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Level of Knowledge among Medical Student Regarding The Role of Vitamin C For Skin Health in Universitas Sumatera Utara

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Abstract. BACKGROUND: The main function of vitamin C for skin health is as an antioxidant, combating environmental oxidative stress, which helps the natural regeneration of environmental oxidative stressors, collagen formation and brightening the skin. Humans cannot synthesize their own vitamin C, so to meet the vitamin C needs of the body, humans must consume vitamin C from fresh fruits and vegetables. In addition to oral and topical use, the practice of using vitamin C by injection has also been widely spread in major cities in Indonesia. Taking vitamin C is not something bad, but using vitamin C that is not according to the recommended dosage can have unwanted effects on health. OBJECTIVE: This study aims to determine the level of knowledge of students at the Faculty of Medicine, Universitas Sumatera Utara to regarding the role of vitamin C for skin health in 2020. METHODS: This study used a descriptive observational method with a cross sectional design. The sample size in this study was 247 people. The samples used were students of Faculty of Medicine at the Universitas Sumatera Utara class 2017, 2018, and 2019. Data on student knowledge levels collected from the results of filling out the questionnaire will be grouped using the Guttman scale and forwarded for further data processing using the Statistical Package for Social Sciences (SPSS) program 25 . RESULTS : In this study it was found that 86.3% of respondents had sufficient knowledge about the role of vitamin C for skin health, 91.2% of female respondents had sufficient knowledge, 81.5% of male respondents had sufficient knowledge. Based on how to use vitamin C, it can be seen that 41.9% of students have high knowledge about the use of vitamin C orally, 60% of respondents have sufficient knowledge about the use of vitamin C topically, and 50.4% of respondents have sufficient knowledge about its use vitamin C by injection. CONCLUSION: The level of knowledge of students at the Faculty of Medicine at the Universitas Sumatera Utara, for 2017, 2018 and 2019 regarding the role of vitamin C for skin health is sufficient. There are differences in the level of knowledge according to gender in this study, it was found that women have a better level of knowledge than men.

Keyword: Knowledge Level, Vitamin C, Skin Health.

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Introduction

Vitamin C is a nutrient needed by the body in metabolic processes. However, according to research conducted in 2016, it is known that humans do not have gulonolactin oxidase, which is an enzyme needed for the biosynthesis of vitamin C, which causes humans to not be able to synthesize their own vitamin C, so humans only get vitamin C intake from fresh fruits and vegetables. Taking vitamin C supplements is an efficient way to increase vitamin C levels in the body when food sources do not meet the needs[16].

Vitamin C for the skin is a powerful antioxidant that can neutralize and remove oxidants such as those found in environmental pollutants and after exposure to ultraviolet (UV) radiation[5] . Normal skin contains high concentrations of vitamin C which stimulates collagen synthesis and helps in antioxidant protection against UV-induced damage. This has been one of the background of vitamin C in topical [15] .

Vitamin C has immunomodulating properties that are beneficial in Indonesia[4] . Lately there are many uses of vitamin C among the public. In addition to oral and topical use, the practice of using vitamin C by injection has also been widely spread in major cities in Indonesia.

In the modern times, humans are required to have high mobility which causes changes in lifestyle that have an impact on public health, such as lack of exercise and rest, unbalanced nutrition, smoking and alcohol consumption habits . This bad lifestyle will have an impact on the body so that it is vulnerable to free radicals. This causes a person to feel the need for vitamins in high doses, such as vitamin C which functions as an antioxidant[16] . The public's enthusiasm for vitamin C encourages local and foreign products to make many variants of vitamin C for health and beauty with various benefits such as preventing black spots due to UV, brightening the face, removing acne scars, making the body more fit, and increasing body immunity.

Excessive use of vitamin C can cause several side effects in the form of diarrhea, acute hemolysis , *sickle cell* crisis , and the formation of kidney stones. However, vitamin C deficiency also results in impaired immunity and a higher susceptibility to infection[3]. Taking vitamin C is not a bad thing, but using vitamin C that is not according to the recommended dosage can have unwanted effects on health aspects.

Based on the description above, the author realizes the importance of sufficient knowledge and understanding in consuming the correct vitamin C, to avoid the bad effects of excessive use or deficiency of vitamin C, especially among students of the Faculty of Medicine at the Universitas Sumatera Utara.

Research methods

The research protocol approval was given by the Chairperson of the Research Ethics Commission, University of North Sumatra.

This research is a descriptive observational study with a cross-sectional approach based on a questionnaire (online questionnaire) which aims to obtain information about the level of

knowledge of students at the Faculty of Medicine, Universitas Sumatera Utara regarding the role of vitamin C for skin health in 2020.

The sample in this study were 247 students who are currently studying at the Faculty of Medicine, Universitas Sumatera Utara and are willing to sign the informed concent and fill out a complete online questionnaire.

Overall, this questionnaire contains multiple choice questions. The questionnaire used as a measuring tool for this study has met the validity and reliability test. Student knowledge level data collected from the results of filling out the questionnaire will be grouped using the Guttman scale and forwarded for further data processing using the Statistical Package for Social Sciences (SPSS) program 25.

Research result

The research sample was students of the Faculty of Medicine at the Universitas Sumatera Utara, class 2017, 2018, and 2019 with a total sample of 270 people. The characteristics contained in the study included age, gender, class, and also the level of student knowledge about the role of vitamin C for skin health. The characteristics of the respondents can be seen in the table.

Table 1 . Distribution of the frequency of respondents by age .

Characteristics		**Frequency**	**Percentage (%)**
Age	15-19 years	104	38.5
	20-24 years	166	61.5
Total		**270**	**100**

Based on the characteristics of the age of respondents in table 1, it can be seen that there are 104 respondents aged 15-19 years (38%) and aged 20-24 years as many as 166 people (61.5%).

Table 2. Frequency distribution of respondents based on gender.

Characteristics		**Frequency**	**Percentage (%)**
Gender	Man	135	50
	Women	135	50
Total		**270**	**100**

Based on table 2 regarding the sex characteristics of the respondents, it can be seen that the balanced distribution of respondents between the gender of men and women is the ratio of 135 people (50%) to male and 135 (50%) female.

Table 3 . Respondent frequency distribution by batch.

Characteristics		**Frequency**	**Percentage (%)**
Force	2017	90	33.3
	2018	90	33.3

	2019	90	33.3
Total		**270**	**100**

Based on the characteristics of the class in table 3, the same frequency distribution in each class is obtained, namely the frequency of respondents in the 2017 class totaling 90 people (33.3%), the 2018 class totaling 90 people (33.3%), and the 2019 class totaling 90 people (33.3%).

Table 4 . Respondent frequency distribution based on knowledge.

Characteristics		**Frequency**	**Percentage (%)**
Knowledge	Low	33	12.2
	Sufficient	233	86.3
	High	4	1.5
Total		**270**	**100**

Based on table 4 regarding the characteristics of respondents' knowledge as a whole, from 270 respondents it is known that 33 people (12.2%) have insufficient knowledge, 233 people (86.3%) have sufficient knowledge, and 4 people (1.5%) have high knowledge about the role of vitamin C for skin health.

Table 5 . Distribution of knowledge according to gender.

Gender	**Knowledge**							
	Low		**Sufficient**		**High**		**Total**	
	n	**%**	**n**	**%**	**n**	**%**	**N**	**%**
Man	25	18.5	110	81.5	0	0.0	135	50
Women	8	5,9	123	91.1	4	3.0	135	50
Total	**33**	**12.2**	**233**	**86.3**	**4**	**1.5**	**270**	**100**

Based on the results of data collection according to gender, from 135 people (50%) male respondents found 25 respondents (18.5%) with insufficient knowledge, followed by 110 respondents (81.5%) who had sufficient knowledge, and there were no male respondents who had good knowledge in this study. Of the 135 (50%) female respondents, there were 8 respondents (5.9%) who had sufficient knowledge, followed by 123 people (86.3%) who had sufficient knowledge, and 4 (3%) who had good knowledge.

Table 6 . Distribution of knowledge according to generation.

Force	**Knowledge**			
	Low	**Sufficient**	**High**	**Total**

	n	%	n	%	n	%	N	%
2017	12	13.3	77	85.6	1	1,1	90	33.3
2018	10	11.1	78	86.7	2	2,2	90	33.3
2019	11	12.2	78	86.7	1	1,1	90	33.3
Total	**33**	**12.2**	**233**	**86.3**	**4**	**1.5**	**270**	**100**

Based on the results of data collection according to the batch, it was found that the number of respondents in the 2017 class was 90 people (33.3%), with low knowledge of 12 people (13.3%), followed by respondents who had sufficient knowledge of 77 people (85.6%)), and high knowledge of 1 person (1.1%). In the 2018 batch, there were 90 respondents (33.3%), with low knowledge of 10 people (11.1%), followed by 78 people (86.7%) who had sufficient knowledge, and with high knowledge as many as 2 people (2.2%). In the 2019 class, there were 90 respondents (33.3%), with low knowledge of 11 people (12.2%), followed by 78 respondents (86.7%) who had sufficient knowledge, and high knowledge of a number of 1 person (1.1%).

Table 7. The level of student knowledge about the role of vitamin C in general.

Force	General Knowledge							
	Low		Sufficient		High		Total	
	n	%	n	%	n	%	N	%
2017	10	11.1	74	82.2	6	6,7	90	33.3
2018	12	13.3	68	75.6	10	11.1	90	33.3
2019	18	20.0	60	66.7	12	13.3	90	33.3
Total	**40**	**14.8**	**202**	**74.8**	**28**	**10.4**	**270**	**100**

Based on the results of data collection of respondents regarding knowledge of the role of vitamin C in general, it was found that the number of respondents in 2017 was 90 people (33.3%), with low knowledge of 10 people (11.1%), followed by respondents who had sufficient knowledge as much 74 people (82.2%), and it was found that respondents with high knowledge were 6 people (6.7%). In the 2018 class, there were 90 respondents (33.3%), 12 people with low knowledge (13.3%), followed by 68 respondents (75.6%) with high knowledge 10 people (11.1%). In the 2019 class, there were 90 respondents (33.3%), 18 people with low knowledge (20%), followed by 60 people with sufficient knowledge (66.7%), and respondents with high knowledge a total of 12 people (13.3%).

Table 8 . The level of students' knowledge of the role of vitamin C orally.

Force	Oral Knowledge							
	Low		Sufficient		High		Total	
	n	%	n	%	n	%	N	%
2017	19	21.1	25	27.8	46	51.1	90	33.3
2018	22	24.4	29	32.2	39	43.3	90	33.3
2019	18	20.0	44	48.9	28	31.1	90	33.3
Total	**59**	**21.9**	**98**	**36.3**	**113**	**41.9**	**270**	**100**

Based on the results of data collection of respondents regarding knowledge of the role of vitamin C orally, it was found that the number of respondents in 2017 was 90 people (33.3%), with low knowledge of 19 people (21.1%), followed by respondents who had sufficient knowledge as much 25 people (27.8%), and it was found that respondents with high knowledge were 46 people (51.1%). In the 2018 class, there were 90 respondents (33.3%), 22 people with low knowledge (24.4%), followed by 29 people (32.2%) who had sufficient knowledge, and respondents with high knowledge of 39 people (43.3%). In the 2019 batch, there were 90 respondents (33.3%), 18 people with low knowledge (20%), followed by 44 people with sufficient knowledge (48.9%), and respondents with high knowledge a total of 28 people (31.1%).

Table 9. The level of knowledge of students on the role of vitamin C topically

Force	Topical Knowledge							
	Low		Sufficient		High		Total	
	n	%	n	%	n	%	N	%
2017	32	35.6	51	56.7	7	7,8	90	33.3
2018	29	32.2	53	58.9	8	8.9	90	33.3
2019	25	27.8	58	64.4	7	7,8	90	33.3
Total	**86**	**31.9**	**162**	**60.0**	**22**	**8.1**	**270**	**100**

Based on the results of data collection of respondents regarding knowledge of the role of vitamin C topically, it was found that the number of respondents in the 2017 class was 90 people (33.3%), with low knowledge of 32 people (35.6%), followed by respondents who had sufficient knowledge as much as 51 people (56.7%), and high knowledge as many as 7 people (7.8%). In the 2018 batch, there were 90 respondents (33.3%), with low knowledge of 29 people (32.2%), followed by respondents who had sufficient knowledge as many as 53 people (58.9%), and with high knowledge a number of 8 people (8.9%). In the 2019 class, there were 90 respondents (33.3%), 25 people with insufficient knowledge (27.8%), followed by 58 respondents (64.4%) with sufficient knowledge and high as many as 7 people (7.8%).

Table 10 . The level of students' knowledge of the role of vitamin C by injection.

Force	Knowledge by Injection							
	Low		Sufficient		High		Total	
	n	%	n	%	n	%	N	%
2017	13	14.4	50	55.6	27	30.0	90	33.3
2018	12	13.3	39	43.3	39	43.3	90	33.3
2019	16	17.8	47	52.2	27	30.0	90	33.3
Total	**41**	**15.2**	**136**	**50.4**	**93**	**34.4**	**270**	**100**

Based on the results of the collection of respondent data regarding knowledge of the role of vitamin C by injection, it was found that the number of respondents in 2017 was 90 people (33.3%), with low knowledge of 13 people (14.4%), followed by respondents who had sufficient knowledge as much 50 people (55.6%), and high knowledge as many as 27 people (30%). In the 2018 class, there were 90 respondents (33.3%), 12 people with insufficient knowledge (13.3%), followed by 39 respondents (43.3%) who had sufficient knowledge. And high knowledge of 39 people (43.3%). In the 2019 class, there were 90 respondents (33.3%), 16 people with low knowledge (17.8%), followed by 47 people (52.5%) who had sufficient knowledge, and respondents with high knowledge as many as 27 people (30%).

Discussion

Everyone has different vitamin needs, depending on their needs. So the Food and Nutrition Board (FNB) recommends the Recommended Dietary Allowance (RDA) of vitamin C as a reference to find out the average daily intake of vitamin C needed by the body based on age and sex[11]. The RDA for vitamin C is based on physiological and antioxidant functions. However, in people with deficiency this need will increase[8].

From the results of this study, it can be seen that the majority of students at the Faculty of Medicine at The Universitas Sumatera Utara have sufficient knowledge about the role of vitamin C by injection, however, respondents still lack knowledge. Lack of knowledge on the use of vitamin C can lead to dosage abuse, and if used for a long time it will have an impact on the health of the body. According to research conducted on animals in 2016, there was a decrease in liver function in female rats that were injected with high dosage of *white vitamin* C for a long time [22]. Some of the initial symptoms of toxicity with the use of vitamin C injection are shortness of breath, palpitations, nausea, vomiting, impaired kidney function, and diarrhea [17], abscesses, allergies, and poisoning [1]. Injection practices can be harmful if used unsterilized tools can transmit infections, needlestick injuries that can cause damage, lack of supervision of the professional, and the use of needles or syringes are repeated [23].

From the results of this study, it can be seen that the majority of students at the Faculty of Medicine, Universitas Sumatera Utara have sufficient knowledge about the role of vitamin C, but respondents still lack knowledge. Lack of vitamin C intake can cause a person to experience

scurvy which is characterized by fatigue or lethargy, extensive connective tissue weakness, and capillary fragility[11], besides that deficiency of vitamin C for skin health will have an impact on a number of important skin functions such as poor wound healing caused by impaired collagen formation, thickening of the stratum corneum accompanied by extreme subcutaneous bleeding due to fragility, and loss of connective tissue morphology[19]. However, excessive use of vitamin C can cause several side effects in the form of diarrhea, acute hemolysis, sickle cell crisis, and the formation of kidney stones[3]. So that the FNB has set the Tolerable Upper Intake Level (UL) as a reference to prevent vitamin C toxicity.

From the results of this study, it can be seen that the majority of students at the Faculty of Medicine Universitas Sumatera Utara have good knowledge about the role of vitamin C which is used orally, but there are still respondents who lack knowledge. Lack of knowledge about the use of vitamin C orally can have an impact on dosage abuse. The use of oral vitamin C supplements in high doses over a long period of time can cause chromosomal and/or DNA damage and contribute to cancer development[10].

From the results of this study, it can be seen that the majority of students at the Faculty of Medicine, Universitas Sumatera Utara have sufficient knowledge about the role of vitamin C topically, but there are still respondents with less knowledge. Lack of knowledge about the use of vitamin C topically can have an impact on skin health, such as irritation of sensitive skin[2] and the use of toxic doses of vitamin C can cause cell apoptosis, namely by using 100-200 times the recommended daily dose[14].

Based on gender, for women vitamin C has many uses in supporting their appearance, the benefits obtained from vitamin C are brightening the skin, forming collagen, maintaining skin elasticity and smoothness, as an antioxidant[9], protecting from UV and Photoaging[12], preventing aging[21], and healing wounds[18]. And in men vitamin C is also beneficial in improving sperm quality[20].

From the results of this study it can be seen if men have less knowledge than women, this is in line with Hayati's (2007) statement which states that a person's interest is related to one's knowledge. The higher a person's interest in something, the higher the level of knowledge, this can happen because differences in one's interests will affect the knowledge of each individual. This is made clearer from a study conducted in Thailand which states that women are more concerned about their health than men[13].

Conclusion

From the results of this study, it can be seen that the majority of students at the Faculty of Medicine, Universitas Sumatera Utara have sufficient knowledge about the role of vitamin C by injection, however, respondents still lack knowledge. Lack of knowledge on the use of vitamin C can lead to dosage abuse, and if used for a long time it will have an impact on the health of the body.

From the results of this study, it can be seen that the majority of students at the Faculty of Medicine, Universitas Sumatera Utara have sufficient knowledge about the role of vitamin C, but there are still respondents with insufficient knowledge.

From the results of this study, it can be seen that the majority of students at the Faculty of Medicine, Universitas Sumatera Utara have a good knowledge of the role of vitamin C which is used orally, but there are still respondents with low knowledge.

From the results of this study, it can be seen that the majority of students at the Faculty of Medicine, Universitas Sumatera Utara have sufficient knowledge about the role of vitamin C topically, but there are still respondents with insufficient knowledge.

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