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Research article

Perception of Medical Students at Ciputra University Aged 17-25 Years Regarding The Importance of Sunscreen Use

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ABSTRACT

Background: The use of sunscreen is important in the efforts to protect the skin from the dangers of ultraviolet (UV) radiation. Sunscreen contains protective components measured by sun protection factor (SPF) and UVA protection. The perception of sunscreen use is essential for maintaining skin health, especially among medical students who have more excellent knowledge about the harmful effects of UV radiation. Continuous exposure to UV radiation can lead to skin damage, such as sunburn, darkening, the appearance of spots on the face, dullness, premature aging, and even melanoma. This research aimed to provide evaluation, insight, and confidence regarding the importance of sunscreen use. By understanding this perception, it is hoped that we can identify shortcomings in education and develop interventions to promote sunscreen use practices in the broader community**.**
Methods: The research employed a descriptive approach. Data collection was conducted using total sampling techniques with questionnaires distributed to 184 medical students at Ciputra University aged 17 to 25 years.
Results: Descriptive tests were performed.
Conclusion: Both students who use sunscreen and those who do not express that using sunscreen is important.

INTRODUCTION

Indonesia has a tropical climate exposes most of its regions to high-intensity sunlight. Sunlight can be seen in wavelengths of 400 nm, while invisible sunlight falls within the 10 to 400 nm range. In some aspects, ultraviolet (UV) rays benefit humans, such as synthesizing Vitamin D and their role in killing bacteria. However, excessive exposure to ultraviolet rays can adversely affect human skin (Isfardiyana & Hapsah, 2014). Ultraviolet rays consist of UVA, UVB, and UVC, differentiated by their wavelengths. The type of ultraviolet radiation that causes the most skin problems is UVB radiation, which is the strongest and leads to photodamage on the skin (Wilson et al., 2012). Skin damage can occur due to prolonged exposure to sunlight and is categorized into acute (short-term) and chronic (long-term) damage. Acute skin damage includes sunburn and tanning. Sunburn is characterized by symptoms such as pain and warmth on the skin, while tanning refers to the darkening of the skin due to UV exposure. Research by Saridi et al. (2015) in Greece revealed that the incidence of sunburn among children and adolescents during summer ranges from 41.9% to 55.6%. A study conducted in the United States and Europe in 2018 explained that the incidence rate of sunburn due to UV rays is influenced by various factors such as race, gender, age, tanning habits, and outdoor activities (Bowers et al., 2021; Pramesti, 2019; Saridi et al., 2015). Chronic skin damage includes photoaging, which causes the skin to become dry and rough and experience pigmentation changes. Prolonged exposure to ultraviolet rays can also

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contribute to skin cancer since ultraviolet radiation can damage DNA structure depending on each individual's immune system (Minerva, 2019). The number of melanoma cases in the United States has increased dramatically from 1 per 100,000 people per year in 1935 to 23 per 100,000 people per year in 2012.

Several reasons have been proposed for this phenomenon, including changes in diagnostic methods (Levell et al., 2009), increased use of devices emitting ultraviolet radiation (Lazovich et al., 2010), and building structures with many windows (Godar et al., 2009). Avoiding sun exposure through personal initiative and using chemical sunscreens remain common recommendations from doctors and health experts to reduce the risk of melanoma and other types of skin cancer (Albert & Ostheimer, 2003; US Department of Health and Human Services, 2014). Sunscreens have a sun protection factor (SPF) and a level of UVA protection (PA), indicating how effectively these products protect the skin from ultraviolet rays. The effectiveness of sunscreen is determined by its SPF value, which ranges from 1 to 50. Sunscreens with an SPF above 15 and broad-spectrum protection are recommended to protect the skin from UVA and UVB rays. However, it is important to remember that sunscreen does not provide complete protection. A "+" symbol indicates the level of UVA protection; the more "+" signs there are, the higher the level of protection. PA classification ranges from PA+ (minimal protection) to PA++++ (very high protection) against UVA rays that can cause premature aging of the skin (Sulistiyowati et al., 2022). Based on this explanation, this study aims to explore the perceptions of medical students at Universitas Ciputra, aged 17 to 25, regarding the effectiveness, comfort, side effects, knowledge, needs, experiences, and price factors related to the importance of using sunscreen.

METHODS

The subjects of this research are medical students at Universitas Ciputra aged 17 to 25 years who meet the inclusion and exclusion criteria. The inclusion criteria consist of medical students from Universitas Ciputra, aged 17 to 25, who use low, high, and very high SPF sunscreens and students who do not use sunscreen. The exclusion criteria include individuals with photosensitive skin disorders and those unwilling to participate in the study. The instrument used for this research is a questionnaire. This study will be conducted from August to September 2024. The research method is descriptive, with data collection followed by statistical analysis. For students using sunscreen, the study will investigate effectiveness, comfort, and side effects based on their SPF levels (low, high, and very high), as well as their personal experience and price factors. For students who do not use sunscreen, the study will explore their perceptions regarding comfort, side effects, personal experiences, and price factors that influence their decision not to use sunscreen.

RESULTS

Table 1. Distribution of age among medical students at Ciputra University

Characteristic	Category	Frequency	Percentage
Age	17 years	0	0%
	18 years	9	5,3%
	19 years	52	30,8%
	20 years	42	25%
	21 years	51	30%
	22 years	12	7,1%
	23 years	1	0,6%
	24 years	0	0%
	25 years	2	1,2%
Mean± Standar deviation	20,07 ± 1,18		
Minimum value	0		
Maksimum value	52		
Median	20		

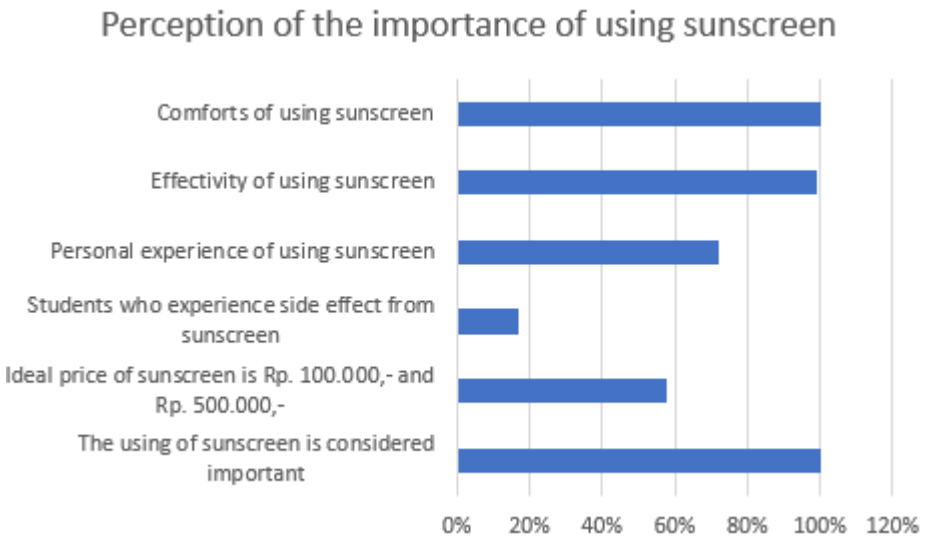
The age range of the respondents is 17 to 25 years, with the most common age being 19 years.

Table 2. Distribution of gender among medical students at Ciputra University

Characteristic	Frequency	Percentage
Male	41	24%
Female	128	76%

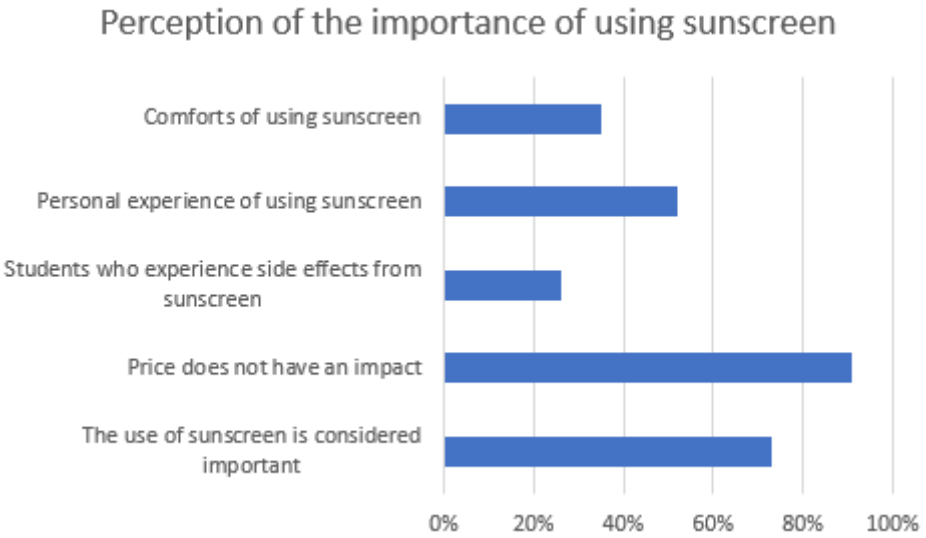
The dominant gender among medical students at Universitas Ciputra aged 17 to 25 years is female, with a frequency of 128 individuals and a percentage of 76%.

In this study, a descriptive analysis was conducted by calculating the frequency of each variable. Each variable will be analyzed based on the responses of the participants and grouped accordingly, and then frequency and percentage calculations will be performed. A total of 181 students were surveyed, with 12 students excluded due to having photosensitive skin disorders, resulting in a final dataset of 169 students. This group includes 146 students who use sunscreen and 23 who do not. The results from respondents using sunscreen indicate that comfort in using sunscreen was reported at 100%. Students using low SPF found the sunscreen to feel light (2%), safe for acne-prone skin (1.4%), and suitable for sensitive skin (0.7%). For those using high SPF, their perceptions included adequate protection (30%), safe for acne-prone skin (4.1%), feeling light (4.1%), suitable (9.6%), non-sticky (2.7%), and quick absorption (1.4%). Those using very high SPF reported guaranteed protection (22%), no need to reapply (2%), moisturizing effects (2.7%), and comfort levels for both high and very high SPF based on their activities (2%). Other students felt comfortable across all three SPF levels due to activity adjustments (5%), while some expressed comfort but did not specify SPF or reasons (10.3%). The effectiveness of sunscreen usage was reported at 99%, with low SPF users citing no stinging sensations (2.8%) and others not providing explanations (1.4%). For high SPF users, effectiveness was noted with no redness (2.8%), no darkening of the skin (3.5%), no burning or stinging sensations, and skin remaining hydrated and soft (1.4%). Additionally, some reported no appearance of spots, while 43% did not provide reasons but claimed effectiveness. For very high SPF users, reports included no redness (2.1%), no darkening (2.1%), no dullness (1.4%), and no spots appearing (2.1%), with others not specifying reasons (20.8%). Some high and very high SPF users noted that their skin did not burn (1.4%), while others did not provide reasons (0.7%). Students who felt effective across all three SPF levels cited no redness as a reason (3.5%), with others not providing explanations (1.4%). Some students claimed effectiveness without specifying SPF, citing reasons such as no spots appearing (1.4%), no stinging sensations (0.7%), and softer and healthier skin (0.7%), while others did not provide reasons (4%). Two students reported ineffectiveness, all citing that their skin darkened after prolonged sun exposure (100%). Other findings related to personal experiences using sunscreen showed that 96% of students had experience with sunscreen use, while 4% had none. Students using low SPF mentioned faster burning of the skin (1%) and protection from the sun (1%). Those using high SPF reported that their skin did not darken (8.6%) and experienced no darkening, stinging, or peeling sensations (6.7%). The study also examined side effects associated with sunscreen use; 83% reported no side effects, while 17% experienced effects such as itching with low SPF (4%), dryness and dullness with high SPF (8%), acne breakouts (28%), itching again with high SPF (16%), oiliness with very high SPF (8%), acne breakouts again with very high SPF (24%), grayish appearance on the face (4%), and stinging or redness experienced across all three SPF levels. Price factors were also investigated to see if they influenced decisions regarding sunscreen use and SPF levels; 37.7% of students preferred sunscreens priced below Rp 100,000 for 40-50 ml products due to comfort and suitability reasons (23.6%) as well as affordability (32.7%). The ideal price range for sunscreen was between Rp 100,000 and Rp 500,000 for 40-50 ml products, chosen by 57.5% of students based on various reasons, including suitability for facial conditions. Ultimately, 100% of students agreed that using sunscreen is important for several reasons: it protects valuable facial skin assets (2.1%), maintains the skin barrier (12.3%), prevents skin cancer (13%), stops the appearance of dark spots (12.3%), prevents premature aging (10.3%), protects against burning and darkening of the skin (31.5%), prevents skin damage like spots, cancer, and aging signs (13%), optimizes skincare effectiveness (0.7%), while 4.8% did not provide explanations.



Picture 1. Perception among students who use sunscreen of the importance of using sunscreen

Twenty-three students do not use sunscreen. Among them, 15 students have used sunscreen in the past but are no longer using it, while eight students have never used it. The survey results show that 35% of students feel comfortable using sunscreen, 30% feel uncomfortable, and the remaining 35% have never used it. The reasons students feel comfortable but are reluctant to use sunscreen include being lazy (38%), forgetting (12%), and engaging in indoor activities (50%), making them feel that sunscreen is optional. Students who reported discomfort cited feeling sticky and oily (71%) and itchy (29%). Personal experiences with using sunscreen were examined to see if they influenced the decision to use it; 52% of students have personal experience with sunscreen, while 48% do not. Students reported that when using sunscreen, their skin does not burn easily (50%), feels sticky (42%), and has no effect (8%). Side effects from using sunscreen were experienced by 26% of students, while 39% did not experience any side effects, and 35% have never used it. The only side effect reported was the occurrence of acne (100%). Price factors were also investigated to see if they influenced students' perceptions about using sunscreen. Only 9% of students consider price as a factor in their decision to use sunscreen, with an ideal price of Rp. 20,000 for small sizes and Rp. 500,000 for larger packages (50%). Other students mentioned Rp. 50,000 as the ideal price (50%). Nearly all students, 91%, stated that price does not influence their decision to use sunscreen, explaining that price is not an issue; they are simply trying to find a sunscreen that suits their skin condition. Ultimately, it was found that 73% of students still consider using sunscreen important, while 27% do not find it important. Students who deemed it important provided reasons related to protecting their skin from ultraviolet radiation (100%). In contrast, those who found it unimportant argued that sunscreen is only necessary for sensitive skin (17%), has no effect (17%), or did not provide any explanation (66%).



Picture 2. Perception among students who do not use sunscreen of the importance of using sunscreen

DISCUSSION

From 2007 to 2019, the average sunscreen usage among all students increased by 4% each year. During this period, sunscreen use among white, Asian, Native American/Alaskan Native, Hispanic/Latino, and Black/African American students overall increased (Rajagopal et al., 2021). The importance of sunscreen usage aligns with the findings of this study, as both students who use and do not use sunscreen acknowledge its importance in protecting the skin from UV radiation.

Students reported that the effectiveness of sunscreen is reflected in their skin being less prone to burning and sunburn, and they do not darken as much. Students using high and very high SPF sunscreens also stated that after using sunscreen, they no longer experienced the appearance of spots. The education they received about skin health has made them aware and compliant in using sunscreen, they believe that using sunscreen is important for maintaining skin health, preventing skin cancer, and avoiding premature aging. Erythema and edema contribute to the pathomechanism of squamous cell carcinoma and melanoma, which are risks associated with continuous exposure to ultraviolet radiation (CDC, 2019; D'Orazio et al., 2013; Sambandan & Ratner, 2011).

In the Canadian population, several sociodemographic factors such as geographic location, weather, vegetation type, genetics, and skin type can influence the amount of ultraviolet radiation received, which subsequently affects the risk of developing skin melanoma (Berman-Rosa et al., 2022; Conte et al., 2022, 2023; Lagacé et al., 2023). Conte et al. (2022) recently found differences in melanoma cases across various provinces in Canada. Nova Scotia reported an incidence rate of 27.66 cases per 100,000 people per year, while Prince Edward Island had an even higher rate of 30.94 cases. Both are above the national average of 20.75. New Brunswick's incidence rate was nearly equal to Canada's average at 19.99. Meanwhile, Newfoundland and Labrador (NL) had a rate below the national average at 16.63 cases (Conte et al., 2022). Clear evidence shows that skin melanoma can largely be prevented by taking sun protection measures. These measures include using sunscreen, wearing protective clothing, and avoiding excessive sun exposure, tanning, and sunburns (Elwood et al., 1985; Ghiasvand et al., 2016; Li et al., 2021).

Although skin cancer incidence rates in Asia are generally lower than in Western countries, Asian skin is more susceptible to pigmentation disorders. Reports indicate that rates of squamous cell carcinoma and melanoma remain relatively low among Chinese, Malay, and Indian populations in Singapore from 1968 to 2016 (Kantor, 2021; Oh et al., 2021). Additionally, wrinkles typically appear 10–20 years earlier in Europeans compared to Asians. Meanwhile, Asians and those with darker skin are more prone to actinic lentigo and hyperpigmentation (Nouveau-Richard et al., 2005; Vierkötter et al., 2016). These pigmentation disorders can make individuals appear older across all age groups (Mayes et al., 2010). Skin darkening due to UV radiation is particularly noticeable and is one-factor motivating students to use sunscreen. To prevent and correct hyperpigmentation issues as well as skin aging caused by sun exposure, it is recommended to use broad-spectrum sunscreen that protects against both UVB and UVA-VL regularly and in adequate amounts. Sunscreens with a minimum SPF of 50 are advised to address common issues related to inadequate sunscreen use. Broad-spectrum sunscreens with SPF 50+ and balanced protection against UVA (with a UVB/UVA protection ratio as close to 1 as possible) are highly recommended (Goh et al., 2024).

Some students still hesitate to use sunscreen because it feels sticky and sometimes causes acne. Modern sunscreens must effectively and safely protect the skin from harmful UV radiation effects. Therefore, sunscreens generally contain various UV-B filters (wavelength: 280-320 nm) and UV-A filters (wavelength: 320-400 nm). However, these filters often make sunscreens feel sticky, which becomes a particular issue for daily use. The higher the content of UV filters in a product, the greater this problem becomes. Consumers tend to apply less sunscreen than necessary to address stickiness issues, resulting in inadequate protection. Despite many efforts to develop sunscreen formulations with lower stickiness levels, this issue has not been fully resolved—especially for products with high sun protection factors. Thus, there remains an ongoing need to develop new sunscreen formulations that demonstrate lower stickiness levels (Janssen et al., 2022). It would be highly beneficial if there were compositions of sunscreen that resist sand adhesion—specifically those with a sun protection factor (SPF) of 20 or higher that show very low sand adhesion properties. The development of acne is influenced by external environmental factors, with ultraviolet (UV) radiation being one major factor affecting the skin (Dréno et al., 2018). Several studies indicate that UV rays can increase the number of oil-producing cells (sebocytes), enhance sebum production, and trigger the release of inflammatory substances—all of which can worsen acne conditions (Akitomo et al., 2003; Lee et al., 2013; Zouboulis,

2004). A study on a new selective cream (acne RA-1,2) overseas showed that this cream can effectively reduce acne while improving skin barrier function (which reduces water loss) and decreasing sebum production (Cestone et al., 2017). Therefore, it is recommended that acne patients—especially Asians at high risk for post-inflammatory pigmentation—use sunscreen since pigmentation often occurs due to acne in Asian individuals (Goh et al., 2016). Generally, it is advised to use broad-spectrum non-acne sunscreens with a sun protection factor (SPF) of 30 or higher (Goh et al., 2015). Thus, sunscreen can significantly alleviate inflammation caused by acne while speeding up the healing process of acne scars.

The Cancer Council Australia recommends applying sunscreen daily when the UV Index is forecasted to reach three or higher. Application should occur on clean, dry skin approximately 20 minutes before exposure to UV rays to form an effective protective barrier. It is advised to use an adequate amount—about 35 ml—to cover the entire body of an adult. Furthermore, sunscreen should be reapplied at least every two hours outdoors or after swimming, towel drying, or sweating (Diffey, 2017).

CONCLUSION

Students consider the use of sunscreen to be important. Students who do not use sunscreen have perceptions related to knowledge, side effects, needs, personal experiences, and price factors regarding sunscreen use that lead them to decide against using it. They acknowledge the importance of sunscreen but are still searching for products that suit their skin conditions. On the other hand, students who use sunscreen have perceptions related to knowledge, effectiveness, side effects, needs, and price factors that influence their decision to use sunscreen.

ACKNOWLEDGMENTS:

Descriptive data analysis from this study indicates that further research is needed, as well as innovations to explore the causes and provide in-depth solutions related to the perception of stickiness in sunscreen use.

CONFLICTS OF INTEREST

The authors declare that this study is free from any conflicts of interest

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