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Association Between Knowledge Level and Attitudes Towards Sunscreen Use Behavior

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ABSTRACT

Prolonged exposure to sunlight can lead to skin damage caused by ultraviolet (UV) radiation. Protective measures are essential when considering the dangers of UV radiation. One effective method of protecting the skin from such radiation is to apply sunscreen. The aim of this study is to determine the relationship between knowledge and attitude towards the use of sunscreen. The research design was analytical observation using a cross-sectional approach with a questionnaire as the data collection instrument. Technical abbreviations that are being used will be explained at the beginning of the questionnaire section. The study was conducted in SMK Garuda Nusantara Karangawen, Demak. The participants were female students aged 16-18 years belonging to grade X-XII. A total of 180 respondents were selected using the accidental sampling technique. Data were gathered through the distribution of online questionnaires via Google Forms, which were shared via WhatsApp groups for each grade with the help of school teachers. The questionnaire began with informed consent, which included the name, age and class of the students. The questionnaire consisted of 14 questions regarding knowledge about sunscreen, 10 questions focused on respondents' attitudes toward sunscreen use, and 13 questions concerned with their sunscreen use behavior. The collected data were analyzed utilizing the Spearman Rank correlation test.The results show that the 180 students that were tested, 58.9% showed that they have enough knowledge about sunscreen. The majority of students (69.4%) demonstrated excellent sunscreen use behavior, and almost all of the children had a positive attitude toward using sunscreen. The rank spearman correlation test revealed no correlation between sunscreen knowledge and application (p=0.788). A ranked Spearman's test result for the sunscreen attitude variable revealed a (p=0.132), demonstrating a lack of relationship between sunscreen knowledge and sunscreen usage behaviour. All in all, there is no significant relationship between knowledge and attitude towards sunscreen use behavior.

Keywords: *Behavior, Knowledge, Sunscreen*

1. INTRODUCTION

The equator-bound nation of Indonesia has a tropical climate. Due to Indonesia's proximity to the equator, it experiences intense sunlight. Sun exposure can cause damage to the skin due to ultraviolet (UV) radiation.[1] In addition, climate change caused by global warming can lead to higher exposure to UV rays. UV light has a wavelength of 100-400 nm and is divided into three types, namely: UV A (315-400 nm), UV B (280-315 nm) and UV C

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(100-280 nm). UV C rays can be absorbed by ozone, water vapor, oxygen, and carbon dioxide because the ozone layer more easily absorbs short UV wavelengths.[2] UV A light cannot be absorbed at all, as opposed to UV Blight, which is only slightly absorbed such that it can still permeate the earth. [3]

It is clear that the ozone layer has the ability to block the entry of UV B and UV C rays. Therefore, if the ozone layer is continually diminished, the earth may be exposed to UV C rays that are dangerous to the life being. Due to the fact that UV A is not absorbed by the ozone layer, it can penetrate further into the skin and have harmful effects such as early aging, weakened immunity, skin cancer, melasma, and blindness. [4]

Despite the fact that the body has a built-in defense mechanism against UV radiation, the skin must be protected because of the risks it poses.[5] Generally speaking, there are two types of techniques to protect the skin from the risks of UV radiation: physical protection, such as wearing umbrellas, wide hats, long-sleeved shirts, long-sleeved pants, and so on; and chemical protection, such as using sunscreen. [6] Additionally, chemical protection can be achieved by putting sunscreen or other sun protection chemicals directly on the skin. [3]

Given the numerous risks posed by UV radiation from the sun, skin protection is necessary. Using sunscreen is one approach to shield the skin from UV radiation. A skincare product called sunscreen uses ultraviolet filters to shield the skin from UV rays. SPF (Sun Protection Factor) is a frequent name for this filter. Sunscreen is often referred to as the gold standard of skin protection from UV rays. The suggested sunscreen is broad-spectrum (UVA and UVB protection), water-resistant, and has an SPF value of 30 or above. To get the best protection function, the application technique and quantity of sunscreen must be taken into account. [7, 8]

Based on previous research, it is known that public knowledge and awareness of the importance of using sunscreen in daily activities is still low. This study was carried out on schoolchildren in order to educate them about the value of skin protection from an early age before entering into the employment period. When they enter employment, it's expected that students will be accustomed to using sunscreen.

2. METHOD

This study used a qualitative method with a cross sectional approach. It was conducted during June - July 2023 at SMK Garuda Nusantara Karangawen, Demak. There were up to 180 students in grades X–XII, ages 16–18, who participated in the survey. The sampling method was obtained by simple random sampling technique. Data was gathered through distributing online surveys created with Google Forms to groups on WhatsApp for each class, with the assistance of the school's teachers. Name, age, and class information are included in the questionnaire's informed consent section. Following that, there were 14 questions about sunscreen knowledge, 10 questions about the respondent's attitude toward applying sunscreen, and 13 questions about sunscreen usage behavior. By consulting the

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relevant literature, the questionnaire's content validity was checked, and a comparable check on 13 people using respondents as the criteria was done. Knowledge of sunscreen and attitude toward using sunscreen were the study's variables. The Spearman Rank correlation test was used for data analysis.

3. RESULTS

The research was conducted at SMK Garuda Nusantara during June - July 2023. The results of data collection were obtained as follows

Table 1. Analysis of student characteristics

Student characteristics	N	%
Gender		
Male	42	23,3
Female	138	76,7
Age		
15 years old	75	42,7
16 years old	88	48,9
17 years old	16	8,9
18 years old	1	0,6
Class		
X	179	99,4
XI	1	0,6

Based on Table 1, it is known that the respondents of this study were mostly female students, 76.7%. Respondents aged 16 years were the most (48.9%) while respondents aged 18 years were the least at 0.6% and almost all respondents (99.4%) were grade X students.

Table 2. Knowledge response analysis

No	Question	Item										Mean ± SD
		Strongly disagree		Disagree		Neutral		Agree		Strongly agree		
		n	%	n	%	n	%	n	%	n	%	
1	Sunlight can have a negative impact on skin	0	0,0	14	7,8	0	0,0	134	74,4	32	17,8	4,02 ± 0,70
2	The reason why sunlight can be bad for your skin	4	2,2	35	19,4	0	0,0	92	51,1	49	27,2	3,02 ± 1,11
3	Adverse effects that can occur due to sun exposure	1	0,6	11	6,1	0	0,0	131	72,8	37	20,6	4,07 ± 0,71
4	Safe time for sun exposure	3	1,7	17	9,4	0	0,0	136	75,6	24	13,3	3,89 ± 0,81
5	There are cosmetics that can protect from the sun	2	1,1	6	3,3	0	0,0	134	74,4	38	21,1	4,11 ± 0,66

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No	Question	Item										Mean ± SD
		Strongly disagree		Disagree		Neutral		Agree		Strongly agree		
		n	%	n	%	n	%	n	%	n	%	
6	Cosmetics that can protect from the sun	2	1,1	31	17,2	0	0,0	130	72,2	17	9,4	3,72 ± 0,90
7	The time one needs to use sunscreen	4	2,2	34	18,9	0	0,0	101	56,1	41	22,8	3,78 ± 1,07
8	Reasons one needs to use sunscreen at specific hours	3	1,7	27	15,0	0	0,0	110	61,1	40	22,2	3,87 ± 0,98
9	What can be prevented by regular use of sunscreen	5	2,8	42	23,3	0	0,0	112	62,2	21	11,7	3,57 ± 1,06
10	Benefits that can be gained from using sunscreen	2	1,1	8	4,4	0	0,0	99	55,0	71	39,4	4,27 ± 0,78
11	SPF stands for Sun Photochemistry Factor.	4	2,2	17	9,4	0	0,0	100	55,6	59	32,8	4,07 ± 0,95
12	The most ideal minimum SPF value	8	4,4	29	16,1	0	0,0	114	63,3	29	16,1	3,71 ± 1,06
13	Types of skin tones that require sunscreen	12	6,7	36	20,0	0	0,0	112	62,2	20	11,1	3,51 ± 1,13
14	Things that cause sunscreen effectiveness to decrease	10	5,6	59	32,8	0	0,0	88	48,9	23	12,8	3,31 ± 1,21

The analysis of knowledge responses in Table 2 shows that more students agreed with the statements about sunscreen knowledge, so the level of knowledge of students about sunscreen is mostly good. The majority of students (74.4%) who responded to the first question concurred that sunlight can harm skin. Additionally, more than half of the students (51.1%) agreed on the reason why sunlight can harm skin. The majority of students (72.8%) believed that sun exposure can have negative effects. The majority of students (75.6%) also concurred on the best time to be in the sun.

The proportion of students who agreed that there are cosmetics that can protect against the sun was also the highest (74.4%). Likewise, in the question about cosmetics that can protect from the sun, 72.2% of students also agreed. Students who agreed about the time one needs to use sunscreen were 56.6%. Students who agreed on the reason why one needs to use sunscreen at certain hours were 61.1%. The proportion of students who agreed on what can be prevented from using sunscreen regularly was 62.2%; while the number of students who agreed on the benefits of using sunscreen was 55.0%.

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Next, the majority of students (63.3%) responded positively to the query regarding the optimum SPF minimum value. The majority of students (62.2%) responded positively to the question about what skin tone needs sunscreen. In response to the topic of what makes sunscreen less effective, 48.9% of students agreed and 32.8% disagreed.

Table 3. Analysis of attitude responses

No	Question	Item	Strongly disagree		Disagree		Neutral		Agree		Strongly agree		Mean ± SD
			n	%	n	%	n	%	n	%	n	%	
1	Using *sunscreen* is important for you		2	1,1	6	3,3	0	0,0	134	74,4	38	21,1	4,11 ± 0,66
2	Your considerations in choosing which sunscreen to buy		2	1,1	31	17,2	0	0,0	130	72,2	17	9,4	3,72 ± 0,90
3	Your considerations in choosing a *sunscreen* based on SPF value		4	2,2	34	18,9	0	0,0	101	56,1	41	22,8	3,78 ± 1,07
4	SPF value you will choose			0,0	26	14,4	0	0,0	140	77,8	14	7,8	3,79 ± 0,78
5	The parts of the body that you think most need to use *sunscreen*		7	3,9	46	25,6	0	0,0	81	45,0	46	25,6	3,63 ± 1,22
6	Length of time the *sunscreen* can be absorbed into the skin		2	1,1	8	4,4	0	0,0	99	55,0	71	39,4	4,27 ± 0,78
7	Selection of *sunscreen* by type		4	2,2	17	9,4	0	0,0	100	55,6	59	32,8	4,07 ± 0,95
8	Reasons to use sunscreen		8	4,4	29	16,1	0	0,0	114	63,3	29	16,1	3,71 ± 1,06
9	What to do to protect your skin from the sun in the absence of sunscreen		12	6,7	36	20,0	0	0,0	112	62,2	20	11,1	3,51 ± 1,13
10	Reasons for not or forgetting to use *sunscreen*		10	5,6	59	32,8	0	0,0	88	48,9	23	12,8	3,31 ± 1,21

Students often replied affirmatively, indicating a generally positive attitude, according to the analysis of attitude responses for each question in Table 3. 74.4% of students responded "yes" to the first question about how vital it is to apply sunscreen. In response to the second question, 72.2% of students indicated that they would think about buying sunscreen. 56.1% of students responded positively to the third question about choosing sunscreen based on SPF value. 77.8% of students correctly responded to the fourth question regarding the SPF value to be selected. The fifth question, which asked students to name

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the body parts that need sunscreen the most, received a positive response from 45.0% of the class.

The sixth question, about how long sunscreen can stay absorbed in the skin, was answered correctly by 55.0% of students. When asked to choose sunscreen based on skin type, 55.6% of students said yes to the seventh question. The seventh question about the benefits of using sunscreen was answered correctly by 63.3% of students. In response to the ninth question, 62.2% of students said they could protect their skin from the sun without using sunscreen. In response to the tenth question, which addressed why people could forget to wear sunscreen, 48.9% of students said yes.

Table 4. Behavioral response analysis

No	Question	Item Strongly disagree		Disagree		Neutral		Agree		Strongly agree		Mean ± SD
		n	%	n	%	n	%	n	%	n	%	
1	You use sunscreen regularly every day	31	17,2	23	12,8	30	16,7	35	19,4	61	33,9	3,40 ± 1,49
2	Use suncreen for face and neck	30	16,7	23	12,8	34	18,9	44	24,4	49	27,2	3,33 ± 1,43
3	You reapply sunscreen every 2 hours	60	33,3	39	21,7	42	23,3	10	5,6	29	16,1	2,49 ± 1,42
4	You apply sunscreen before swimming	73	40,6	21	11,7	24	13,3	22	12,2	40	22,2	2,64 ± 1,62
5	You apply sunscreen after swimming and sweating	97	53,9	20	11,1	25	13,9	11	6,1	27	15,0	2,17 ± 1,50
6	You choose a sunscreen that has both UV A and UV B protection	23	12,8	27	15,0	33	18,3	29	16,1	68	37,8	3,51 ± 1,44
7	You repurchase sunscreen when it runs out	31	17,2	25	13,9	19	10,6	30	16,7	75	41,7	3,52 ± 1,55
8	You apply sunscreen 15-30 minutes before doing outdoor activities	33	18,3	25	13,9	36	20,0	36	20,0	50	27,8	3,25 ± 1,46
9	You use sunscreen when you're indoors	53	29,4	32	17,8	37	20,6	24	13,3	34	18,9	2,74 ± 1,48
10	You use makeup products (such as powder) that contain SPF but still use sunscreen	56	31,1	19	10,6	32	17,8	26	14,4	47	26,1	2,94 ± 1,60
11	You sometimes forget to use sunscreen because you're in a hurry	39	21,7	26	14,4	48	26,7	40	22,2	27	15,0	2,94 ± 1,36
12	You pay attention to the expiration date of the sunscreen I use	21	11,7	14	7,8	26	14,4	43	23,9	76	42,2	3,77 ± 1,37
13	You pay attention to the expiration date of the sunscreen I use	22	12,2	17	9,4	24	13,3	38	21,1	79	43,9	3,75 ± 1,41

The results of the behavioral response analysis in Table 4 show that students' responses to each question are very varied. In the first question more students (33.9%) regularly use sunscreen every day. In the second question about the use of sunscreen for the face and neck, the answer was always to use on both surfaces (27.2%). However, the majority

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of students (33.3%) said never to the third question about applying sunscreen every 2 hours, and the majority of students (40.6%) answered never to the fourth question about applying sunscreen before swimming. Students (53.9%) answered never to the fifth question about wearing sunscreen after swimming and sweating.

In the sixth question, the majority of students (37.8%) always chose sunscreen with UVA and UVB protection. In the seventh question, 41.7% of students always return to buy sunscreen when it runs out. In the eighth question, 27.8% of students said they always wore sunscreen 15-30 minutes before doing outside activities, while 20.0% said they often or sometimes did. In the ninth question, 29.4% of students said they never used sunscreen indoors.

In the tenth question, 31.1% of students never use makeup products (such as powder) that contain SPF but use sunscreen. In the eleventh question there were 26.7% of students who sometimes forgot to use sunscreen because they were in a hurry. In the twelfth question there were 42.2% who always paid attention to the expiration date of the sunscreen used; and in the thirteenth question there were 43.9% of students who paid attention to the expiration date of the sunscreen that they used.

Table 5. Analysis of knowledge level, attitude, and behavior

Assessment category	N	%	Score
Knowledge			
Good	106	58,9	≥ 75%
Simply	71	39,4	> 56% - 74%
Less	3	1,7	< 55%
Attitude			
Positive	179	99,4	≥ 50%
Negative	1	0,6	< 50%
Behavior			
Good	125	69,4	≥ 50%
Not good	55	30,6	< 50%
Total	**180**	**100**	

Based on Table 5, it was found that out of 180 students, more than half (58.9%) had good knowledge about sunscreen and only 1.7% had poor knowledge. Based on attitude, it was found that almost all students had a positive attitude towards the use of sunscreen, and most students (69.4%) had good sunscreen use behavior.

Table 6. Normality and Homogeneity Test

	Normality (Kolmogorov Smirnov)		Homogeneity (Levene)	
	Sig.	**Description**	**Sig.**	**Description**
Knowledge	<0,001	Not normal	0,149	Homogeneous
Attitude	<0,001	Not normal	0,002	Not Homogeneous
Behavior	<0,001	Not normal		

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Table 6 shows that knowledge, attitude and behavior of using sunscreen have an abnormal data distribution as shown from the Kolmogorov Smirnov test results with a p value of <0.00l (p<0.05). The variance of knowledge data was found to be homogeneous (p>0.05), but the variance of attitude data was not homogeneous (p<0.002). The requirements for parametric tests were not met because the data distribution was not normal, so to determine the relationship between knowledge and attitudes with sunscreen use behavior was tested with Spearman Rank correlation.

Table 7. Relationship between knowledge and sunscreen use behavior

Knowledge	Sunscreen usage behavior				Total		*p*
	Good		Not good				
	n	%	n	%	n	%	
Good	74	69,8	22	30,2	106	100,0	0,873
Simply	50	70,4	21	29,6	71	100,0	
Less	1	33,3	2	66,7	3	0,0	
Total	125	69,4	55	30,6	180	100,0	

Table 7 shows that out of 74 students with good knowledge about sunscreen, most (69.8%) had good behavior. Most (70.4%) students with sufficient knowledge also have good behavior, but of the 3 students with poor knowledge (66.7%) have poor behavior. The Rank Spearman correlation test results indicate that there is no association between sunscreen knowledge and sunscreen use behavior, with a p value of 0.788 indicating that p>0.05.

Table 8. Relationship between attitude and sunscreen use behavior

Attitude	Sunscreen usage behavior				Total		*p*
	Good		Not good				
	n	%	n	%	n	%	
Positive	125	69,8	54	30,3	179	100,0	0,132
Negative	0	0,0	1	100,0	1	100,0	
Total	125	69,4	55	30,6	180	125	

Table 8 shows that out of 179 students who have a positive attitude, most (69.8%) have good behavior; while from 1 student with a negative attitude shows poor behavior. Based on the results of the Spearman Rank correlation test, the p value is 0.132 because p>0.05, it is stated that there is no relationship between attitude and sunscreen use behavior.

4. DISCUSSION

According to the data in the table above, the majority (69.8%) of the 74 students who had good understanding of sunscreen displayed good behavior, but there were some (30.2%) who did not. This study indicates that there is not a significant association between knowledge level and behavior, with the findings of the analysis showing a value of p=0.132.

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These findings back up previous research (Nafi et al., 2022) that shows there is no relevant relationship between knowledge and sunscreen use. [9] Other research that claim there is no correlation between knowledge and sunscreen use among students at Mulawarman University complement these findings. [10] According to Nurfitriani's research from 2021, one of the things that affect a person's knowledge is their age. [11]

Age affects their cognition, and their thinking style evolves with age, thus the knowledge they gather improves. This can happen because younger kids are much more likely to acquire knowledge about the use of sunscreen because they have an environment that encourages or affects them to be more curious about the use of sunscreen, and this is one of the elements that affect their knowledge. With the development of technological advances, sunscreen use can also be influenced by other variables such as information obtained from various mass media platforms. This may be due to the fact that it is easy to get information about sunscreens by using available mass media resources. Information on sunscreen also can be obtained through various sources, including books, magazines, newspapers, radio, television and the internet. Furthermore, teenagers like content regarding skincare. This information is also readily available, particularly for teenagers and university students who utilize social media for entertainment and knowledge. [12] The Rank Spearman correlation analysis of attitude and sunscreen use behavior produced a p value of 0.132, indicating that there was no statistically significant association between the two variables. These findings are consistent with Hujjah's 2022 research, which found no significant association between sunscreen attitude and behavior at Yannas Husada Health Vocational School. [13] In this example, there are several elements influencing respondents' attitudes, including their level of knowledge. The higher the level of knowledge, the higher the level of attitude, and vice versa. Someone with good knowledge can have a positive attitude. A newly established cognitive base alters our perception of something as we learn more about it. In order to create a certain attitude, suggestive messages supplied by information might provide an emotive basis for perceiving and judging something.[14]

5. CONCLUSION

The study's results revealed that there was no statistically significant association between students' knowledge and opinions regarding sunscreen use behavior. Although responders are familiar with sunscreen, further education about the usage of sunscreen that can protect against UV rays is required.

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