

sunscreen use behavior is still a crucial problem that must be resolved given the consequences that can be caused by the adverse effects of sunlight (Roozbahani et al., 2020; Seo et al., 2024).

Almost all respondents realized that the use of sunscreen is very important in an effort to maintain skin health so that the fear of diseases caused by the adverse effects of sunlight can be avoided. Sunlight can cause serious skin health problems such as skin cancer (Fauziah et al., 2024; Gilchrist et al., 2020; Keurentjes et al., 2021). Appropriate use of sunscreen will reduce the adverse effects of sunlight on the skin. There is ample evidence that the use of appropriate primary precautions can prevent skin cancer (Doncel Molinero et al., 2022; Rydz et al., 2021; Siddiqee et al., 2023). However, research shows that people's sun-protective behaviors are often not enough. Many people know the risk of developing skin cancer, but do not protect themselves. On the other hand, some people seem to be unaware of the risk because they may not have enough information about it. This is due to individual constraints, such as prolonged exposure, or structural constraints, such as unfavorable social conditions (Manne et al., 2023; Passeron et al., 2019; Stanganelli et al., 2020).

In addition, many people use sunscreen incorrectly as they tend to apply only 20%-50% of the required amount or do not reapply (Fonseca et al., 2023; Liu et al., 2021; Monifa, 2020). Research shows that some prevention campaigns have been successful in raising public awareness, but more educational efforts are needed to promote better sunscreen use behavior. Based on the effectiveness of previous intervention campaigns, future campaigns should use personalized interventions or multi-component media such as the Internet. To promote health-related information via the Internet, it is important to offer comprehensive, reliable and evidence-based information and prohibit misleading or false information regarding sun protection (Siddiqee et al., 2023).

Conclusion

The main conclusions of the study may be presented in a short Conclusions section, which may stand alone or form a subsection of a Discussion or Results and Discussion sect the results showed that the factors that influence individual behavior in using sunscreen include knowledge, socioeconomic, cultural and perceptions of beauty standards in the environment where they live. In addition, it was found that the influence of social media plays a major role in the behavior of using sunscreen for teenagers so that the use of social media as a forum for campaigning matters related to sunscreen or skin health to be able to optimize the use of sunscreen in the community. Thus, this study can make a significant contribution to efforts to prevent skin cancer and protect the skin from damage due to UV exposure.

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In writing this article, the authors do not have any conflict of interest.

References

Akdeniz, K. A., Aydın, A., Ugur, O., & Bektas, M. (2020). Factors affecting knowledge levels of oncology nurses about skin cancer and sun protection. *European Journal of Cancer Care*, *29*(6). https://doi.org/10.1111/ecc.13310

Alli, S., LeBeau, J., Hasbani, A., Lagacé, F., Litvinov, I. V, & Peláez, S. (2023). Understanding the Perceived Relationship between Sun Exposure and Melanoma in Atlantic Canada: A Consensual Qualitative Study Highlighting a "Sunscreen Paradox. *Cancers*, *15*(19), 4726. https://doi.org/10.3390/cancers15194726

Aygun, O., & Karayağız, M. G. (2021). The Effect of a School-Based Sun Protection Program on Students' Sun Protection Behavior in Turkey. *Journal of Pediatric Nursing*, *59*, 61– 69. https://doi.org/10.1016/j.pedn.2021.01.030

Castro-Maqueda, G., Lagares Franco, C., Gutiérrez-Manzanedo, J. V, Gobba, F., Blázquez Sánchez, N., & Troya-Martin, M. (2021). What Sun Protection Practices Should Be Adopted by Trainee Teachers to Reduce the Risk of Skin Cancer and Other Adverse Outcomes? *International Journal of Environmental Research and Public Health*, *18*(2), 529. https://doi.org/10.3390/ijerph18020529

Chaudhry, S. B., Armbrecht, E. S., Gibbons, M., Council, M. L., Knutson, A., & Lickerman, S. (2021). Sun Protection Outreach Teaching by Students (SPOTS)—Evaluating the Efficacy of Skin Cancer Prevention Education for Adolescents. *Dermatologic Surgery*, *47*(7), 926–930. https://doi.org/10.1097/DSS.0000000000003093

Chinta, S., Ghassani, A., & Lidwina, M. (2023). Dampak Standar Kecantikan. *Prosiding Seminar Nasional Ilmu Ilmu Sosial (SNIIS)*. Retrieved from https://proceeding.unesa.ac.id/index.php/sniis/article/download/920/389

Doncel Molinero, D., Ruiz Paulano, M., Rivas Ruiz, F., Blázquez Sánchez, N., Gálvez Aranda, M. V, Castro Maqueda, G., & Troya Martín, M. (2022). Sun Protection Behaviour and Sunburns in Spanish Cyclists. *Journal of Cancer Education*, *37*(4), 957–964. https://doi.org/10.1007/s13187-020-01906-y

Durand, C., Lamy, A., Richard, J.-B., Saboni, L., Cousson-Gélie, F., Catelinois, O., Bord, A., Lepage, B., Mouly, D., & Delpierre, C. (2022). Influence of Social and Psychosocial Factors on Summer Vacationers' Sun Protection Behaviors, the PRISME Study, France. *International Journal of Public Health*, *67*, 1604716. https://doi.org/10.3389/ijph.2022.1604716

Fauziah, N. Z., Sudarti, S., & Yushardi, Y. (2024). Mekanisme Terjadinya Kanker Kulit Akibat Radiasi Sinar Ultraviolet. *SAINTIFIK*, *10*(1), 152–156. https://doi.org/10.31605/saintifik.v10i1.470

Fonseca, M., Rehman, M., Soares, R., & Fonte, P. (2023). The Impact of Flavonoid-Loaded Nanoparticles in the UV Protection and Safety Profile of Topical Sunscreens. *Biomolecules*, *13*(3), 493. https://doi.org/10.3390/biom13030493

Garcia, G., & Winduwati, S. (2023). Representasi Standar Kecantikan Wanita di Media Sosial Instagram @springsummerstyle. *Koneksi*, *7*(1), 248–255. https://doi.org/10.24912/kn.v7i1.21313

Garza, H., Maymone, M. B. C., & Vashi, N. A. (2021). Impact of Social Media on Skin Cancer Prevention. *International Journal of Environmental Research and Public Health*, *18*(9), 5002. https://doi.org/10.3390/ijerph18095002

Gilchrist, J. D., Morris, K. L., Dwyer, L. A., & Conroy, D. E. (2020). Patterns of sun safety behaviors in parents: Associations with physical activity, sedentary behavior, and access to neighborhood physical activity resources. *Preventive Medicine*, *132*, 105976. https://doi.org/10.1016/j.ypmed.2019.105976

Hammad, S. S. A. E.-H., & Gaber, M. A. (2022). Knowledge, attitudes and practices of the general puplic toward the harmful effects of sun exposure and protection. *International Journal of Health Sciences*, 14007–14020. https://doi.org/10.53730/ijhs.v6nS2.8675

Harmasari, L., Karman, A., Madeamin, S., & Taupiq, T. (2023). Bahasa dan Ideologi Dalam Iklan Skincare Somethinc (Kajian Analisis Wacana Kritis Norman Fairclough). *Jurnal Dieksis ID*, *3*(2), 171–180. https://doi.org/10.54065/dieksis.3.2.2023.372

Hujjah, S., & Siahaan, S. (2022). Pengetahuan Sikap dan Perilaku Anak Remaja Usia 15-18 Tahun terhadap Penggunaan Sunscreen di SMK Kesehatan Yannas Husada Bangkalan. *Jurnal Health Sains*, *3*(1), 117–128. https://doi.org/10.46799/jhs.v3i1.404

Hunkin, H., & Morris, J. (2020). A decade of sun protection in Australian early-childhood services: Analysis of cross-sectional and repeated-measures data. *Health Education Research*, *35*(2), 99–109. https://doi.org/10.1093/her/cyaa005

Infante, V. H. P., Maia Campos, P. M. B. G., Calixto, L. S., Darvin, M. E., Kröger, M., Schanzer, S., Lohan, S. B., Lademann, J., & Meinke, M. C. (2021). Influence of physical–mechanical properties on SPF in sunscreen formulations on ex vivo and in vivo skin. *International Journal of Pharmaceutics*, *598*, 120262. https://doi.org/10.1016/j.ijpharm.2021.120262

Irwanto, I., & Hariatiningsih, L. R. (2020). Penggunaan Skincare Dan Penerapan konsep Beauty 4.0 Pada Media Sosial. *Jurnal Khatulistiwa Informatika*, *11*(2). https://doi.org/10.31294/jkom.v11i2.8366

Jakobsen, M. M., Mortensen, O. S., & Grandahl, K. (2022). Sun Protection Behavior in Danish Outdoor Workers Following a Multicomponent Intervention. *Frontiers in Public Health*, *10*, 885950. https://doi.org/10.3389/fpubh.2022.885950

Jewett, P. I., Lazovich, D., Wehelie, H., Boull, C., & Vogel, R. I. (2020). Sun exposure and protection behaviors in urban and rural long-term melanoma survivors. *Archives of Dermatological Research*, *312*(6), 413–420. https://doi.org/10.1007/s00403-019-02023-7

Joshi, M., Korrapati, N. H., University, T. S. M., Reji, F., University, T. S. M., Hasan, A., University, T. S. M., Kurudamannil, R. A., & University, I. J. T. S. (2022). The Impact of Social Media on Skin Care: A Narrative Review. *Lviv Clinical Bulletin*, *1–2(37–38*, 85–96. https://doi.org/10.25040/lkv2022.01-02.085

Julian, A. K., Welch, J., Bean, M. M., Shahid, S., & Perna, F. M. (2020). Information About Sunscreen on YouTube and Considerations for Sun Safety Promotion: Content Analysis. *JMIR Dermatology*, *3*(1). https://doi.org/10.2196/14411

Keurentjes, A. J., Kezic, S., Rustemeyer, T., Hulshof, C. T. J., & Molen, H. F. (2021). Protection Against Solar Ultraviolet Radiation in Outdoor Construction Workers: Study Protocol for a Non-randomized Controlled Intervention Study. *Frontiers in Public Health*, *9*, 602933. https://doi.org/10.3389/fpubh.2021.602933

Kwan, Z., Yong, S. S., & Robinson, S. (2020). Analysis of Internet searches using Google Trends to measure interest in sun protection and skin cancer in

selected South-East Asian populations. *Photodermatology, Photoimmunology & Photomedicine*, *36*(2), 83–89. https://doi.org/10.1111/phpp.12510

Liu, H., Lu, S., Wang, X., & Long, S. (2021). The Influence of Individual Characteristics on Cultural Consumption from the Perspective of Complex Social Network. *Complexity*, 1–14. https://doi.org/10.1155/2021/7404690

Lyford, W. H., Crotty, A., & Logemann, N. F. (2022). Sun Exposure Prevention Practices Within U.S. *Naval Aviation. Military Medicine*, *187*(1–2), 167–173. https://doi.org/10.1093/milmed/usab099

Maharani, F. D. R., & Tarcisia, T. (2024). Peningkatan Pengetahuan Remaja Perempuan 17-22 Tahun Tentang Sunscreen Di FK UNTAR. *Jurnal Kesehatan Tambusai*, *5*(1), 1–9. https://doi.org/10.31004/jkt.v4i4.22938

Manne, S., Wu, Y., Buller, D., Heckman, C., Devine, K., Frederick, S., Solleder, J., Schaefer, A., & Lu, S.-E. (2023). The Effects of a Parent-Focused Social Media Intervention on Child Sun Safety: Pilot and Feasibility Study. *JMIR Formative Research*, *7*. https://doi.org/10.2196/48402

McKenzie, C., Nahm, W. J., Kearney, C. A., & Zampella, J. G. (2023). Sun-protective behaviors and sunburn among US adults. *Archives of Dermatological Research*, *315*(6), 1665–1674. https://doi.org/10.1007/s00403-023-02547-z

Miller, K. A., Huh, J., Piombo, S. E., Richardson, J. L., Harris, S. C., Peng, D. H., & Cockburn, M. G. (2021). Sun protection changes among diverse elementary schoolchildren participating in a sun safety intervention: A latent transition analysis of a randomized controlled trial. *Preventive Medicine*, *149*, 106601. https://doi.org/10.1016/j.ypmed.2021.106601

Monifa, A. (2020). The Urgency of the Prohibition of Cosmetics on the Marine Environment in Marine Tourism. *Administrative and Environmental Law Review*, *1*(1), 1–14. https://doi.org/10.25041/aelr.v1i1.2075

Mumtazah, E. F., Salsabila, S., Lestari, E. S., Rohmatin, A. K., Ismi, A. N., Rahmah, H. A., Mugiarto, D., Daryanto, I., Billah, M., Salim, O. S., Damaris, A. R., Astra, A. D., Zainudin, L. B., & Ahmad, G. N. V. (2020). Pengetahuan Mengenai Sunscreen Dan Bahaya Paparan Sinar Matahari Serta Perilaku Mahasiswa Teknik Sipil Terhadap Penggunaan Sunscreen. *Jurnal Farmasi Komunitas*, *7*(2), 63. https://doi.org/10.20473/jfk.v7i2.21807

Niu, Z., Willoughby, J. F., Coups, E. J., & Stapleton, J. L. (2021). Effects of Website Interactivity on Skin Cancer–Related Intentions and User Experience: Factorial Randomized Experiment. *Journal of Medical Internet Research*, *23*(1), 18299. https://doi.org/10.2196/18299

Ottwell, R., Cook, C., Greiner, B., Hoang, N., Beswick, T., & Hartwell, M. (2021). Lifestyle behaviors and sun exposure among individuals diagnosed with skin cancer: A cross-sectional analysis of 2018 BRFSS data. *Journal of Cancer Survivorship*, *15*(5), 792–798. https://doi.org/10.1007/s11764-020-00971-y

Passeron, T., Bouillon, R., Callender, V., Cestari, T., Diepgen, T. L., Green, A. C., Pols, J. C., Bernard, B. A., Ly, F., Bernerd, F., Marrot, L., Nielsen, M., Verschoore, M., Jablonski, N. G., & Young, A. R. (2019). Sunscreen photoprotection and vitamin D status. *British Journal of Dermatology*, *181*(5), 916–931. https://doi.org/10.1111/bjd.17992

Prasetia, W. E., & Erwiyani, A. R. (2021). *Tingkat Pengetahuan Dan Perilaku Penggunaan Sunscreen Pada Mahasiswa Farmasi Universitas Ngudi Waluyo*. Universitas Ngudi Waluyo. Retrieved from https://shorturl.asia/ezn4d

Raymond-Lezman, J. R., & Riskin, S. (2023). Attitudes, Behaviors, and Risks of Sun Protection to Prevent Skin Cancer Amongst Children, Adolescents, and Adults. *Cureus*, *15*(2). https://doi.org/10.7759/cureus.34934

Reis-Mansur, M. C. P. P., Luz, B. G., & Dos Santos, E. P. (2023). Consumer Behavior, Skin Phototype, Sunscreens, and Tools for Photoprotection. *A Review. Cosmetics*, *10*(2), 39. https://doi.org/10.3390/cosmetics10020039

Rocholl, M., Ludewig, M., John, S. M., Bitzer, E. M., & Wilke, A. (2020). Outdoor workers' perceptions of skin cancer risk and attitudes to sun-protective measures: A qualitative study. *Journal of Occupational Health*, *62*(1), 12083. https://doi.org/10.1002/1348-9585.12083

Rohmiatika, H. (2023). Hegemoni Budaya Warna Kulit Wanita Korea Sebagai Standar Kecantikan Wanita Indonesia. *Prosiding Seminar Nasional Komunikasi, Administrasi Negara Dan Hukum*, *1*(1), 421–426. https://doi.org/10.30656/senaskah.v1i1.245

Roozbahani, N., Kaviani, A.-H., & Khorsandi, M. (2020). Path analysis of skin cancer preventive behavior among the rural women based on protection motivation theory. *BMC Women's Health*, *20*(1), 121. https://doi.org/10.1186/s12905-020-00978-8

Rydz, E., Harper, A., Leong, B., Arrandale, V. H., Kalia, S., Forsman-Phillips, L., Holness, D. L., Tenkate, T., & Peters, C. E. (2021). Sun Protection Use at Work and Leisure by Outdoor Workers in Alberta, Canada. *Journal of Occupational & Environmental Medicine*, *63*(3), 138– 144. https://doi.org/10.1097/JOM.0000000000002133

Saeidi, F. N., Haeri-Mehrizi, A. A., Akbarzadeh, Z., Janbozorgi, N., Montazeri, A., Yaseri, M., & Shab-

Bidar, S. (2022). Association of health literacy and nutritional literacy with sun exposure in adults using structural equation modelling. *BMC Public Health*, *22*(1), 1162. https://doi.org/10.1186/s12889-022-13465-6

Seo, B., Yang, S., Cho, E., Qureshi, A. A., & Han, J. (2023). Association of sun-seeking behaviors with indoor tanning habit in US females. *Research Square*. https://doi.org/10.21203/rs.3.rs-2899336/v1

Seo, B., Yang, S., Cho, E., Qureshi, A. A., & Han, J. (2024). Association of sun-seeking behaviors with indoor tanning behavior in US white females during high school/college in Nurses' Health Study II. *BMC Public Health*, *24*(1), 162. https://doi.org/10.1186/s12889-024-17716-6

Siddiqee, M. H., Bhattacharjee, B., Hasan, M., Shojon, M., Hassan, M., Rouf, R. R., Siddiqi, U. R., Rabbi, F., & Siddiqi, U. R. (2023). Risk perception of sun exposure and knowledge of vitamin D among the healthcare providers in a high-risk country: A cross-sectional study. *BMC Medical Education*, *23*(1), 46. https://doi.org/10.1186/s12909-023-04001-0

Sotoudeh, A., Mazloomy Mahmoodabad, S. S., Vaezi, A. A., Fattahi Ardakani, M., & Sadeghi, R. (2020). Determining Skin Cancer Protective Behaviors in the Light of the Protection Motivation Theory among Sailors in Bandar-Bushehr in the South of Iran. *Asian Pacific Journal of Cancer Prevention*, *21*(12), 3551–3556. https://doi.org/10.31557/APJCP.2020.21.12.3551

Stanganelli, I., Naldi, L., Cazzaniga, S., Gandini, S., Magi, S., Quaglino, P., Ribero, S., Simonacci, M., Pizzichetta, M. A., Spagnolo, F., Palmieri, G., & Queirolo, P. (2020). Sunburn-related variables, secular trends of improved sun protection and short-term impact on sun attitude behavior in Italian primary schoolchildren: Analysis of the educational campaign "Il Sole Amico. *Medicine*, *99*(1). https://doi.org/10.1097/MD.0000000000018078

Tamminga, M. A., & Lipoff, J. B. (2021). Understanding sunscreen and photoprotection misinformation on parenting blogs: A mixed-method study. *Pediatric Dermatology*, *38*(1), 88–91. https://doi.org/10.1111/pde.14411

Trenerry, C., Fletcher, C., Wilson, C., & Gunn, K. (2022). She'll Be Right, Mate": A Mixed Methods Analysis of Skin Cancer Prevention Practices among Australian Farmers—An At-Risk Group. *International Journal of Environmental Research and Public Health*, *19*(5), 2940. https://doi.org/10.3390/ijerph19052940

Tribby, C. P., Julian, A. K., Oh, A. Y., Perna, F. M., & Berrigan, D. (2020). Associations between ultraviolet radiation, tree cover and adolescent sunburns. *International Journal of Health Geographics*, *19*(1), 59. https://doi.org/10.1186/s12942-020-00253-x

Yang, S., Dai, F., Wang, Z., Li, R., Xu, X., Li, C., Hou, X., Liu, Y., Wang, C., Li, D., Li, L., & Xu, T. (2023). Association between sun-protective behaviors and hypertension: A cross-sectional study from. *BMC Public Health*, *23*(1). https://doi.org/10.21203/rs.3.rs-2889028/v1

Young, A. R., Narbutt, J., Harrison, G. I., Lawrence, K. P., Bell, M., O'Connor, C., Olsen, P., Grys, K., Baczynska, K. A., Rogowski-Tylman, M., Wulf, H. C., Lesiak, A., & Philipsen, P. A. (2019). Optimal sunscreen use, during a sun holiday with a very high ultraviolet index, allows vitamin D synthesis without sunburn. *British Journal of Dermatology*, *181*(5), 1052–1062. https://doi.org/10.1111/bjd.17888

Zhao, X., Jogdand, Y., Sharma, P., & Khan, S. (2023). Sun protection practices in India: Preliminary findings from a nationally representative sample. *Preventive Medicine Reports*, *36*, 102420. https://doi.org/10.1016/j.pmedr.2023.102420