



# Relationship Between Knowledge Level and Compliance Towards the Importance of Sunscreen use in Pharmacy Students of University of Muhammadiyah Kuningan

Rakhmawati Hanifah \*, Vera Mulyawantie, Suci Purwaningsih

Faculty of Pharmacy, Health & Science, University of Muhammadiyah Kuningan, Kuningan, West Java, Indonesia

\*Email (corresponding author): [hanifahrahmawati27@gmail.com](mailto:hanifahrahmawati27@gmail.com)

**Abstract.** Excessive exposure to UV rays from the sun on the skin can cause problems such as premature aging, sunburn, and even skin cancer. Sunscreen is a cosmetic used as a way to protect the skin from sun exposure. This study aims to determine the relationship between the level of knowledge and compliance with the importance of using sunscreen in Pharmacy Students at the Muhammadiyah University of Kuningan. The type of research used in this study is observational analytic using a cross-sectional design. This study uses a purposive sampling technique for sample selection. The population in this study was 184 people with a sample size of 65 people. Data analysis used was univariate and bivariate analysis. The results of the study on the level of knowledge and compliance with the use of sunscreen in Pharmacy Students at the Muhammadiyah University of Kuningan, have a level of knowledge of 57% in the fairly good category, and compliance with the use of sunscreen of 57% in the compliant category. The results of the Spearman rank test on the data on the relationship between the level of knowledge and compliance obtained a significance value of 0.158, meaning that there is no relationship between the level of knowledge and compliance with the use of sunscreen in Pharmacy Students at the Muhammadiyah University of Kuningan.

**Keywords:** Compliance; Pharmacy Students; Knowledge; UV rays; Sunscreen

## 1. Introduction

Indonesia is a country with a tropical climate because it is located right on the equator. This allows it to be exposed to direct sunlight with high intensity throughout the year, causing the surrounding area to have high temperatures. Sunlight has benefits for the skin and is a source of human energy, but excessive exposure to sunlight can damage the skin because the sun contains ultraviolet (UV) rays (Wadoe et al., 2020). Ultraviolet radiation that reaches the earth's surface consists of UV-A (around 95%) and UV-B (around 5%) (Rakhmawati et al., 2018). Long-term exposure to UV rays from the sun causes skin damage accompanied by oxidative stress that affects the skin. Skin damage is divided into acute (fast) skin damage and chronic(long-term) skin damage. Acute skin damage includes sunburn and tanning, sunburn is a burn that occurs on the skin due to exposure to ultraviolet (UV) rays from the sun, while tanning is a condition where the skin changes color to a darker color. Meanwhile, chronic skin damage includes premature aging, melasma and skin malignancy (Putri et al., 2019).

One effective way to protect the skin from the adverse effects of sun exposure, especially on the face, is to use sunscreen. This product comes from a chemical formulation specifically designed to protect against sunlight. Sunscreen works by reflecting and absorbing ultraviolet radiation, thus providing an important barrier against the adverse effects of sunlight (Nurfritriani & Sultan, 2021). Early detection of skin cancer is very important, especially for

---

high-risk groups. Individuals who spend a lot of time outdoors and are exposed to direct sunlight have a higher risk of developing skin cancer (Suryantari et al., 2019). Students are a group that has quite high outdoor activities, especially during lectures and field practice, so they are at risk of direct exposure to UV rays. Knowledge about the dangers of UV exposure and the importance of using sunscreen is important for students to have as prospective health workers who can later play a role in educating the public about skin health. However, a good level of knowledge is not always directly proportional to compliance in using sunscreen regularly. Previous research entitled "Knowledge of Attitudes and Behavior of Adolescents Aged 15-18 Years Towards the Use of Sunscreen at SMK Kesehatan Yannas Husada Bangkalan" stated the results that as many as (47.6%) had poor knowledge of the use of sunscreen and (0%) respondents had good use, (30.2%) had fairly good use and (69.8%) had poor use of 4 uses of sunscreen. This study shows that adolescents aged 15-20 years have poor use of sunscreen as well as poor knowledge of the dangers of sun exposure and are less concerned about their skin health (Hujjah & Siahaan, 2022).

The absence of research that examines the relationship between the level of knowledge and compliance with sunscreen use in pharmacy students specifically indicates that there is a research gap that needs to be addressed, and there are still many pharmacy students at the University of Muhammadiyah Kuningan who do not use sunscreen so that education is needed regarding the importance of using sunscreen. This research aligns with SDGs (Sustainable Development Goals (SDGs) 3 about Good Health and Well-Being, specifically target 3.4 on reducing premature mortality from non-communicable disease through prevention. Therefore, this study was conducted to determine the relationship between the level of knowledge and compliance with the importance of sunscreen use in pharmacy students at the University of Muhammadiyah Kuningan.

## 2. Methods

This study is an observational analytic study with a cross-sectional design. The data taken are primary data. The variables in this study include students' knowledge and compliance with the importance of using sunscreen. The population of this study were pharmacy students at the Muhammadiyah University of Kuningan with a sample taken by purposive sampling of 65 respondents. The inclusion criteria are students of the Muhammadiyah University of Kuningan, D3 and S1 Pharmacy Study Programs, Semesters 2 and 4, male and female aged 17-25 years, and students who use sunscreen. The research instrument uses a questionnaire that has been tested for validity and reliability to measure the level of knowledge and compliance with the use of sunscreen. Data were analyzed univariately and bivariately using the Spearman Rank test to determine the relationship between the level of knowledge and compliance with the use of sunscreen. This research has received an ethical approval letter from the YPIB University Ethics Commission with the number: 308/KEPK/EC/IV/2025, on April 11, 2025.

### 3. Results and Discussion

**Table 1.** Respondent Characteristics

Characteristics	n (%)
<b>Gender</b>	
Male	9 (14)
Female	56 (86)
<b>Age</b>	
17	1 (2)
18	8 (12)
19	27 (42)
20	21 (32)
21	7 (11)
23	1 (2)
<b>Study Program/Semester</b>	
D3 Pharmacy/2	16 (25)
D3 Pharmacy/4	18 (28)
S1 Pharmacy/2	22 (34)
S1 Pharmacy/4	9 (14)

The characteristics of respondent are presented in Table 1. Shows the characteristics of female respondents who are more numerous than male respondents, with a total of 56 people (86%). Men's views on sunscreen as a cosmetic specifically for women and can affect masculinity are factors that cause men to be reluctant to use sunscreen (Wadoe et al., 2020). Most of the respondents are 19 years old, 27 people (42%), this is because in the age range of 16-20 years, a person's comprehension will be more mature so that they are able to understand and answer the questionnaire questions correctly (Nurfitriani & Sultan, 2021). Some of the respondents came from the Pharmacy S1 study program, Semester 2, as many as 22 people (34%).

**Table 2.** Univariate Analysis

Variable	n (%)
<b>Knowledge Level</b>	
Good	18 (28)
Quite Good	40 (62)
Not Good	0 (0)
Not Good	7 (11)
<b>Compliance</b>	
Compliant	42 (65)
Not Compliant	23 (35)

Univariate analysis are presented in Table 2. Shows that most respondents have a fairly good level of knowledge, namely 40 people (62%). Previous research conducted by Kusumajaya (2023) stated that 65.3% of students at the Faculty of Medicine had a fairly good level of knowledge, this is in line with the results of this study (Kusumajaya, 2023). According to Notoatmodjo, a person's level of knowledge is influenced by various factors such as the education received, media as a means of information, sociocultural and economic, the

surrounding environment, experiences gained during life, and age (Masturoh, 2018). Age will affect the ability to understand a person's way of thinking and will develop further so that the knowledge gained becomes better. The majority of respondents in this study were aged 17-25 years. Another factor that can influence is exposure to information, the more information received, the more knowledge they have (Rhamadany, 2021). Other factors also influence a person's knowledge, such as culture, information, and experience. The development of technology makes it easier for someone to get information. In modern times, social media is widely used by teenagers. Social media is one of the main choices in getting information and knowledge that is not obtained from school (Darsini & Cahyono, 2019) .

Most respondents had compliance results in the form of compliance as many as 42 people (65%) of the total respondents. Another study conducted by Ahnafani et al (2024) showed a high level of compliance, namely 80.2% in high school students in Palangka Raya (Ahnafani et al., 2024). Age, gender, ethnicity or race, and culture are sociodemographic factors that influence compliance in the use of therapy. Compliance is related to demand and is interpreted as an action taken at the request of someone or the request of someone else. Various factors, such as level of knowledge, education, social and economic status, and culture, influence a person's compliance with health recommendations. The level of good compliance in students is influenced by their awareness of the dangers of UV radiation which can cause skin problems, both acute and chronic (Kusumajaya, 2023). Experience and education are factors that can influence a person in taking action. Experience can be generated from education. The experience experienced by an individual can influence the formation and influence a person in a stimulus (object) in a response or response will be the basis for an action such as the use of something. The formation of an action and the factors that influence the action are determined by the personality, intelligence, and interests of the individual formed in the world of education. Education can be in the form of formal education and nonformal education (Diah Ningsih et al., 2020).

**Table 3.** Bivariate Analysis

<b>Variable</b>	<b>Correlation Coefficient</b>	<b>Sign (2-tailed)</b>
Knowledge Level Compliance	0,177	0,158

Bivariate analysis are presented in Table 3. Analysis using the Spearman Correlation test shows that the significance value obtained is 0.158 ( $> 0.05$ ) which means that H1 is rejected and H0 is accepted, it can be concluded that there is no relationship between the level of knowledge and compliance with the use of sunscreen. The correlation coefficient value obtained is 0.177. Based on Sugiyono's theory, the level of strength of the relationship or correlation between the variables of the level of knowledge and compliance is in the very low category. This study is in line with research conducted by Kurniawati et al (2023) with based on Sugiyono's theory with the results of the Spearman Correlation test of the relationship between the level of awareness and the use of sunscreen obtained a p value of 0.555 which means that the level of awareness is not related to the use of sunscreen in female employees of the Kasongan Lama sub-district. The correlation coefficient obtained is 0.060, which means that the correlation between the two variables has a very weak strength (Kurniawati, 2023).

---

This study is also in line with research conducted by Salenda et al (2025) with the results of the Spearman Correlation test showing that there is no significant relationship between the level of knowledge and compliance with the use of sunscreen in online motorcycle taxi drivers in the city of Palangka Raya, both variables and the direction of the relationship between the two variables is negative ( $p = 0.116$  and  $r = -0.293$ ) (Salenda et al., 2025). In this study, statistically, it was found that knowledge had no relationship with compliance with sunscreen use. According to Notoadmodjo, the level of knowledge starts from knowing, understanding, applying, analyzing, synthesizing, and evaluating. It is at this application stage that a person begins to utilize the knowledge he has to use in everyday life, including in behaving.

However, in reality, this was found to be inversely proportional to the results of the research that had been conducted. A good level of knowledge about sunscreen does not guarantee that the person will want to or comply with using sunscreen, likewise someone with a low level of knowledge does not mean that the person is not compliant with using sunscreen. A similar thing was found in the study of Mumtazah et al (2020) regarding the knowledge possessed by civil engineering students was good, but regarding the accuracy of choosing and using sunscreen it was still lacking (Mumtazah et al., 2020). Research by Hujjah et al (2022) on students of SMK Kesehatan Yannis Husada Bangkalan also showed that there was no relationship between knowledge and sunscreen use behavior (Hujjah & Siahaan, 2022).

In addition to knowledge, many factors can influence a person's compliance. Among them are supporting facilities at work, gender, age, occupation, and education. Other factors that contribute to low compliance, are also due to lack of knowledge, lack of time, forgetfulness, lack of skills, discomfort, skin irritation, and lack of training and for pharmacy students is prioritization of academic tasks over skincare routine (Nizar et al., 2016).

## Conclusions

This study shows that there is no significant relationship between the level of knowledge and compliance with sunscreen use in pharmacy students at the University of Muhammadiyah Kuningan. However, most students have a fairly good level of knowledge and good compliance with sunscreen use. Health students, especially pharmacy students, should be aware of the importance of using sunscreen to protect their faces from ultraviolet light exposure. Using sunscreen is not only an aesthetic treatment but also a preventative measure against the risk of skin damage, including skin cancer. Therefore, education about the importance of regular sunscreen use is still needed to raise student awareness in maintaining healthy skin.

## Funding

This research received no external funding.

## Acknowledgments

The author would like to express his gratitude and appreciation especially to the Muhammadiyah University of Kuningan and all the pharmacy student respondents who were willing to help carry out this research.



---

## Conflicts of Interest

This authors declare no conflict of interest.

## References

- Ahnafani MN, Kurniawati D, Hakim AR, Yuwindry I, Kesehatan F, Mulia US. The level of knowledge and use of sunscreen in Palangka Raya High School students. 2024; 18(8):965–71.
- Darsini, Fahrurrozi, & Cahyono EA. Knowledge: Article Review. J Nursing. 2019; 12(1):95–107.
- Diah Ningsih V, Nur Atiqah S. Formulation and Test of SPF (Sun Protection Factor) Value of Moringa Leaf Extract (Moringa oliefreia) in Nanoemulsion Sunscreen Preparation. J Farm Tinctura. 2020; 2(1):18–24.
- Hujjah, S., & Siahaan S. Knowledge of Attitudes and Behaviors of Adolescents Aged 15-18 Years Towards the Use of Sunscreen atSMK Kesehatan 95 Yannas Husada Bangkalan. J Heal Science,. 2022; 3(1):2548–1398.
- Kurniawati D, AR Judge, Study P, Pharmacy S, Health F, Sari U, et al. The Relationship between the Level of Knowledge and Awareness of Women Employees in Kasongan Lama Village to the Importance of Using Sunscreen. Innov J Soc Sci Res. 2023; 3(4):9128–38.
- Kusumajaya KA. The Relationship Between The Level Of Knowledge Related To The Importance Of The Use Of Sunscreen For Skin Health And Compliance With The Use Of Sunscreen In Preclinical Students Of The Faculty Of Medicine Of Al-Azhar Islamic University. Nucl Phys. 2023; 13(1):104–16.
- Masturoh I TN. Health research methodology. Health Human Resources Development and Empowerment Agency; 2018;
- Mumtazah, E. F., Salsabila, S., Lestari, E. S., Rohmatin, A. K., Ismi A., Rahmah, H. A., Mugiarto, D., Daryanto, I., Billah, M., Salim, O. S. D, R., Astra, A. D., Zainudin, L. B., Noorrizka, G., & Ahmad V. Knowledge of Sunscreen and the Dangers of Sun Exposure of Civil Engineering Students to the Use of Sunscreen. J Farm Community,. 2020; 7(2):63–68.
- Nizar MF, Tuna H, Sumaningrum ND. The Relationship between Worker Characteristics and Compliance in the Use of Personal Protective Equipment (PPE) in Clinical Laboratory Officers at Kediri City Baptist Hospital. Prev Indones J Public Heal. 2016; 1(1):1.
- Nurfitriani, Rumi, A., & Sultan A. Factors Related to Knowledge of Sunscreen Use in Tadulako University Students. J Heal Science,. 2021; 2(4):2723–4339.
- Putri YD, Kartamihardja H, Lisna I. Formulation and Evaluation of Stevia Leaf Extract Sunscreen Lotion (Stevia rebaudiana Bertoni M). Formulation and Eval Sunscreen Lotion with Stevia Leaf Extract (Stevia rebaudiana Bertoni M). 2019; 6(1):32–6.
- Rahmawati R, Muflihunna A, Amalia M. Analysis of UV Protection Activity of Soursop Fruit Juice (*Annona Muricata* L.) based on the Value of Sun Protection Factor (SPF) by UV-Vis Spectrophotometry. J Phytopharma Indonesia. 2018; 5(2):284–8.
- Rhamadany CC. Comparison of the Knowledge Level of Students of the Faculty of Medicine and NonFaculty of Medicine, University of North Sumatra regarding Pneumonia in Children Under Five. 2021;

- 
- Salenda R, Teresa A, Widodo T, Arifin S, Adelgrit Trisia. The Relationship Between Knowledge Level And Compliance With The Use Of Sunscreen In Online Motorcycle Taxi Drivers In Palangka Raya City. 2025; 3(1):1-8.
- Suryantari, S. A. A., Satyarsa, A. B. S., Undriani, I. G. A. T., Sudarsa, P., Rusyati, L. M. & A, S. M. The relationship between knowledge level and attitude regarding sun exposure and skin cancer in Marine and Fisheries students of Udayana University Bali. *Essence, Sci Med J.*, 2019; 17(1):5-8.
- Wadoe M, Syifaudin DS, Alfianna W, Aifa FF, D. P. N, Savitri RA, et al. The Use and Knowledge of Sunscreen in Unair Students. *J Farm Community*. 2020; 6(1):1.
- 

CC BY-SA 4.0 (Attribution-ShareAlike 4.0 International).

This license allows users to share and adapt an article, even commercially, as long as appropriate credit is given and the distribution of derivative works is under the same license as the original. That is, this license lets others copy, distribute, modify and reproduce the Article, provided the original source and Authors are credited under the same license as the original.

