

## **Attitudes and Behavior of Community Towards Using Vitamin Supplements to Improve The Immunity During the COVID-19 Pandemic**

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### **Abstract**

During the COVID-19 pandemic, the consumption of vitamin supplements has become a new habit. As a result of its, people's attitude and behaviour had altered, particularly when it came to consuming vitamin supplements to boost the immunity or maintain healthy body. The aim was to analyze the correlation between the attitude and behaviour of the community toward using vitamin supplements during the COVID-19 pandemic. A cross-sectional study was conducted in two cities in Indonesia, Jakarta and Pandeglang Banten, in August-October 2021. A total of 804 research subjects filled out an attitude and behavior questionnaires. Snowball sampling technique applied by distributing text of Google Forms link of the questionnaire through head of community or neighbourhood unit so it final reached every resident in one of the sub-district of East Jakarta and Pandeglang. Data was analyzed the socioeconomy characteristics by Chi square test, while the correlation of attitude and behaviour tested by Spearman rho test. The characteristics of Socioeconomy such as education, consumption of vitamin supplements during the COVID-19 period, and people's residence were correlated significantly with attitude and behaviour ( $P < 0.005$ ). There was a significant correlation between attitude and behaviour in using vitamin supplements to increase immunity during the COVID-19 pandemic ( $P = 0.001$ , correlation coef = 0.465). The correlation was moderate strength with a positive path. It means that people who have positive view will support the use of vitamins during COVID-19 pandemic.

**Keywords:** attitude, behaviour, COVID-19, vitamin supplement.

## **Sikap dan Perilaku Masyarakat terhadap Penggunaan Suplemen Vitamin untuk Meningkatkan Imunitas di Masa Pandemi COVID-19**

### **Abstrak**

Selama pandemi COVID-19, konsumsi suplemen vitamin telah menjadi bagian dari kebiasaan hidup baru. Sikap dan perilaku masyarakat berubah sebagai dampak dari pandemi terutama penggunaan suplemen vitamin dalam upaya peningkatan imunitas ataupun menjaga keehatan tubuh. Penelitian ini bertujuan untuk memberikan gambaran sikap dan perilaku masyarakat dalam penggunaan suplemen vitamin selama masa pandemi COVID-19. Penelitian ini merupakan studi cross-sectional di dua kota di Indonesia, yaitu Jakarta dan Pandeglang Banten. Sebanyak 804 subjek penelitian mengisi kuesioner sikap dan perilaku. Teknik Snowball sampling diterapkan dengan menyebarkan pesan tautan (link) Google Form kuesioner melalui ketua RW, RT, hingga akhirnya menjangkau semua warga di salah satu kelurahan di Jakarta Timur dan Pandeglang. Data dianalisis secara deskriptif untuk karakteristik sosioekonomi terhadap sikap, dan perilaku dengan analisis chi Square; sedangkan hubungan antara sikap dan perilaku diuji menggunakan analisis Spearman-rho. Tingkat pendidikan dan penggunaan suplemen vitamin serta lokasi tempat tinggal secara signifikan berhubungan dengan sikap dan perilaku penggunaan suplemen vitamin. Terdapat korelasi yang signifikan antara sikap dan perilaku penggunaan suplemen vitamin untuk meningkatkan imunitas di masa pandemi COVID-19 ( $P = 0,001$ , koefisien korelasi = 0,465). Sifat korelasi ini adalah positif dengan kekuatan korelasi cukup. Ini berarti semakin positif pandangan masyarakat maka akan semakin meningkatkan perilaku untuk menggunakan suplemen vitamin di masa pandemi COVID-19

**Kata kunci:** COVID-19, perilaku, sikap, suplemen vitamin.

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## Introduction

The coronavirus virus (COVID-19) had been a pandemic from early 2020 to 2021. A total of 89.4 million people worldwide had been confirmed COVID-19 and as many as 1.9 million had died caused COVID-19 in January 2021.<sup>1</sup> In addition, the fear of COVID-19 made almost many people around the world were also starting to experience mental disorders due to excessive fear and vigilance due to COVID-19.<sup>2</sup>

The pandemic situation had been changed attitudes and actions that encourage each individual to try everything possible to avoid the disease COVID-19.<sup>3</sup> It also made people around the world who were anxious to finally changed their behaviour as responded to the COVID-19 pandemic. One of attitude and behaviour that looked significantly different from the period before the pandemic was the increasing number of good living habits, consuming nutritious food, exercising, getting enough rest and taking vitamin supplements to increase the immunity.<sup>3</sup>

A research study exactly PLifeCOVID-19 Online Studies from the University of Oxford found an increase in vitamin supplement consumption behavior from January to October 2020 during the early period of COVID-19 cases worldwide.<sup>4</sup> One study while online researched too in Indonesia also stated that as many as 74% of 215 respondents engaged in health product consumption behavior, including health supplements, in the hope of increasing immunity during the COVID-19 pandemic.<sup>5</sup>

Sources of therapeutic guidelines for COVID-19 patients informed that vitamin supplements can be used as additional therapy for the treatment and prevention of COVID-19 disease. According to a literature review, vitamin C, vitamin D, and Zinc are important vitamin supplements

for COVID-19 patients.<sup>6</sup> Basically the use of vitamin supplements is to provide the micronutrient needs, but most people in the world use them for various reasons such as disease prevention, health reason, and improvement the healthy condition of post-treatment.<sup>4</sup>

According to behavioral approach theory, the intention is one of the most powerful things in consumer behaviour. Just as during the pandemic conditions and the fear of the impact of the COVID-19 disease, every individual intends to buy vitamin supplements. In one study, it was found that there was a significant correlation between the intention, attitude and behaviour of using vitamin supplements. A positive attitude encourages the behaviour of using vitamin supplements.<sup>7</sup> . Another study, it was found that the patient's attitude toward vitamin supplements encouraged the intention of buying behaviour for the product.<sup>8</sup>

The results studied in one of the cities in Indonesia stated that as many as 69.4% of Indonesians consumed supplements during the COVID-19 pandemic and most had a good and positive attitude towards health supplement products.<sup>3</sup> One of the research results on health faculty students in Ambon City, Indonesia found that 49.1% of 144 respondents had a positive attitude with good behavior in using supplements to increase immunity during the COVID-19 pandemic. The same thing was also found in Pharmacy students in Malang, stating that 77.4% had a good attitude with a good category of vitamin supplement consumption of 80.6% of a total of 93 people. This showed that a good attitude will be in line with good supplement use behavior.<sup>9,10</sup>

Indonesia as part of a country in the world with a dense population has also experienced many changes in social behavior related to health during the COVID-19 pandemic. East Jakarta and Pandeglang were cities in

Indonesia that have been affected, one of which was a change in lifestyle of consuming health supplements. Research related to attitudes and behavior of using vitamin supplements has never been conducted in these two cities. The number of subjects in the study, which reached more than 700 respondents, will certainly be an assessment that represents cities in Indonesia regarding the description of attitudes and behavior of using vitamin supplements which are associated with the hope of increasing body immunity during the COVID-19 pandemic. However, it should be remembered that health conditions can be said to be good if the behavior of using vitamin supplements is still within reasonable limits and does not exceed the established guidelines. This study aimed to describe the attitudes and behavior of using vitamin supplements by the community during the COVID-19 pandemic.

## Methods

The research was designed as a cross-

sectional study. Data was collected from August to October 2021 in one sub-district of East Jakarta and Panimbang City, Pandeglang Regency, Banten Province. The sample size was calculated using Slovin's formula with a 95% confidence level. Population data was obtained from the Indonesian Central Statistics Agency, and by applying Slovin's formula, the sample size was determined to be 404 from East Jakarta and 400 from Pandeglang, Banten, resulting in a total sample of 804 respondents. Ethical approval for this study was obtained from the Health Research Ethics Committee of Universitas Muhammadiyah (KEPK-Uhamka) on September 16, 2021, with approval numbers 03/21.09/01300 and 03/21.09/01.09/01302. The Google Forms questionnaire link was provided to the heads of head of community or neighbourhood unit and then distributed randomly to residents within each neighbourhood unit who included the inclusion criteria. Respondents who agreed to participate in the study clicked the consent option on the informed consent page of

**Table 1. The Socioeconomic Characteristics of Participant**

Atribut	Distribution	Frequency (%)	Attitude	Behaviour
		N = 804	P-value <sup>a</sup>	P-value <sup>a</sup>
Gender	Male	314 (39.04)	0.037*	0.435
	Female	490 (60.95)		
Age	18-25 years	388 (48.26)	0.223	0.141
	26-35 years	207 (25.75)		
	36-45 years	131 (16.29)		
	46-59 years	78 (9.70)		
Education	Non-high education	455 (56.59)	0.001*	0.001*
	High education	349 (43.41)		
Occupation	Working	590 (73.38)	0.112	0.138
	Not working	214 (26.62)		
Consumpting of Vitamin Supplement	Yes	435 (54.10)	0.005*	0.001*
	No	369 (45.90)		
Residence	Pandeglang city	400 (49.75)	0.001*	0.001*
	East jakarta city	404 (50.25)		

<sup>a</sup> Chi-square test, \*significant

**Table 2. Distribution Scores of Attitude of Participants**

No.	Statements	Attitude		
		Frequency (%)		
		N = 804 (100%)		
		supportive attitude n (%)	Undecided n (%)	Non-supportive attitude n (%)
1	I believe that vitamin supplements can complement nutritional needs	791 (98.38)	11 (1.37)	2 (0.25)
2	I believe that vitamins are nutrients that the body needs in micro quantities and can be obtained from outside the body	700 (87.06)	91 (11.32)	13 (1.62)
3	I believe that vitamins are substances that can help metabolic processes in the body	778 (96.76)	22 (2.74)	4 (0.50)
4	I believe that vitamins C, D and E can help maintain the immune system	730 (90.80)	68 (8.46)	6 (0.75)
5	I believe that vitamins C, D and E are one of the body's essential vitamins	696 (86.57)	100 (12.44)	8 (1.00)
6	I believe that vitamin C contains antioxidants	748 (93.03)	47 (5.85)	9 (1.12)
7	I believe that vitamins can help recovery process	636 (79.10)	108 (13.43)	60 (7.46)
8	I believe vitamins can provide daily nutritional needs	706 (87.81)	74 (9.20)	24 (2.99)
9	I believe that consuming high doses of vitamin C continuously can cause diarrhea, nausea, stomach cramps, and gastrointestinal disturbances	719 (89.43)	71 (8.83)	14 (1.74)
10	I believe that consuming high doses of vitamin D continuously is at risk of causing impaired kidney function	646 (80.35)	142 (17.66)	16 (1.99)
11	I believe that the dose of vitamin C to maintain immunity in women > 15 years is 75 mg/day, for men > 15 years it is 90 mg/day.	587 (73.01)	206 (25.62)	11 (1.37)
12	I believe that the dose of vitamin D to maintain immunity in men and women 10-61 years is 15 mcg/day	501 (62.31)	297 (36.94)	6 (0.75)
13	I believe that the dose to provide needs of vitamin E in the body in men >12 years is 15mg/day for women 10-64 years, which is 15mg/day	489 (60.82)	308 (38.31)	7 (0.87)

Google Forms. Personal data of respondents will not be disclosed, as explained on the informed consent form.

The study used an attitude and behavior questionnaire developed by the research team based on the guidebook “Buku Saku

Suplemen Kesehatan Untuk Memelihara Daya Tahan Tubuh Dalam Menghadapi COVID-19,” published by the The Indonesian Food and Drug Authority (BPOM).<sup>11-13</sup> The questionnaire was created using Google Forms. Inclusion criteria included residents

**Table 3. Distribution Scores of Behaviour of Participants**

No.	Statements	Distribution Frequency N			
		N=804			
		-100%			
		Always n (%)	Often n (%)	Sometimes n (%)	Never n (%)
1	I take vitamin C to increase my immune system during the pandemic	286 (35.57)	287 (35.70)	114 (14,18)	117 (14.55)
2	I take vitamin D to increase my immune system during the pandemic	277 (34.45)	198 (24.63)	184 (22,89)	145 (18.03)
3	I take vitamin E to increase my immune system during the pandemic	163 (20.27)	174 (21.64)	224 (27,86)	243 (30.22)
4	I pay attention to the warnings/warnings listed on the label of vitamin supplement products before I take them	228 (28.36)	307 (38.18)	176 (21,89)	93 (11.57)
5	I take vitamin C supplements once a day during the pandemic to maintain my immune system	164 (20.40)	328 (40.80)	181 (22,51)	131 (16.29)
6	I pay attention to the side effects listed on the vitamin supplement product label before I take it	162 (20.15)	241 (29.98)	207 (25,75)	194 (24.13)
7	I pay attention to the use of vitamin supplements to suit my body condition	231 (28.73)	275 (34.20)	188 (23,38)	110 (13.68)
8	I buy vitamins from the pharmacy	180 (22.39)	283 (35.20)	206 (25,62)	135 (16.79)
9	I buy vitamins other than at the pharmacy	163 (20.27)	217 (27.00)	338 (42,04)	86 (10.70)
10	I pay attention to the dosage listed on the vitamin supplement product label before I take it	251 (31.22)	339 (42.16)	184 (22,89)	30 (3.73)

living in 90 sub-districts of Panimbang and Klender, aged 18-59 years, and willing to complete the informed consent form. The exclusion criteria were respondents who did not complete all sections of the questionnaire. The exclusion criteria were respondents who did not complete all sections of the questionnaire.

Attitude and behaviour questionnaires were tested for content validity and construct validity. The stages of content validity testing was intended as a test of the contents of the questionnaire with rational analysis through professional judgement by lecturers and pharmacists at pharmacy UHAMKA. The results of the content validity test obtained an I-CVI value of 0.92 (relevant >0.9) for

the attitudes questionnaire and an I-CVI of 1 (relevant) for the behaviours questionnaire.

The attitude questionnaire consists of 13 questions with answered choices on a Likert scale of strongly disagree (point 1), disagree (point 2), undecided (point 3), agree (point 4), and strongly agree (point 5). The description of the attitude for each question was grouped into a supportive attitude (for the answers agree and strongly agree), undecided, and a non-supportive attitude for the answers disagree and strongly disagree. The results of construct validity test on the 13 question items were valid with the r-table value in the range of 0.629-0.765, while the reliability test obtained Cronbach's alpha value of 0.811 (reliable).



**Table 4. Correlation of Attitude and Behaviour Toward Using Vitamin Supplement During COVID-19 Pandemic**

	Behaviour	
	P-value <sup>a</sup>	Coeff. Correlation
Attitude	0.001*	0.465

<sup>a</sup> Spearman Rho test, \* significant

The behaviour questionnaire consisted of 10 questions with answer choices never (point 1), sometimes (point 2), often (point 3), and always (point 4) except the ninth statement were given always (point 1), often (point 2), sometimes (point 3), and never (point 4). The construct validity test of the behaviour questionnaire obtained all valid question items with r-label values in the range 0.308-786 and the questionnaire was declared reliable with Cronbach's alpha value of 0.846.

The data analysis included a descriptive study of the attitude and behaviour of the people in the Panimbang (Pandeglang) and Klender sub-districts, East Jakarta. The chi-square test was used to examine the correlation between respondent characteristics and their attitudes and behaviors. Meanwhile, the Spearman's rho test was used to assess the correlation between attitudes and behaviors, aiming to determine both the strength and direction of the correlation between these variables.

## Results

### *Socioeconomic characteristic*

From 804 study subjects, 60.95% were female, with the majority being aged between 18-25 years (48.26%). The majority had a non-high school education (56.59%) and were employed (73.38%) (Table 1). The characteristics of gender, education, vitamin supplement consumption, and city of residence were significantly correlated with attitudes ( $p < 0.05$ ). For behavior variables,

only education, vitamin supplement consumption, and city of residence showed significant correlations ( $p < 0.05$ ) (Table 1).

### *Attitude and behaviour of using vitamin supplements*

More than 95% of subjects in this study believe that vitamin supplements can fulfill the body's nutritional needs, and as many as 80.69% of research subjects also believe that micronutrient vitamin supplements are necessary during the COVID-19 pandemic (Table 2). More than 85% of respondents have a supportive attitude that vitamins C, D, and E are essential vitamins that can help maintain the immune system and believe that vitamin C is a vitamin element that contains antioxidant compounds (Table 2).

Based on the results, it was found that respondents who chose to always and often use vitamins C and D to boost their immunity during the pandemic accounted for more than 70% of the total research sample (Table 3). The community that frequently purchased vitamin supplements at the pharmacy reached 35.2% (Table 3). There are still people who do not pay attention to the labels or instructions for use, side effects, usage dosage, and warning signs on vitamin supplement packaging, ranging from 3% to 24%.

## Discussion

The increase in mortality rates due to COVID-19 has led to changes in nutritional consumption patterns among people worldwide. One behavior that has been

affected is the purchase of health products such as vitamin supplements.<sup>2,14</sup>

The characteristic of gender is correlated with attitudes towards the use of supplements, with this study being dominated by female respondents. Another study on a community in Wuhan found that 57.2% of the 598 participants, and 78.2% of the 866 health students at a university in Turkey, were female respondents willing to participate in research.<sup>2,14</sup> Research on attitudes and behaviors regarding the use of supplements and traditional medicine at a university in Jember, Indonesia, also found that a majority of participants were female, accounting for 73.6% of the total 606 students involved.<sup>15</sup> Additionally, a significant number of female respondents showed a 21% increase in their attitudes toward the use of immune-boosting products compared to before the pandemic.<sup>16</sup> The educational characteristics in this study are significantly correlated with attitudes and behaviors regarding the use of vitamin supplements during the pandemic ( $p < 0.05$ ). Gurhan et al. (2022) also reported in their research that education correlates with attitudes towards the use of health supplement products.<sup>17</sup> In this study, a higher proportion of respondents had lower levels of education, amounting to 56.59%. Most respondents from rural areas still have low educational levels, similar to the research findings in the city of Lamongan, where 62% of the population had low to medium education levels (elementary to high school), yet many engaged in the behavior of using vitamin supplements during the pandemic.<sup>18</sup> In terms of behavior, perceived benefits significantly influence positive behavior towards the use of vitamin supplements to improve quality of life or health conditions.<sup>19</sup>

There is a correlation between vitamin supplement consumption and the attitudes and behaviors of the community in efforts to boost immunity ( $p < 0.05$ ). The situation that

has suddenly changed due to the COVID-19 had influenced people's behavior, and one of factor influenced it is by emotional factors and a sense of fear due to COVID-19 that does not subside 5. It is undeniable that the COVID-19 pandemic has significantly changed living habits, including consumption patterns and the new tendency to routinely purchase health products. In this study, the respondents on average have frequently used vitamins C and D to help boost their immunity. However, a smaller proportion, only 41.91%, always or often use vitamin E. The elements of vitamins C, D, and E, which function as antioxidants, are very important in maintaining immunity. COVID-19 patients are very susceptible to deteriorating immune system conditions and require nutrition up to twice the normal.<sup>20</sup>

The location of residence between respondents in East Jakarta and Pandeglang, Banten, correlates with attitudes and behaviors regarding the use of vitamin supplements ( $p < 0.05$ ). One literature study in Indonesia mentions that the factors of panic buying and the increasing health awareness among our community have made vitamin supplements one of the primary needs.<sup>21</sup> However, another study in Indonesia found that the provincial location does not have a significant correlation with attitudes and behaviors related to health in preventing COVID-19.<sup>22</sup>

There was a significant correlation between attitude and behaviour in using vitamin supplements during the COVID-19 pandemic ( $P = 0.001$ , correlation coef = 0.465). The correlation coefficient value was 0.465, which showed moderate correlation strength with a positive correlation direction 22. This means that the positive support an attitude, the more behaviour will increase. Respondents showed a more supportive looked from all the answered attitude questionnaire even though the percentage of used vitamin supplement was still below 50%. Another

study in Pahang, Malaysia found the same thing: attitudes and actions regarding vitamin supplement consumption during the pandemic were significantly correlated, although the correlation value obtained ( $r=0.152$ ) was considered weak. However, this is a first step towards continually fostering positive attitudes so that vitamin consumption always follows good health guidelines.<sup>24</sup>

The limited activities or mobility out the house almost people in the world during the pandemic caused a new behaviour such as buying by online market. The increasing promotion of health products also encouraged people to buy health products including supplements through online shops. In addition, it is also known that taking vitamin supplements during the covid pandemic makes them feel healthier. The buying behaviour of supplement products is strongly influenced by the widespread advertising of supplement products, family and environmental influences and individual perspectives.<sup>21</sup>

From the research, it was known that there were still many people who didn't pay attention to the dosage and label instructions on vitamin packages and did not pay attention to the side effects of it. Overdose of it when the body is under normal conditions can cause adverse effects on the body. Therefore, the use of vitamin supplements in high doses without a doctor's supervision is not recommended.<sup>20</sup>

From the results of this study, it is known that attitude and behavior have a positive correlation, so strategies need to be continuously developed to foster a positive attitude in the community to encourage wise behavior in the use of vitamin supplements. Good information related to medication is obtained at the proper healthcare facilities, such as pharmacies, so there is a need for extensive information and education to encourage people to buy medication and health supplements from pharmacies.

Furthermore, with the rapid dissemination of information through online media, it is hoped that health organizations like the Indonesian Pharmacists Association will provide continuous and regular education through online media.

## Conclusion

Attitude and behaviour community in using vitamin supplements were quite high during the COVID-19 pandemic. Socioeconomic factors such as education, consumption of vitamin supplements and residence (regional origin) were significantly correlated with attitudes and behavior in using vitamin supplements during COVID-19 pandemic. There was a correlation significantly between attitude and behavior ( $p<0.05$ ). There is a need to increase education so that people are encouraged to buy medication and health supplements from appropriate healthcare facilities such as pharmacies. Additionally, the involvement of organizations like the Indonesian Pharmacists Association is expected to inspire pharmacists to disseminate educational information through online media, making it easily accessible to all Indonesian people.

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## Conflict of Interest

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