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Effect of Education on Knowledge and Attitude Level Related to Vitamin D in Pharmacy Students

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Abstract

Indonesia is a country located in the tropics with sun exposure throughout the season. Sun exposure is the best source of vitamin D and there have been no cases of vitamin D intoxication due to excessive sun exposure. Pharmacy students tend to lack knowledge of vitamin D. Changes in lifestyle and modernization lead to high use of sunscreens which can lead to a decrease in the synthesis of vitamin D in the skin. This research was conducted to determine the differences in knowledge and attitudes towards sun exposure using cross sectional method on 100 first semester pharmacy students and 100 final semester students. Test differences in aspects of knowledge and attitudes using odds ratios. The results of the knowledge aspect odds ratio test are 1,000 and the attitude aspect odds ratio test results were 0.583 so that it can be concluded that both knowledge and attitudes towards sun exposure have the same risk tendency for first semester and final semester pharmacy students.

Keywords: attitude, knowledge, pharmacy, vitamin D

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1 Introduction

Indonesia is a country located in the tropics with sun exposure throughout the season. Exposure to sunlight is one of the most abundant sources of vitamin D in Indonesia, which is exposed to sunlight all year round. Vitamin D is not as well-known as other vitamins, because most people think that vitamin D is easy to get [1,2]. Sun exposure is the best source of vitamin D and there are no cases of vitamin D intoxication due to excessive sun exposure [3]. Lack of exposure to sunlight is still one of the main problems in the health sector [4]. Deficiency of vitamin D can cause skin cancer, osteoporosis, hypertension, obesity and others [5,6].

Nearly 1 billion people worldwide are deficient in vitamin D [7,8]. Vitamin D deficiency is influenced by lifestyle. A low lifestyle tends to avoid sun exposure [9]. Data shows that nearly 1/3 of the American population is deficient in vitamin D [10]. Meanwhile in Europe, Australia, South America, Saudi Arabia, the United Arab Emirates, Turkey, India, Lebanon, around 30-50% have a high risk of vitamin D deficiency. In South Asia it is estimated that around 70% while in Southeast Asia between 6-70% of adults are at risk of vitamin D deficiency [11,12]. Sources of vitamin D are sun exposure, food and supplements. Foods rich in vitamin D such as milk, eggs, fish, shrimp, cheese, fish oil, spinach, soybeans. Even though the main source for the body is exposure to sunlight, it still requires food, because without food ingredients containing provitamin D, the process of forming vitamin D with the help of sunlight will not occur [13,14]. Lack of knowledge about vitamin D is a factor in the occurrence of vitamin D deficiency [15]. A person's knowledge determines his attitude, the better the knowledge, the better the attitude of a person. This study was conducted to determine differences in knowledge and attitudes towards sun exposure in pharmacy students in the early and final semesters. The indicators used to determine knowledge and attitudes towards light exposure use a questionnaire [16,17].

According to research by Malaeb et al. [18], chosed pharmacy students because pharmacy students tend to lack vitamin D knowledge, but later as pharmacists they should have capacity on drug therapy and collaborate in monitoring and optimizing vitamin D supplements in all patients, especially those at high risk. The Ministry of Health of the Republic of Indonesia, has made the problem of lack of sun exposure a nutritional status problem that needs to be identified and paid attention to. To support the government program, the involvement and active role of health workers is needed. The role of pharmacy according to APTFI (2013) [19], is being able to prepare information about drugs and treatment, being able to manage information services, consultations, education about drugs and treatment as well as preventive measures. This research is the initial data to describe students, especially students in the health sector, including pharmacy. The purpose of this study was to determine differences in knowledge and attitudes towards sun exposure in pharmacy students in the early and final semesters.

2 Experimental section

2.1 Research design

This type of research is a cross sectional research design. Data collection is carried out at one time. This research was conducted by observing knowledge and attitudes towards sun exposure in pharmacy students in the early and final semesters. When the research will be carried out in September-December 2017. The research is carried out at the Faculty of Pharmacy, University of Surabaya.

2.2 Research variable

The variables of this study were pharmacy students, knowledge and attitudes towards sun

exposure. In the first semester of pharmacy students, it is assumed that students are experiencing changes in the environment from high school to college, so they have to adapt to a new environment. A final semester pharmacy student is someone who is in a period of study for more than 4 years or has taken a final assignment in the form of a thesis.

The level of knowledge was measured by a questionnaire, included: what is vitamin D, sources of vitamin D, benefits of vitamin D, due to lack of vitamin D, can sunlight produce vitamin D, is sunlight harmful to the skin, is it a good time to be exposed to direct sunlight, how much is it? the length of time it takes the body to be exposed to sunlight. The level of attitude was measured by a questionnaire, included: how often do you travel or take a walk in direct sunlight, how long per day are exposed to direct sunlight avoiding sun exposure, reasons for avoiding sun exposure, whether to use skin protection equipment, whether to take supplements, whether to use sufficient vitamin D in the body [17,20,21,22].

2.3 Population and Sample

The population of this study were students of the Faculty of Pharmacy at the University of Surabaya. The sample in this study were pharmacy students in the first semester and final semester pharmacy students who met the inclusion and exclusion criteria and were willing to fill out a questionnaire at the University of Surabaya. The criteria for research subjects were not having mental disorders/disabilities, and not suffering from skin cancer. In this study for sampling using non-probability sampling technique by quota sampling.

The calculation of the subject size uses the formula in equation 1.

$$n = \frac{N}{1 + N\ (d^2)} \qquad \text{(Equation 1)}$$

Information :
n = sample size
N = population size
d = desired level of confidence or degree of accuracy (0.1)

From the results of the calculation of the formula equation 1, it can be seen that there are 2294 students who are active in the first semester and final semester students who are still active as a population. The minimum target sample to be taken as respondents is 100 first semester pharmacy students and 100 final semester pharmacy students.

2.4 Data analysis

The stages of processing data from this research are as follows:

1. Data coding (data coding), data coding is a process of systematically compiling raw data (which is in the questionnaire) into a form that is easier to read by data processing machines with the help of the SPSS software program for windows version 24.
2. The data that has been obtained from the questionnaire is then analyzed to compare knowledge and attitudes towards sun exposure in pharmacy students in the early and final semesters.

Knowledge classification is divided into 2 groups, namely: A score of 75% and above was classified as having good knowledge and <74% as less. Meanwhile, attitude classification is divided into 2 groups, a score of 75% and above was classified as having good attitude and <74% as less [23].

3 Results and Discussion

3.1 Questionnaire Test Results

The validation process was carried out on 30 people with characteristics appropriate to the research respondents, namely active students at the Faculty of Pharmacy at the University of Surabaya (they will not be involved as research respondents). The results of the validity test showed that all knowledge questions on sun exposure were declared valid, because the value of r_{count} (Corrected Item-Total Correlation) > r_{table} was 0.361. The reliability test was carried out on the knowledge question item on sun exposure which was declared reliable because it had a Cronbach Alpha value of 0.61-0.80. The results of the validity test showed that all attitude questions regarding sun exposure were declared valid, because the r_{count} (Corrected Item-Total Correlation) > r_{table} was 0.361 (Table 1).

Table 1. Validity and Reliable Test of Knowledge on Sun Exposure

No	Question	Validity Test		Reliability Test	
		Corrected Item-Total Correlation	Conclusion	Cronbach's Alpha	Conclusion
1.	a. Know about vitamin D b. If yes, that is known regarding vitamin D	0,486	Valid	0,622	11
2.	Source information about vitamin D	0,370	Valid		
3.	Source greatest vitamin D	0,439	Valid		
4.	Benefits of vitamin D for body	0,442	Valid		
5.	Consequence from vitamin D deficiency	0,373	Valid		
6.	Reason body vitamin D deficiency	0,447	Valid		
7.	a. Ray sun can help produce vitamin D b. If yes, the reason	0,439	Valid		
8.	a. Ray sun dangerous for skin b. If yes, the reason	0,438	Valid		
9.	Good time for caught exposure ray sun in a manner direct to the body get vitamin D	0,455	Valid		
10.	The length of time needed by the body for exposed ray sun in a manner directly to get vitamin D	0,381	Valid		
11.	Good amount of SPF (Sun Protection Factor). for body	0,528	Valid		

Table 2. Profile Answers Knowledge related to Vitamin D

No.	Question	Answer	Group			
			First semester		Final semester	
			Frequency (n:100)	Percentage (%)	Frequency (n:100)	Percentage (%)
1.	Know about vitamin D	Yes	93	93.00	83	83.00
		No	7	7.00	17	17.00
	If yes, that is known regarding vitamin D	Vitamins for health bone	63	63.00	53	53.00
		Derived vitamins from ray sun	7	7.00	10	10.00
		Fat soluble vitamins	5	5.00	9	9.00
		Absorption calcium in the intestine	16	16.00	3	3.00
		For defense body	2	2.00	8	8.00
2.	Source information about vitamin D*	Pharmacists/nurses/doctors/other health workers	16	16.00	26	26.00
		Family	22	22.00	23	23.00
		Book	51	51.00	56	56.00
		School	71	71.00	62	62.00
		Other	8	8.00	26	26.00
3.	Source greatest vitamin D	Vitamins or supplements	4	4.00	17	17.00
		Vegetable	4	4.00	7	7.00
		Sun	77	77.00	64	64.00
		Meat	7	7.00	6	6.00
		Other	4	4.00	1	1.00
		Don't know	4	4.00	5	5.00
4.	Benefits of vitamin D for body*	For skin health	2	2.00	7	7.00
		For bone health	99	99.00	78	78.00
		Prevent jaundice in babies	-	-	1	1.00
		Prevent cancer	-	-	1	1.00
		For the body's immune system	11	11.00	7	7.00
		Don't know	5	5.00	7	7.00
5.	Consequence from vitamin D deficiency*	Cancer	7	7.00	20	20.00
		Obesity	6	6.00	4	4.00
		Increased cholesterol	3	3.00	3	3.00
		Bone disease	95	95.00	89	89.00
		High blood pressure	6	6.00	5	5.00
		Other	2	2.00	-	-
6.	Reason body vitamin D deficiency*	Use of an umbrella during the day	31	31.00	32	32.00
		Sunbathing on the beach during the day	4	4.00	9	9.00
		Do regular physical activity	3	3.00	12	12.00
		Wear closed clothes	33	33.00	43	43.00
		Use sunscreen	56	56.00	35	35.00
		Other	3	3.00	5	5.00
		Don't know	5	5.00	5	5.00

Table 2. Continue……

No.	Question	Answer	Group			
			First semester		Final semester	
			Frequency (n:100)	Percentage (%)	Frequency (n:100)	Percentage (%)
7.	Ray sun can help produce vitamin D	Yes	49	49.00	38	38.00
		No	51	51.00	62	62.00
	If yes, the reason	Good for bone health	19	19.00	8	8.00
		Sunlight is the main source of vitamin D	14	14.00	9	9.00
		Increases the synthesis of vitamin D with the help of UV sunlight	10	10.00	3	3.00
		Converts provitamin D to vitamin D	6	6.00	17	17.00
		Helps absorption of calcium in the intestine	-	-	1	1.00
8.	Ray sun dangerous for skin	Yes	81	81.00	75	75.00
		No	8	8.00	15	15.00
		Don't know	11	11.00	10	10.00
	If yes, the reason:	Exposure during the day	8	8.00	10	10.00
		Exposure too long and too often	12	12.00	7	7.00
		UV rays from the sun	2	2.00	16	16.00
		Causes skin problems	22	22.00	12	12.00
		The skin darkens	8	8.00	5	5.00
		Skin cancer	27	27.00	25	25.00
		Harm the health of the eyes, skin and body	2	2.00	-	-
	If not, the reason:	Sunlight has its benefits	2	2.00	3	3.00
		Sunlight is a source of vitamin D	4	4.00	1	1.00
		Sunlight is good for health	2	2.00	11	11.00
9.	good time for caught exposure ray sun in a manner direct to the body get vitamin D	06.00-10.00 WIB	98	98.00	96	96.00
		10.00-14.00 WIB	2	2.00	3	3.00
		14.00-17.00 WIB	-	-	1	1.00
10.	The length of time needed by the body for exposed ray sun in a manner directly to get vitamin D	5-15 minutes	42	42.00	23	23.00
		15-30 minutes	34	34.00	58	58.00
		30-60 minutes	24	24.00	13	13.00
		>1 hour	-	-	5	5.00
		Don't know	-	-	1	1.00
11.	Good amount of SPF (Sun Protection Factor). for body	< 15	19	19.00	8	8.00
		>15	43	43.00	48	48.00
		Don't know	38	38.00	44	44.00

*) answer can more from 1

3.2 Characteristics of Respondents

The first semester of pharmacy students consists of 100 people, while the final semester of pharmacy students consists of 100 people. Pharmacy student respondents in the early and final semesters were 200 people. It is known that the frequency distribution of gender in first semester pharmacy students is 24% for males, while 76% for females. The number of male final semester pharmacy students is 29% while the female is 71%. The number of pharmacy students in the first semester and final semester is more female than male.

Gender can affect research results. Women in this study had better knowledge about sun protection and the use of sunscreen, so that the use of sunscreen was higher than men. This would affect respondents' attitudes towards sun exposure [16,24].

3.3 Frequency Distribution of Knowledge related to Vitamin D

Research on knowledge of sun exposure in pharmacy students in the first semester and the final semester was carried out giving a score to each question item answered by each respondent (Table 2).

Based on the SPSS results, the odd ratio test results for knowledge related to vitamin D where the OR value was 1.000 with a significance level of CI95% 0.197–5.078 showed that in the first semester the risk of poor knowledge was 1 times higher than in the final semester, so final semester pharmacy students had good knowledge compared to early semester pharmacy students. Based on the results of the analysis using the chi-square test to see the differences in knowledge related to vitamin D between the early and final semester groups, the results showed that there was no significant difference between the two (p value>

0.05), indicating that there was no significant difference in knowledge of vitamin D. Sun exposure in pharmacy students in the first and final semesters.

3.4 Attitude Risk Comparison Test Results related to Vitamin D

Research regarding attitudes towards sun exposure in pharmacy students in the first and final semesters was carried out by giving a score to each question item answered by each respondent (Table 3).

Table 3. Profile Answers Attitude related to Vitamin D

No.	Question	Answer	Group			
			First semester		Final semester	
			Frequency (n:100)	Percentage (%)	Frequency (n:100)	Percentage (%)
1.	Travel often or take a walk below ray sun in a way direct	Yes	74	74.00	78	78.00
		No	26	26.00	22	22.00
2.	Long exposure ray sun in a way direct every day	<5 minutes per day	8	8.00	5	5.00
		5-10 minutes/day	20	20.00	28	28.00
		10-15 minutes/day	40	40.00	28	28.00
		15-30 minutes/day	32	32.00	39	39.00
3.	Avoid exposure ray sun in a way direct	Yes	79	79.00	64	64.00
		No	21	21.00	36	36.00
	If yes , the reason:	Midday sunlight is not good for the body	10	10	-	-
		Causes skin problems	7	7.00	8	8.00
		Heat from sunlight (UV)	16	16.00	13	13.00
		Causes black/dark skin	40	40.00	35	35.00
		Sweaty and uncomfortable	6	6.00	4	4.00
		Lifestyle	-	-	1	1.00
		Skin cancer	-	-	3	3.00
4.	Use tool protector skin from exposure ray sun in a way direct	Yes	93	93.00	87	87.00
		No	7	7.00	13	13.00
	* Protective equipment used:	Umbrella	25	25.00	16	16.00
		Hat	18	18.00	13	13.00
		Jacket	49	49.00	76	76.00
		Veil solar / *sunblock*	55	55.00	56	56.00
		Other	6	6.00	6	6.00
		Don't use it tool protector	2	2.00	1	1.00
5.	Reasons to use tool protector	Easy to use , easy attainable and effective	32	32.00	17	17.00
		Protect skin from hot ray sun (UV)	22	22.00	30	30.00
		Protect skin so that it doesn't dark , burning and cancerous	6	6.00	2	2.00
		Protect skin so that it doesn't dark (scorched)	16	16	30	30.00
		Guard health skin	13	13	4	4.00
		Protect skin when drive	2	2	2	2.00
		Protect head	-	-	1	1.00
		Multifunction	2	2.00	1	1.00
6.	Consume supplement	Yes (contains vitamin D)	1	1.00	2	2.00
		No	99	99.00	98	98.00
7.	If yes (contains vitamin D), the reason:	Guard health	1	1.00	2	2.00
8.	Vitamin D requirement in body	Yes	70	70.00	47	47.00
	Already sufficient	No	30	30.00	53	53.00
	If yes , the reason:	Frequent exposure to sunlight	10	10.00	9	9.00
		Healthy lifestyles	14	14.00	17	17.00
		Feel healthy	32	32.00	18	18.00
		Consume foods that contain vitamin D	14	14.00	3	3.00
	If not the reason:	Unhealthy lifestyle	3	3.00	4	4.00
		Feeling that the need for vitamin D is still lacking	27	27.00	49	49.00
9.	Interested For know more Lots about vitamin D	Yes	96	96.00	92	92.00
		No	4	4.00	8	8.00
	If yes , the reason:	For health	34	34.00	21	21.00
		Increase knowledge	54	54.00	64	64.00
		Just curious	6	6.00	7	7.00
		Related to cosmetics	2	2.00	-	-
	If not , the reasons are:	Don't want to know about vitamin D	4	4.00	8	8.00

Table 4. Classification of Knowledge and Attitude related to Vitamin D

Classification Knowledge related to Vitamin D	Respondent group			
	First semester		Final Semester	
	Frequency (n:100)	Percentage (%)	Frequency (n:100)	Percentage (%)
Good	97	97.00	97	97.00
Less	3	3.00	3	3.00
Classification Attitude related to Vitamin D				
Good	10	10.00	16	16.00
Less	90	09.00	84	84.00
Total	100	100.00	100	100.00

Table 4 showed the results of the knowledge data analysis in the first semester and final semester pharmacy student groups. The initial semester pharmacy student group with good knowledge category was 97% and 97% for the final semester pharmacy student group. The number of each group for the bad knowledge category, first semester pharmacy students was 3% and final semester students were 3%. The results of attitude data analysis for groups of pharmacy students in the first and final semesters. The group of pharmacy students in the first semester with a good attitude category was 10% and 16% for the group of pharmacy students in the final semester. The number of each group for the bad attitude category, initial semester pharmacy students was 90% and final semester students was 84%.In this study, respondents were first semester pharmacy students who often traveled or took walks in direct sunlight (74%) and final semester students (78%), while students who did not often travel or take walks in direct sunlight pharmacy first semester (26%) and final semester (22%). As in the study of Zareef and Jackson [25], the majority had changed attitudes towards sun exposure by going out in the sun, while a smaller proportion consumed supplements/foods containing vitamin D.

If a person values bone health and believes that vitamin D helps with bone health, they may be more likely to take a vitamin D supplement to ensure their bone health. In addition, people should know where and how to get vitamin D, as well as how much is needed to maintain certain health benefits, which knowledge informs. On the other hand, if people do not know that vitamin D is necessary for proper bone growth and they do not know where to get vitamin D, they are more likely to take actions that ensure adequate vitamin D [26,27]. In this study, respondents from first semester pharmacy students consumed supplements containing vitamin D to maintain health (1%), while final semester students (2%). Respondents who did not take supplements were first semester pharmacy students (99%) while final semester students (98%). Other studies recommend that prevention of vitamin D deficiency at the age of 19-50 years be carried out by consuming vitamin D supplements in an active form of at least 600 IU/day so as to prevent bone disease and muscle function [11,28].

Respondents of first semester pharmacy students regarding the need for vitamin D in the body were sufficient (70%) which was insufficient (30%) while final semester pharmacy students regarding the need for vitamin D in the body were sufficient (47%) which were insufficient (53%). Respondents of first semester pharmacy students regarding the need for vitamin D in the body is sufficient, there are various reasons for frequent exposure to sunlight (10%), healthy lifestyle (14%), feeling healthy (32%), consuming foods that contain vitamin D (14%) , while final semester students had reasons for frequent exposure to sunlight (9%), a healthy lifestyle (17%), feeling healthy (18%), consuming foods containing vitamin D (3%). Respondents were interested in knowing more about vitamin D for first semester pharmacy students who answered yes (96%) no (4%) while final semester students answered yes (92%) no (8%). Respondents who answered wanted to know more about vitamin D because of health reasons (34%), increased knowledge (54%), just curious (6%), related to cosmetics (2%), while final semester students answered for health (21%), increase knowledge (64%), just curious (7%), nothing to do with cosmetics. Respondents who were not interested because they did not want to know about vitamin D for first semester pharmacy students (4%), final semester students (8%). As pharmacy students

who represent the next generation will influence the development of future health education programs, policy development, formation of social norms and beliefs about health promoting attitudes [29,30].

Comparison of the risk between the two groups of respondents can be observed from the magnitude of the POR (Prevalance Odd Ratio) where the OR value is 0.583 with a significant CI 95% 0.251-1.357 indicating that the first semester pharmacy student group has a bad attitude of 0.5 times compared to the pharmacy student group final semester or in other words the final semester pharmacy student group has a good attitude of 2 times compared to first semester pharmacy students.

In this study, the odds ratio (OR) value was 0.583. This showed that the first semester pharmacy student group has a bad attitude of 0.5 times compared to the final semester pharmacy student group. The value of the 95% confidence interval in this study was 0.251-1.357 so in other words the final semester pharmacy student group had a better attitude compared to first semester pharmacy students. The results of the chi-square statistical test obtained a p-value of 0.207. Based on the chi-square test criteria, it can be seen that p-value is > 0.05, so it can be interpreted that there is no significant difference in attitudes towards sun exposure in pharmacy students in the early and final semesters.

Previous research by Hamhoum et al. [31], among health educators in public schools in Jeddah, menunjukkan that only 45% of health educators had good knowledge of vitamin D, and approximately 43% had a positive attitude towards vitamin D. which is insufficient when considered against the background their significant role in improving health awareness among future generations, including enhancing awareness of the importance of vitamin D and the effects of the deficiency of vitamin D on human health.

3.5 Correlation Test Results of Knowledge and Attitudes related to Vitamin D

The results of the correlation test of knowledge and attitudes towards sun exposure in pharmacy students in the first semester and in the final semester of 0.019 are in the range > 0-0.25, meaning that knowledge and attitudes towards sun exposure have a very weak correlation value for pharmacy students in the first semester and final semester. These results are similar to previous research by Alkalash et al. [32], this study reveals the poor level of knowledge about vitamin D deficiency, and this negatively affected their compliance for vitamin D supplementation when having hypovitaminosis D. Positive attitude toward vitamin D deficiency among the majority of the participants was obvious and may direct them to change their behavior toward vitamin D. Therefore, this study highlights the necessity of educating and sensitizing population about vitamin D and prevention of its deficiency. Further studies using a qualitative approach are crucial to explore the underlying reasons for low knowledge about vitamin D and behaviors related to vitamin D including the intake of vitamin supplementation that may contribute to the high burden of vitamin D deficiency

4 Conclusions

There was no significant difference in the attitude towards sun exposure of pharmacy students in the first semester and the final semester. Knowledge and attitudes towards sun exposure among pharmacy students in the first semester and final semester had a very weak correlation.

5 Declarations

5.1 Acknowledgments

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5.2 Author Contributions

AL, developed the concept and designed the manuscript, director, supervisor and final coordinator of manuscript; RLM and DNR provided key information and intellectual support. MN provided conducting research, collecting data and compiling manuscripts.

5.3 Funding Statement

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5.4 Conflicts of Interest

The authors declare no conflict of interest.

5.5 Ethic

Ethical has been approved by the Commission on Health Research Ethics University of Surabaya No.034/KE/V/2017.

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Author Guidelines

A Brief Summary

Journal of Tropical Pharmacy and Chemistry abbreviated *J. Trop. Pharm. Chem*., firstly published in 2010, is a six monthly published, open access, peer-reviewed, and online international pharmacy journal. Journal of Tropical Pharmacy and Chemistry aims to serve the updated scientific knowledge for international researchers in Pharmacy and Chemistry area.

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- The manuscript accompanied with keywords.
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- **Introduction** (Times New Roman 12). The content of introduction written with Times New Roman 12 font. All references which used in manuscript (as citation sources), must be in references part. References/cites use ordering Arabic number system by using bracket [number], examples [1] if one reference; [2], [3] if two references; [4], [5], [6] if three or more references in which order; and [1], [4], [7] for not ordered number. References/cites number arranged based on reference order which first time found in article.
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Abstract

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2 Method

The part of method not copied directly from thesis.

Method is collection work from implementation of research, start from implementation ways of data recruitment until data analysis.

3 Result and Discussion

The content of result and discussion made in one unified whole. Result is not raw data, however using data which was processed/analysed with method was setting. Discussion is result comparation that obtained with concept/theory already exist.

Table and Figure should be referred to article manuscript, with **total maximum is 5**. For examples the table is 2, so the Figure allowed maximum 3.

Table line only horizontal line be allowed. Table number using numbering Arabic number 1,2,3, and so on, Times New Roman font, 12 pt, 1 space, see right samples on Table 1 and Table 2. Whereas, table not suitable with format could be seen on Table 3.

Otherwise with Figure, the numbering system like numbering on table. Figure number using numbering Arabic number 1,2,3, and so on, Times New Roman font, 12 pt, 1 space.

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Look at example on Figure 1, Figure 2, Figure 3, and Figure 4, as well as Figure 5.

Example Figure not accepted on Journal of Tropical Pharmacy and Chemistry could be seen on Figure 6.

Figure 6 could be modified become Figure can be accepted on Journal of Tropical Pharmacy and Chemistry like as Figure 7.

Table 1 Example Table suitable with Journal of Tropical Pharmacy and Chemistry Format

Sample	Content (%)				
	Carbohydrate	Protein	Lipid acid	Vitamin	Water
1	Value	Value	Value	Value	Value
2	Value	Value	Value	Value	Value
3	Value	Value	Value	Value	Value
4	Value	Value	Value	Value	Value
And soon	Value	Value	Value	Value	Value

Table 2 The result of study X-ray diffraction and BIMEVOX neutron as temperature function.

No.	Oxide	Transition Temperature	Transition Phase	References
1.	BICOVOX	507 °C	$\gamma - \gamma'$	[8]
2.	BICEVOX	550 °C	$\beta - \gamma$	[9]
3.	BIHFVOX	400 °C	$\beta - \gamma$	[10]
4.	BIGAVOX	525 °C	$\beta - \gamma$	[11]

Table 3 Example Table will not accept in Journal of Tropical Pharmacy and Chemistry

Sample	Content (%)				
	Carbohydrate	Protein	Lipid Acid	Vitamin	Water
1	Value	Value	Value	Value	Value
2	Value	Value	Value	Value	Value
3	Value	Value	Value	Value	Value
4	Value	Value	Value	Value	Value
And soon	Value	Value	Value	Value	Value

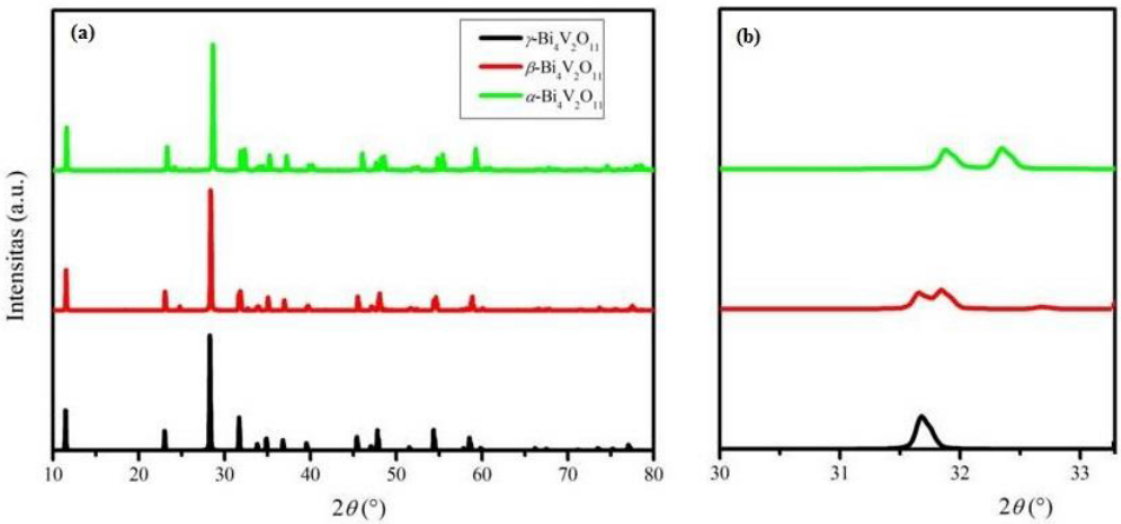

Figure 1 Pattern of X-ray diffraction polymorph oxide BIVOX on angle 2θ (a) 10-80° and (b) 30-33°. Specific peaks of diffraction polymorph α is on 2θ 31,7 and 32,32°, specific peaks of polymorph β is on 2θ 31,6 and 31,8°; whereas specific peak of polymorph γ is on 2θ 31,6°. Taken from [12].

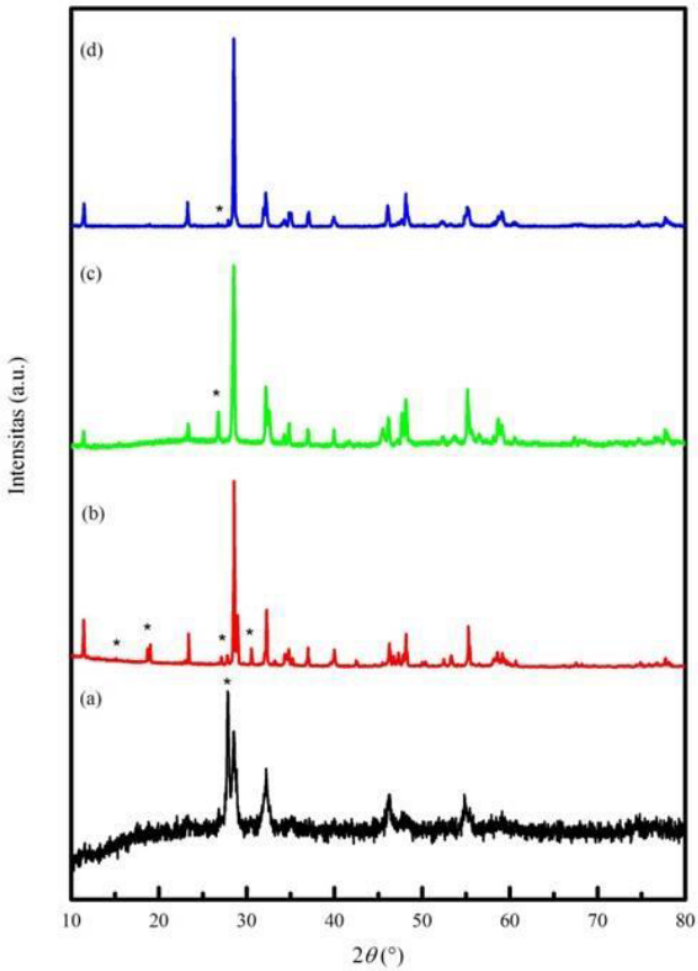

Figure 2 Pattern of oxide diffraction as synthesis result with using sol gel method on various condition that burned on temperature 800 °C, (a) ratio between citric acid as chelating and total mol of metal cation was used is 1 : 1 as well as pH 7, (b) ratio between citric acid as chelating and total mol of metal cation was used is 1 : 1 as well as pH 1-3, (c) ratio between citric acid as chelating and EDTA, (d) ratio between citric acid as chelating and ethylene glycol as well as total mol of cation as 1:1:1 in acid pH condition. Sign * showing some peaks besides BIMEVOX phase.

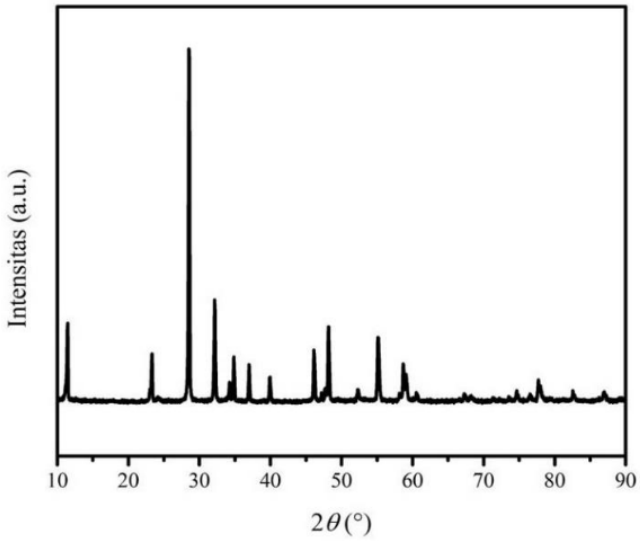

Figure 3 Pattern of X-ray diffraction of oxide powder $Bi_2Zn_{0,1}V_{0,9}O_{5,35}$ that synthesized by using sol gel method with citric acid as chelating and ethylene glycol, with ratio against mol cation total 10:4:1, obtained gel burned in temperature 600 °C.

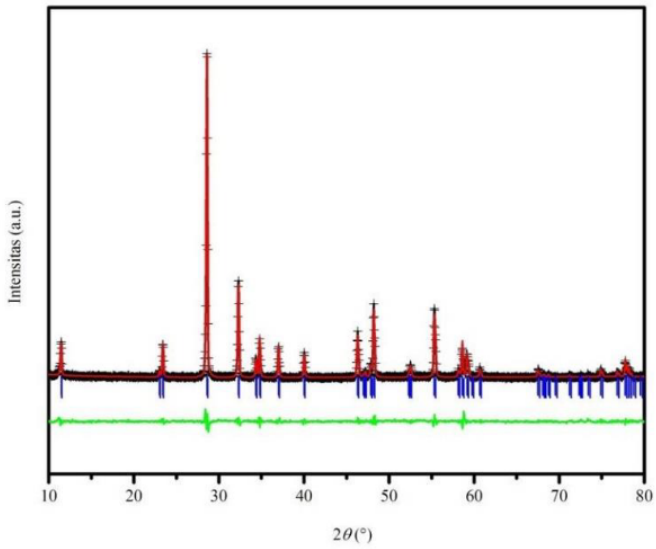

Figure 4 Plot of refinement result of pattern X-ray diffraction of oxide powder $Bi_2Zn_{0,1}V_{0,9}O_{5,35}$ after burned on temperature 600 °C during 24 hours. Sign + with black colour is data observation of result X-ray diffraction, red lines are calculation result, blue vertical lines are Bragg position would be expected, green lines are differences between calculation result and data observation of X-ray diffraction (differences between sign + black coloured and red lines).

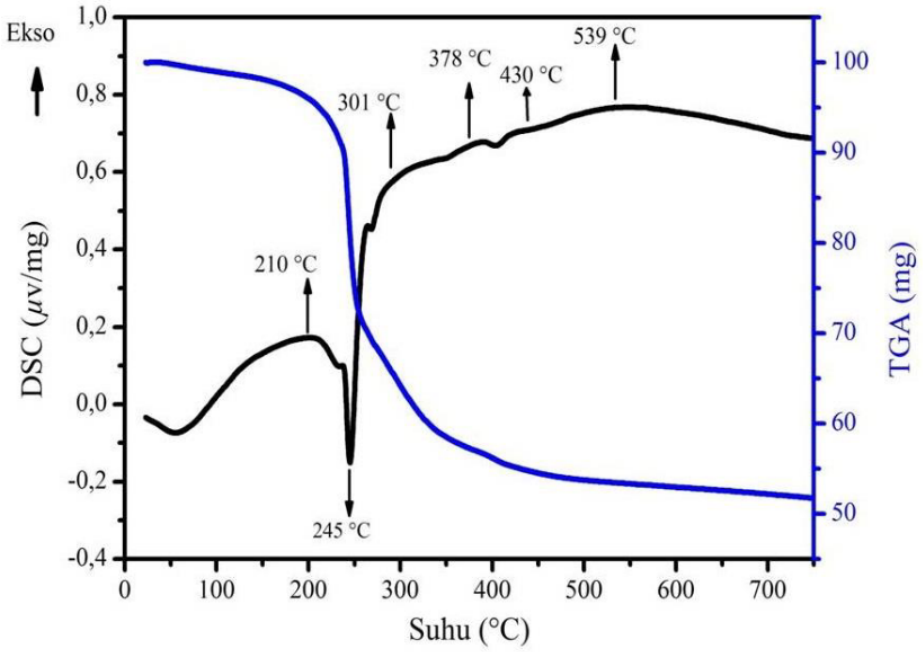

Figure 5 Thermogram of analysis result of thermal gel precursor from $Bi_2Zn_{0,1}V_{0,9}O_{5,35}$. Measurement carried out from room temperature until 750 °C by using increasing temperature rate 10 °C/minute and nitrogen atmosphere with flow rate 20 mL/minute.

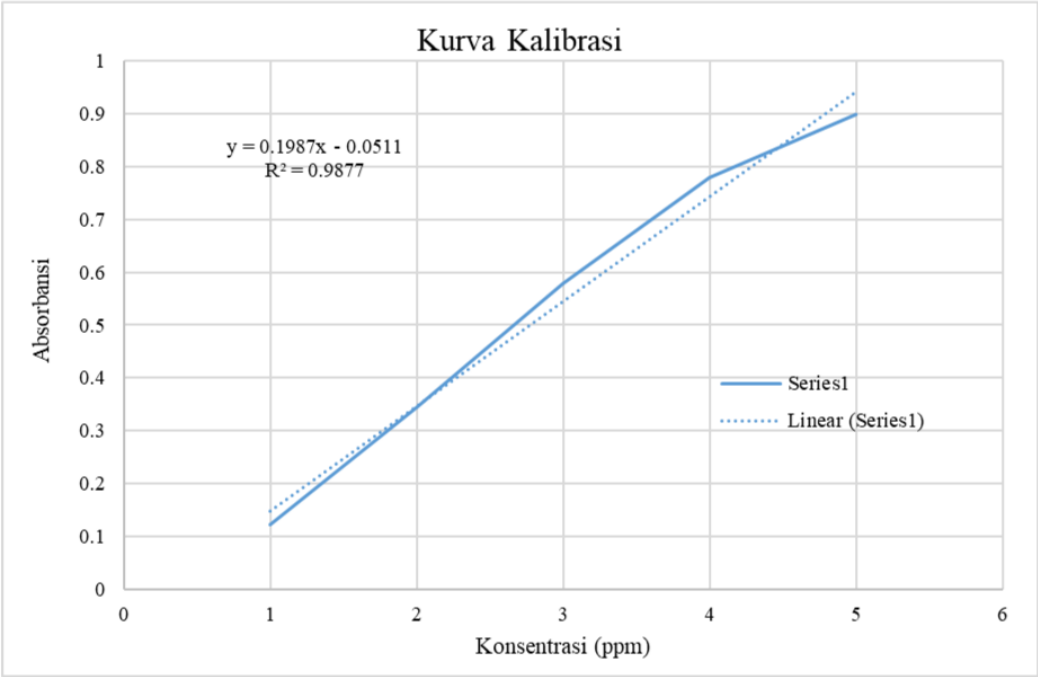

Figure 6 Example Figure not accepted Journal of Tropical Pharmacy and Chemistry

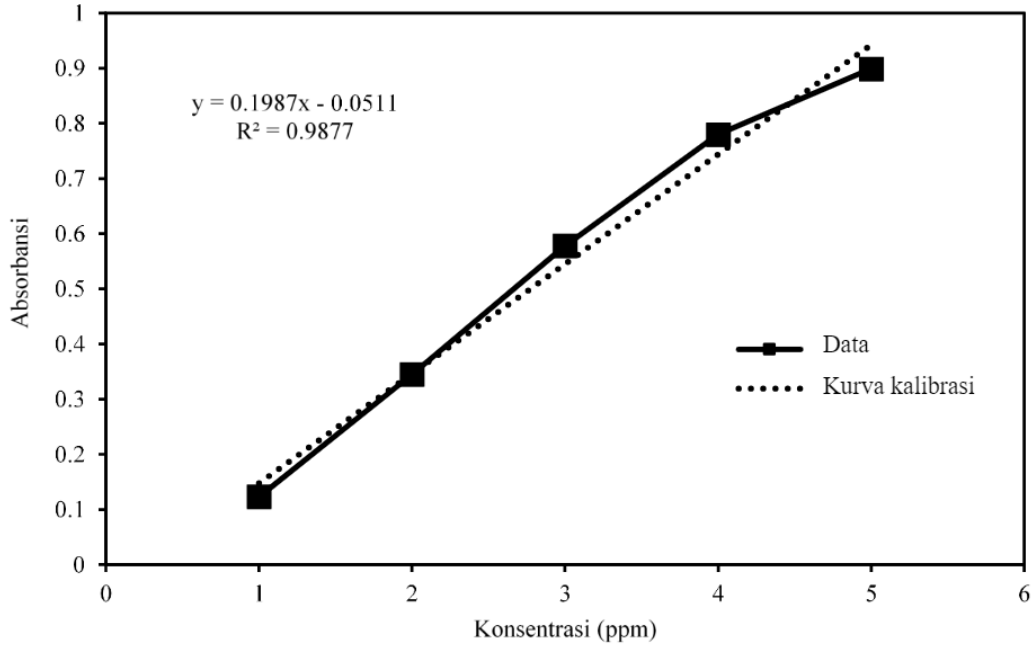

Figure 7 Figure of modification result from Figure 6, so that can be accepted by Journal of Tropical Pharmacy and Chemistry

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Effect of Education on Knowledge and Attitude Level Related to Vitamin D in Pharmacy Students

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Abstract

Indonesia is a country located in the tropics with sun exposure throughout the season. Sun exposure is the best source of vitamin D and there have been no cases of vitamin D intoxication due to excessive sun exposure. Pharmacy students tend to lack knowledge of vitamin D. Changes in lifestyle and modernization lead to high use of sunscreens which can lead to a decrease in the synthesis of vitamin D in the skin. This research was conducted to determine the differences in knowledge and attitudes towards sun exposure using cross sectional method on 100 first semester pharmacy students and 100 final semester students. Test differences in aspects of knowledge and attitudes using odds ratios. The results of the knowledge aspect odds ratio test are 1,000 and the attitude aspect odds ratio test results were 0.583 so that it can be concluded that both knowledge and attitudes towards sun exposure have the same risk tendency for first semester and final semester pharmacy students.

Keywords: attitude, knowledge, pharmacy, vitamin D

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1 Introduction

Indonesia is a country located in the tropics with sun exposure throughout the season. Exposure to sunlight is one of the most abundant sources of vitamin D in Indonesia, which is exposed to sunlight all year round. Vitamin D is not as well-known as other vitamins, because most people think that vitamin D is easy to get [1,2]. Sun exposure is the best source of vitamin D and there are no cases of vitamin D intoxication due to excessive sun exposure [3]. Lack of exposure to sunlight is still one of the main problems in the health sector [4]. Deficiency of vitamin D can cause skin cancer, osteoporosis, hypertension, obesity and others [5,6].

Nearly 1 billion people worldwide are deficient in vitamin D [7,8]. Vitamin D deficiency is influenced by lifestyle. A low lifestyle tends to avoid sun exposure [9]. Data shows that nearly 1/3 of the American population is deficient in vitamin D [10]. Meanwhile in Europe, Australia, South America, Saudi Arabia, the United Arab Emirates, Turkey, India, Lebanon, around 30-50% have a high risk of vitamin D deficiency. In South Asia it is estimated that around 70% while in Southeast Asia between 6-70% of adults are at risk of vitamin D deficiency [11,12]. Sources of vitamin D are sun exposure, food and supplements. Foods rich in vitamin D such as milk, eggs, fish, shrimp, cheese, fish oil, spinach, soybeans. Even though the main source for the body is exposure to sunlight, it still requires food, because without food ingredients containing provitamin D, the process of forming vitamin D with the help of sunlight will not occur [13,14]. Lack of knowledge about vitamin D is a factor in the occurrence of vitamin D deficiency [15]. A person's knowledge determines his attitude, the better the knowledge, the better the attitude of a person. This study was conducted to determine differences in knowledge and attitudes towards sun exposure in pharmacy students in the early and final semesters. The indicators used to determine knowledge and attitudes towards light exposure use a questionnaire [16,17].

According to research by Malaeb et al. [18], chosed pharmacy students because pharmacy students tend to lack vitamin D knowledge, but later as pharmacists they should have capacity on drug therapy and collaborate in monitoring and optimizing vitamin D supplements in all patients, especially those at high risk. The Ministry of Health of the Republic of Indonesia, has made the problem of lack of sun exposure a nutritional status problem that needs to be identified and paid attention to. To support the government program, the involvement and active role of health workers is needed. The role of pharmacy according to APTFI (2013) [19], is being able to prepare information about drugs and treatment, being able to manage information services, consultations, education about drugs and treatment as well as preventive measures. This research is the initial data to describe students, especially students in the health sector, including pharmacy. The purpose of this study was to determine differences in knowledge and attitudes towards sun exposure in pharmacy students in the early and final semesters.

2 Experimental section

2.1 Research design

This type of research is a cross sectional research design. Data collection is carried out at one time. This research was conducted by observing knowledge and attitudes towards sun exposure in pharmacy students in the early and final semesters. When the research will be carried out in September-December 2017. The research is carried out at the Faculty of Pharmacy, University of Surabaya.

2.2 Research variable

The variables of this study were pharmacy students, knowledge and attitudes towards sun

exposure. In the first semester of pharmacy students, it is assumed that students are experiencing changes in the environment from high school to college, so they have to adapt to a new environment. A final semester pharmacy student is someone who is in a period of study for more than 4 years or has taken a final assignment in the form of a thesis.

The level of knowledge was measured by a questionnaire, included: what is vitamin D, sources of vitamin D, benefits of vitamin D, due to lack of vitamin D, can sunlight produce vitamin D, is sunlight harmful to the skin, is it a good time to be exposed to direct sunlight, how much is it? the length of time it takes the body to be exposed to sunlight. The level of attitude was measured by a questionnaire, included: how often do you travel or take a walk in direct sunlight, how long per day are exposed to direct sunlight avoiding sun exposure, reasons for avoiding sun exposure, whether to use skin protection equipment, whether to take supplements, whether to use sufficient vitamin D in the body [17,20,21,22].

2.3 Population and Sample

The population of this study were students of the Faculty of Pharmacy at the University of Surabaya. The sample in this study were pharmacy students in the first semester and final semester pharmacy students who met the inclusion and exclusion criteria and were willing to fill out a questionnaire at the University of Surabaya. The criteria for research subjects were not having mental disorders/disabilities, and not suffering from skin cancer. In this study for sampling using non-probability sampling technique by quota sampling.

The calculation of the subject size uses the formula in equation 1.

$$n = \frac{N}{1 + N\,(d^2)} \qquad \text{(Equation 1)}$$

Information :
n = sample size
N = population size
d = desired level of confidence or degree of accuracy (0.1)

From the results of the calculation of the formula equation 1, it can be seen that there are 2294 students who are active in the first semester and final semester students who are still active as a population. The minimum target sample to be taken as respondents is 100 first semester pharmacy students and 100 final semester pharmacy students.

2.4 Data analysis

The stages of processing data from this research are as follows:

1. Data coding (data coding), data coding is a process of systematically compiling raw data (which is in the questionnaire) into a form that is easier to read by data processing machines with the help of the SPSS software program for windows version 24.
2. The data that has been obtained from the questionnaire is then analyzed to compare knowledge and attitudes towards sun exposure in pharmacy students in the early and final semesters.

Knowledge classification is divided into 2 groups, namely: A score of 75% and above was classified as having good knowledge and <74% as less. Meanwhile, attitude classification is divided into 2 groups, a score of 75% and above was classified as having good attitude and <74% as less [23].

3 Results and Discussion

3.1 Questionnaire Test Results

The validation process was carried out on 30 people with characteristics appropriate to the research respondents, namely active students at the Faculty of Pharmacy at the University of Surabaya (they will not be involved as research respondents). The results of the validity test showed that all knowledge questions on sun exposure were declared valid, because the value of r_{count} (Corrected Item-Total Correlation) > r_{table} was 0.361. The reliability test was carried out on the knowledge question item on sun exposure which was declared reliable because it had a Cronbach Alpha value of 0.61-0.80. The results of the validity test showed that all attitude questions regarding sun exposure were declared valid, because the r_{count} (Corrected Item-Total Correlation) > r_{table} was 0.361 (Table 1).

Table 1. Validity and Reliable Test of Knowledge on Sun Exposure

No	Question	Validity Test		Reliability Test	
		Corrected Item-Total Correlation	Conclusion	Cronbach's Alpha	Conclusion
1.	a. Know about vitamin D b. If yes, that is known regarding vitamin D	0,486	Valid	0,622	11
2.	Source information about vitamin D	0,370	Valid		
3.	Source greatest vitamin D	0,439	Valid		
4.	Benefits of vitamin D for body	0,442	Valid		
5.	Consequence from vitamin D deficiency	0,373	Valid		
6.	Reason body vitamin D deficiency	0,447	Valid		
7.	a. Ray sun can help produce vitamin D b. If yes, the reason	0,439	Valid		
8.	a. Ray sun dangerous for skin b. If yes, the reason	0,438	Valid		
9.	Good time for caught exposure ray sun in a manner direct to the body get vitamin D	0,455	Valid		
10.	The length of time needed by the body for exposed ray sun in a manner directly to get vitamin D	0,381	Valid		
11.	Good amount of SPF (Sun Protection Factor). for body	0,528	Valid		

Table 2. Profile Answers Knowledge related to Vitamin D

No.	Question	Answer	Group			
			First semester		Final semester	
			Frequency (n:100)	Percentage (%)	Frequency (n:100)	Percentage (%)
1.	Know about vitamin D	Yes	93	93.00	83	83.00
		No	7	7.00	17	17.00
	If yes, that is known regarding vitamin D	Vitamins for health bone	63	63.00	53	53.00
		Derived vitamins from ray sun	7	7.00	10	10.00
		Fat soluble vitamins	5	5.00	9	9.00
		Absorption calcium in the intestine	16	16.00	3	3.00
		For defense body	2	2.00	8	8.00
2.	Source information about vitamin D*	Pharmacists/nurses/doctors/other health workers	16	16.00	26	26.00
		Family	22	22.00	23	23.00
		Book	51	51.00	56	56.00
		School	71	71.00	62	62.00
		Other	8	8.00	26	26.00
3.	Source greatest vitamin D	Vitamins or supplements	4	4.00	17	17.00
		Vegetable	4	4.00	7	7.00
		Sun	77	77.00	64	64.00
		Meat	7	7.00	6	6.00
		Other	4	4.00	1	1.00
		Don't know	4	4.00	5	5.00
4.	Benefits of vitamin D for body*	For skin health	2	2.00	7	7.00
		For bone health	99	99.00	78	78.00
		Prevent jaundice in babies	-	-	1	1.00
		Prevent cancer	-	-	1	1.00
		For the body's immune system	11	11.00	7	7.00
		Don't know	5	5.00	7	7.00
5.	Consequence from vitamin D deficiency*	Cancer	7	7.00	20	20.00
		Obesity	6	6.00	4	4.00
		Increased cholesterol	3	3.00	3	3.00
		Bone disease	95	95.00	89	89.00
		High blood pressure	6	6.00	5	5.00
		Other	2	2.00	-	-
6.	Reason body vitamin D deficiency*	Use of an umbrella during the day	31	31.00	32	32.00
		Sunbathing on the beach during the day	4	4.00	9	9.00
		Do regular physical activity	3	3.00	12	12.00
		Wear closed clothes	33	33.00	43	43.00
		Use sunscreen	56	56.00	35	35.00
		Other	3	3.00	5	5.00
		Don't know	5	5.00	5	5.00

Table 2. Continue.....

No.	Question	Answer	Group			
			First semester		Final semester	
			Frequency (n:100)	Percentage (%)	Frequency (n:100)	Percentage (%)
7.	Ray sun can help produce vitamin D	Yes	49	49.00	38	38.00
		No	51	51.00	62	62.00
	If yes, the reason	Good for bone health	19	19.00	8	8.00
		Sunlight is the main source of vitamin D	14	14.00	9	9.00
		Increases the synthesis of vitamin D with the help of UV sunlight	10	10.00	3	3.00
		Converts provitamin D to vitamin D	6	6.00	17	17.00
		Helps absorption of calcium in the intestine	-	-	1	1.00
8.	Ray sun dangerous for skin	Yes	81	81.00	75	75.00
		No	8	8.00	15	15.00
		Don't know	11	11.00	10	10.00
	If yes, the reason:	Exposure during the day	8	8.00	10	10.00
		Exposure too long and too often	12	12.00	7	7.00
		UV rays from the sun	2	2.00	16	16.00
		Causes skin problems	22	22.00	12	12.00
		The skin darkens	8	8.00	5	5.00
		Skin cancer	27	27.00	25	25.00
		Harm the health of the eyes, skin and body	2	2.00	-	-
	If not, the reason:	Sunlight has its benefits	2	2.00	3	3.00
		Sunlight is a source of vitamin D	4	4.00	1	1.00
		Sunlight is good for health	2	2.00	11	11.00
9.	good time for caught exposure ray sun in a manner direct to the body get vitamin D	06.00-10.00 WIB	98	98.00	96	96.00
		10.00-14.00 WIB	2	2.00	3	3.00
		14.00-17.00 WIB	-	-	1	1.00
10.	The length of time needed by the body for exposed ray sun in a manner directly to get vitamin D	5-15 minutes	42	42.00	23	23.00
		15-30 minutes	34	34.00	58	58.00
		30-60 minutes	24	24.00	13	13.00
		>1 hour	-	-	5	5.00
		Don't know	-	-	1	1.00
11.	Good amount of SPF (Sun Protection Factor). for body	< 15	19	19.00	8	8.00
		>15	43	43.00	48	48.00
		Don't know	38	38.00	44	44.00

*) answer can more from 1

3.2 Characteristics of Respondents

The first semester of pharmacy students consists of 100 people, while the final semester of pharmacy students consists of 100 people. Pharmacy student respondents in the early and final semesters were 200 people. It is known that the frequency distribution of gender in first semester pharmacy students is 24% for males, while 76% for females. The number of male final semester pharmacy students is 29% while the female is 71%. The number of pharmacy students in the first semester and final semester is more female than male.

Gender can affect research results. Women in this study had better knowledge about sun protection and the use of sunscreen, so that the use of sunscreen was higher than men. This would affect respondents' attitudes towards sun exposure [16,24].

3.3 Frequency Distribution of Knowledge related to Vitamin D

Research on knowledge of sun exposure in pharmacy students in the first semester and the final semester was carried out giving a score to each question item answered by each respondent (Table 2).

Based on the SPSS results, the odd ratio test results for knowledge related to vitamin D where the OR value was 1.000 with a significance level of CI95% 0.197–5.078 showed that in the first semester the risk of poor knowledge was 1 times higher than in the final semester, so final semester pharmacy students had good knowledge compared to early semester pharmacy students. Based on the results of the analysis using the chi-square test to see the differences in knowledge related to vitamin between the early and final semester groups, the results showed that there was no significant difference between the two (p value>

0.05), indicating that there was no significant difference in knowledge of vitamin D. Sun exposure in pharmacy students in the first and final semesters.

3.4 Attitude Risk Comparison Test Results related to Vitamin D

Research regarding attitudes towards sun exposure in pharmacy students in the first and final semesters was carried out by giving a score to each question item answered by each respondent (Table 3).

Table 3. Profile Answers Attitude related to Vitamin D

No.	Question	Answer	Group			
			First semester		Final semester	
			Frequency (n:100)	Percentage (%)	Frequency (n:100)	Percentage (%)
1.	Travel often or take a walk below ray sun in a way direct	Yes	74	74.00	78	78.00
		No	26	26.00	22	22.00
2.	Long exposure ray sun in a way direct every day	<5 minutes per day	8	8.00	5	5.00
		5-10 minutes/day	20	20.00	28	28.00
		10-15 minutes/day	40	40.00	28	28.00
		15-30 minutes/day	32	32.00	39	39.00
3.	Avoid exposure ray sun in a way direct	Yes	79	79.00	64	64.00
		No	21	21.00	36	36.00
	If yes , the reason:	Midday sunlight is not good for the body	10	10	-	-
		Causes skin problems	7	7.00	8	8.00
		Heat from sunlight (UV)	16	16.00	13	13.00
		Causes black/dark skin	40	40.00	35	35.00
		Sweaty and uncomfortable	6	6.00	4	4.00
		Lifestyle	-	-	1	1.00
		Skin cancer	-	-	3	3.00
4.	Use tool protector skin from exposure ray sun in a way direct	Yes	93	93.00	87	87.00
		No	7	7.00	13	13.00
	* Protective equipment used:	Umbrella	25	25.00	16	16.00
		Hat	18	18.00	13	13.00
		Jacket	49	49.00	76	76.00
		Veil solar / *sunblock*	55	55.00	56	56.00
		Other	6	6.00	6	6.00
		Don't use it tool protector	2	2.00	1	1.00
5.	Reasons to use tool protector	Easy to use , easy attainable and effective	32	32.00	17	17.00
		Protect skin from hot ray sun (UV)	22	22.00	30	30.00
		Protect skin so that it doesn't dark , burning and cancerous	6	6.00	2	2.00
		Protect skin so that it doesn't dark (scorched)	16	16	30	30.00
		Guard health skin	13	13	4	4.00
		Protect skin when drive	2	2	2	2.00
		Protect head	-	-	1	1.00
		Multifunction	2	2.00	1	1.00
6.	Consume supplement	Yes (contains vitamin D)	1	1.00	2	2.00
		No	99	99.00	98	98.00
7.	If yes (contains vitamin D), the reason:	Guard health	1	1.00	2	2.00
8.	Vitamin D requirement in body Already sufficient	Yes	70	70.00	47	47.00
		No	30	30.00	53	53.00
	If yes , the reason:	Frequent exposure to sunlight	10	10.00	9	9.00
		Healthy lifestyles	14	14.00	17	17.00
		Feel healthy	32	32.00	18	18.00
		Consume foods that contain vitamin D	14	14.00	3	3.00
	If not the reason:	Unhealthy lifestyle	3	3.00	4	4.00
		Feeling that the need for vitamin D is still lacking	27	27.00	49	49.00
9.	Interested For know more Lots about vitamin D	Yes	96	96.00	92	92.00
		No	4	4.00	8	8.00
	If yes , the reason:	For health	34	34.00	21	21.00
		Increase knowledge	54	54.00	64	64.00
		Just curious	6	6.00	7	7.00
		Related to cosmetics	2	2.00	-	-
	If not , the reasons are:	Don't want to know about vitamin D	4	4.00	8	8.00

Table 4. Classification of Knowledge and Attitude related to Vitamin D

Classification Knowledge related to Vitamin D	Respondent group			
	First semester		Final Semester	
	Frequency (n:100)	Percentage (%)	Frequency (n:100)	Percentage (%)
Good	97	97.00	97	97.00
Less	3	3.00	3	3.00
Classification Attitude related to Vitamin D				
Good	10	10.00	16	16.00
Less	90	09.00	84	84.00
Total	100	100.00	100	100.00

Table 4 showed the results of the knowledge data analysis in the first semester and final semester pharmacy student groups. The initial semester pharmacy student group with good knowledge category was 97% and 97% for the final semester pharmacy student group. The number of each group for the bad knowledge category, first semester pharmacy students was 3% and final semester students were 3%. The results of attitude data analysis for groups of pharmacy students in the first and final semesters. The group of pharmacy students in the first semester with a good attitude category was 10% and 16% for the group of pharmacy students in the final semester. The number of each group for the bad attitude category, initial semester pharmacy students was 90% and final semester students was 84%.In this study, respondents were first semester pharmacy students who often traveled or took walks in direct sunlight (74%) and final semester students (78%), while students who did not often travel or take walks in direct sunlight pharmacy first semester (26%) and final semester (22%). As in the study of Zareef and Jackson [25], the majority had changed attitudes towards sun exposure by going out in the sun, while a smaller proportion consumed supplements/foods containing vitamin D.

If a person values bone health and believes that vitamin D helps with bone health, they may be more likely to take a vitamin D supplement to ensure their bone health. In addition, people should know where and how to get vitamin D, as well as how much is needed to maintain certain health benefits, which knowledge informs. On the other hand, if people do not know that vitamin D is necessary for proper bone growth and they do not know where to get vitamin D, they are more likely to take actions that ensure adequate vitamin D [26,27]. In this study, respondents from first semester pharmacy students consumed supplements containing vitamin D to maintain health (1%), while final semester students (2%). Respondents who did not take supplements were first semester pharmacy students (99%) while final semester students (98%). Other studies recommend that prevention of vitamin D deficiency at the age of 19-50 years be carried out by consuming vitamin D supplements in an active form of at least 600 IU/day so as to prevent bone disease and muscle function [11,28].

Respondents of first semester pharmacy students regarding the need for vitamin D in the body were sufficient (70%) which was insufficient (30%) while final semester pharmacy students regarding the need for vitamin D in the body were sufficient (47%) which were insufficient (53%). Respondents of first semester pharmacy students regarding the need for vitamin D in the body is sufficient, there are various reasons for frequent exposure to sunlight (10%), healthy lifestyle (14%), feeling healthy (32%), consuming foods that contain vitamin D (14%) , while final semester students had reasons for frequent exposure to sunlight (9%), a healthy lifestyle (17%), feeling healthy (18%), consuming foods containing vitamin D (3%). Respondents were interested in knowing more about vitamin D for first semester pharmacy students who answered yes (96%) no (4%) while final semester students answered yes (92%) no (8%). Respondents who answered wanted to know more about vitamin D because of health reasons (34%), increased knowledge (54%), just curious (6%), related to cosmetics (2%), while final semester students answered for health (21%), increase knowledge (64%), just curious (7%), nothing to do with cosmetics. Respondents who were not interested because they did not want to know about vitamin D for first semester pharmacy students (4%), final semester students (8%). As pharmacy students

who represent the next generation will influence the development of future health education programs, policy development, formation of social norms and beliefs about health promoting attitudes [29,30].

Comparison of the risk between the two groups of respondents can be observed from the magnitude of the POR (Prevalance Odd Ratio) where the OR value is 0.583 with a significant CI 95% 0.251-1.357 indicating that the first semester pharmacy student group has a bad attitude of 0.5 times compared to the pharmacy student group final semester or in other words the final semester pharmacy student group has a good attitude of 2 times compared to first semester pharmacy students.

In this study, the odds ratio (OR) value was 0.583. This showed that the first semester pharmacy student group has a bad attitude of 0.5 times compared to the final semester pharmacy student group. The value of the 95% confidence interval in this study was 0.251-1.357 so in other words the final semester pharmacy student group had a better attitude compared to first semester pharmacy students. The results of the chi-square statistical test obtained a p-value of 0.207. Based on the chi-square test criteria, it can be seen that p-value is > 0.05, so it can be interpreted that there is no significant difference in attitudes towards sun exposure in pharmacy students in the early and final semesters.

Previous research by Hamhoum et al. [31], among health educators in public schools in Jeddah, menunjukkan that only 45% of health educators had good knowledge of vitamin D, and approximately 43% had a positive attitude towards vitamin D. which is insufficient when considered against the background their significant role in improving health awareness among future generations, including enhancing awareness of the importance of vitamin D and the effects of the deficiency of vitamin D on human health.

3.5 Correlation Test Results of Knowledge and Attitudes related to Vitamin D

The results of the correlation test of knowledge and attitudes towards sun exposure in pharmacy students in the first semester and in the final semester of 0.019 are in the range > 0-0.25, meaning that knowledge and attitudes towards sun exposure have a very weak correlation value for pharmacy students in the first semester and final semester. These results are similar to previous research by Alkalash et al. [32], this study reveals the poor level of knowledge about vitamin D deficiency, and this negatively affected their compliance for vitamin D supplementation when having hypovitaminosis D. Positive attitude toward vitamin D deficiency among the majority of the participants was obvious and may direct them to change their behavior toward vitamin D. Therefore, this study highlights the necessity of educating and sensitizing population about vitamin D and prevention of its deficiency. Further studies using a qualitative approach are crucial to explore the underlying reasons for low knowledge about vitamin D and behaviors related to vitamin D including the intake of vitamin supplementation that may contribute to the high burden of vitamin D deficiency

4 Conclusions

There was no significant difference in the attitude towards sun exposure of pharmacy students in the first semester and the final semester. Knowledge and attitudes towards sun exposure among pharmacy students in the first semester and final semester had a very weak correlation.

5 Declarations

5.1 Acknowledgments

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5.2 Author Contributions

AL, developed the concept and designed the manuscript, director, supervisor and final coordinator of manuscript; RLM and DNR provided key information and intellectual support. MN provided conducting research, collecting data and compiling manuscripts.

5.3 Funding Statement

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5.4 Conflicts of Interest

The authors declare no conflict of interest.

5.5 Ethic

Ethical has been approved by the Commission on Health Research Ethics University of Surabaya No.034/KE/V/2017.

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