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Research article

Risk Perception and Efficacy Beliefs Regarding COVID-19 among Indonesian Pharmacy Students

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Abstract

Preventive behavior is important to mitigate COVID-19 transmission, while a low risk perception could reduce the implementation of such behavior. This study aimed to determine pharmacy student's COVID-19 risk perception and efficacy beliefs as well as its related factors. A cross-sectional analytic observational approach was employed; data were gathered through the distribution of online questionnaires. The minimum sample size was calculated using the Cochran formula. The respondents comprised 406 respondents of undergraduate and pharmacist students. The data were analyzed using an independent t-test to compare the mean scores of each independent variable. The mean scores for perceived vulnerability and threat were 3.67 and 3.02, while the mean score for perceived severity was 2.48. The average scores for response and self- efficacy were 4.43 and 4.08. Factors that are statistically significant ($P < 0.05$) in affecting perceived vulnerability include history of supplement consumption, first dose of the COVID-19 vaccine, and parental income. Perceived severity was significantly influenced by gender, a history of chronic disease, initial dose of the COVID-19 vaccine, and area of residence. Gender and initial dose of the COVID-19 vaccine significantly influenced perceived threat. Efficacy beliefs were significantly influenced by a history of supplement consumption, first dose of the COVID-19 vaccine, and adherence to health protocols. The respondents exhibited a high level of risk perception and efficacy beliefs regarding their ability to manage the COVID-19 crisis. Examining the risk perception of pharmacy students is essential, as they play a crucial role in the prevention and control of social infectious diseases.

Keywords: COVID-19, efficacy beliefs, Indonesia, pharmacy student, risk perception

Introduction

SARS-CoV-2, the virus that causes COVID-19, is an RNA virus that first appeared in Wuhan, Hubei Province, China, in late December 2019. World Health Organization (WHO) data indicate that death cases due to COVID-19 as of September 2021 reached 4.5 million people globally [1]. Indonesia was ranked 16th, with 18.6 million cases [2]. Furthermore, Special Region of Yogyakarta province ranked 6th, with highest mortality rate of COVID-19 [3].

The COVID-19 virus is transmitted very quickly and has infected hundreds of millions of people worldwide. Transmission occurs from human to human through respiratory droplets released when someone sneezes, coughs, or talks. Indirect spread could also occur through contaminated surfaces. The Centers for Disease Control and Prevention (CDC) recommends preventive behaviors as an effort to break the chain of virus spread; these measures include wearing a mask, covering the mouth when coughing and sneezing, maintaining an appropriate distance from others, avoiding crowds, and hand washing [4]. One factor that could affect preventive behavior compliance is risk perception; specifically, low risk perception could reduce compliance with preventive behaviors or health protocols [5].

Human behavior is closely related to risk perception when disease outbreaks occur. According to the health behavior model, adherence to preventive behavior depends on a person's perception of risk [6]. Studies conducted when

COVID-19 first appeared found that people's risk perception of COVID-19 was considered high even though their behavior to prevent COVID-19 transmission was still low [7]. A previous study of risk perception conducted by Nanda (2021) measured risk perception using the protection motivation theory (PMT), which consists of perceived vulnerability, perceived severity, and perceived threat. The results showed that at the beginning of the outbreak, Indonesian participants had a fairly high perceived threat [8].

PMT states that a perception of high risk predicts protective or preventive behavior when a person believes that effective protective measures are available (response efficacy) and that they could engage in protective measures (self-efficacy) [9]. Preventive actions that arise are efforts to prevent the transmission of the COVID-19 virus. To the best of our knowledge, there is no studies have examined the factors which influence risk perceptions among pharmacy students. Therefore, in addition to elucidating the factors that influence risk perception mentioned above, studying individuals' efficacy beliefs is necessary to understand their risk perception.

The COVID-19 pandemic has caused various problems, one of which is in the field of education. Some universities have implemented distance or online learning in an effort to reduce mass interaction and prevent virus transmission. However, online learning poses various barriers related to technology and networks as well as readiness for online learning. Students have high mobilization and socialization levels. They generally have good health and often only have mild symptoms when infected with COVID-19. Students also contribute greatly to building the risk perception of their community [10]. A low risk perception of COVID-19 leads to negligence in virus transmission prevention behavior. This study aims to investigate the factor influencing COVID-19 risk perception and efficacy beliefs among pharmacy students. To reduce the risk of spreading the virus, university students must comply with control measures, which are largely influenced by their risk perception. Therefore, research on risk perception and efficacy beliefs as well as influencing factors must be studied to identify students' levels of risk perception during the current pandemic.

Materials and Methods

Materials

The research instrument used for data collection was a questionnaire, which contained questions about personal information, immunization experience, knowledge about the COVID-19 vaccine, risk perception, and efficacy beliefs. The questionnaire items that collected data on risk perception and efficacy beliefs were based on Protection Motivation Theory, including perceived vulnerability, perceived severity, perceived threat, response efficacy, and self- efficacy.

Risk perception and efficacy beliefs related to COVID-19 were assessed on a 5-point Likert scale, with 1 indicating "strongly disagree", 2 indicating "disagree", 3 indicating "neutral", 4 indicating "agree" and 5 indicating "strongly agree". Three questions assessed risk perception by asking about perceived vulnerability, perceived severity, and perceived threat, and two questions focused on efficacy beliefs by assessing response efficacy and self-efficacy.

Methods

This cross-sectional study utilized an analytical observational method to gather information from pharmacy students at Ahmad Dahlan University, Yogyakarta (undergraduate and pharmacist professional study programs). Data were collected with an online survey administered via Google Forms from March 2021 to May 2022. The minimum sample size was calculated using the Cochran formula and informed by a prior study; with Z (at 95% confidence interval) = 1.96, p (proportion with high perceived risk of COVID-19) = 0.434, q (1-p) = 0.566, and e (margin of error) = 0.05 [10]. A total of 377.46 participants were determined. Considering a 7.5% non-response rate during the study, a minimum of 406 participants was required for the analysis. This study used non-probability sampling with a snowball sampling approach. The study was received ethical approval with ethics code number 1786/KEP-UNISA/V/2021.

Data analysis

Univariate analysis was used to describe the demographic characteristics of the respondents, including gender, age, parental occupation, student level, parental income, province of residence, health status, history of chronic disease, smoking history, history of supplement use, COVID-19 vaccination dose 1, COVID-19 vaccination dose 2, and implementation of health protocols. Furthermore, it determined the distribution of responses regarding risk perception and efficacy beliefs, along with the mean scores for risk perception and efficacy beliefs. Risk perception and efficacy beliefs were considered good if the average score of each variable was ≥ 3.

The independent variables in this study were the demographic characteristics of the respondents, and the dependent variables were the five variables of risk perception and efficacy beliefs. The Kolmogorov–Smirnov normality test was conducted before bivariate analysis. If the significance value was > 0.05, the data was considered normally distributed. If the normality test results were normal, the analysis was carried out using an unpaired independent t-test. Test results with significance values of <0.05 were considered significant. Non-normally distributed data were analyzed

with the Mann–Whitney for two categories and the Kruskal–Wallis test for three or more categories. The test results were considered significant if the significance value was < 0.05.

Results and Discussion

This study included 407 pharmacy students participating in undergraduate and professional pharmacist study programs at Universitas Ahmad Dahlan, Yogyakarta, Indonesia. One respondent did not meet the criteria because he did not complete the questionnaire, thus the data of 406 respondents were analyzed. The demographic characteristics of respondents are shown in Table 1.

Table 1. Demographic characteristics of respondents

Variables	Category	Frequency	Percentage (%)
Gender	Female	338	83.3
	Male	68	16.7
Age (years old)	17–20	233	57.4
	≥21	173	42.6
Parental Occupation	Private Employee	53	13.1
	Civil Servant	147	36.2
	Entrepreneur	113	27.8
	Lecturer	3	0.7
	Teacher	22	5.4
	Health Worker	13	3.2
	Miscellaneous	55	13.6
Student level	Undergraduate	384	94.6
	Pharmacist Profession	22	5.4
Parental income	<IDR 1,500,000	18	4.4
	IDR 1,500,000–2,500,000	56	13.8
	IDR 2,500,001–3,500,000	91	22.4
	>IDR 3,500,000	241	59.4
Province of residence	Western Indonesia	375	92.4
	Central Indonesia	23	5.7
	Eastern Indonesia	8	1.9
Health status	Healthy	395	97.3
	Positive for symptomatic COVID-19	1	0.2
	COVID-19 positive with no symptoms/ mild symptoms	1	0.2
	Already recovered from COVID-19	6	1.6
	Pain, but not COVID-19	3	0.7
History of chronic disease	Yes	4	1
	No	402	99
Smoking history	Yes	9	2.2
	No	397	97.8
History of supplement use	Yes	143	35.2
	No	263	64.8
COVID-19 vaccination dose 1	Already	64	15.8
	Not yet	342	83.2
COVID-19 vaccination dose 2	Already	36	8.8
	Not yet	370	91.2
Implementation of health protocols	Always	329	81
	Sometimes	74	18.2
	Rarely	3	0.8
	Never	0	0

Most respondents were women (n = 338, 83.3%); 68 of the respondents (16.7%) were men. Most of the respondents were aged 17–20 years (n = 233, 57.4%), whereas 173 respondents (42.6%) were aged 21 years or over. The difference between the number of respondents aged 17–20 and the number of participants aged 21 years and over was not too large because the average age of undergraduate and pharmacy students was in the range of 17–25 years. The distribution of education levels was as follows: 384 respondents (94.6%) were undergraduate students, and 22

respondents (5.4%) were pharmacy profession students. Table 1 shows that 97.3% of participant had good health, 99% of the students did not have a history of chronic disease, and 97.8% of students did not have a history of smoking. The frequency of respondents who did not use supplements (263 people, 64.8%) was higher than that of respondents who did. In addition, 15.8% of respondents were vaccinated against COVID-19, and 81% of respondents always followed health protocols, such as wearing masks, washing hands, and maintaining distance.

The variables of risk perception and efficacy beliefs consisted of perceived vulnerability, perceived severity, perceived threat, response efficacy, and self-efficacy regarding COVID-19. Furthermore, respondents provided one of the answer choices provided for each of the five variables of risk perception and efficacy beliefs. The distribution of responses regarding COVID-19 risk perception and efficacy beliefs among Ahmad Dahlan University pharmacy students is presented in Table 2.

Table 2. Distribution of responses regarding COVID-19 risk perception and efficacy beliefs

No	Variables	Question	Answer				
			Strongly disagree	Disagree	Neutral	Agree	Strongly agree
1	Perceived Vulnerability	I believe that I and the people around me are at high risk of being exposed to COVID-19	21 (5.2%)	47 (11.6%)	99 (24.4%)	117 (28.8%)	122 (30%)
2	Perceived Severity	I will suffer serious complications if I am infected with COVID-19	92 (22.8%)	109 (26.8%)	139 (34.2%)	52 (12.8%)	14 (3.4%)
3	Perceived Threat	I believe that my life is at risk if I am infected with COVID-19	47 (11.6%)	77 (19%)	150 (36.9%)	85 (20.9%)	47 (11.6%)
4	Self-Efficacy	I am confident that I am able to implement strict health protocols in an effort to protect myself during the pandemic	3 (0.7%)	3 (0.7%)	34 (8.4%)	144 (35.6%)	222 (54.7%)
5	Response Efficacy	I am confident that the personal protection efforts I have taken are effective in preventing COVID-19 infection	3 (0.7%)	7 (1.7%)	73 (18%)	193 (47.6%)	130 (32%)

Table 2 indicates that 58.8% of the respondents agreed or strongly agreed that they were at high risk of being infected with the COVID-19 virus. Previous research showed that the pandemic caused by the SARS-CoV-2 virus increases the binding energy between the SARS-CoV-2 spike alpha, kappa variants and the ACE2 enzyme. This could alter the immune system's ability to neutralize viruses that enter the body [11]. In addition, 49.6% of respondents answered questions regarding perceived severity with "disagree" or "strongly disagree." The large number of respondents who answered "disagree" indicates that many respondents believed that they would not experience severe complications if they contracted COVID-19. Previous studies have shown that younger patients with COVID-19 experience lower disease severity [12]. Other research has shown that patients with previous comorbid diseases are more likely to have severe conditions and symptoms when they are infected with COVID-19 [13]. A total of 32.5% of respondents answered the perceived threat statement with "agree" or "strongly agree." This indicates that most respondents believed that COVID-19 could threaten the life of someone who is infected.

Regarding the efficacy beliefs variable, 90.3% of respondents answered the self-efficacy statement with the answers "agree" and "strongly agree". A total of 144 respondents who answered "agree" and 223 respondents who answered "strongly agree" indicated that they had confidence in implementing health protocols. Most respondents (79,6%) reported always making protective efforts during the pandemic. Self-awareness and knowledge are among the factors that influence the implementation of health protocols [14]. This study included undergraduate pharmacy students and pharmacy profession students who were equipped with good knowledge about disease prevention efforts. Previous research suggested that pharmacy students had high knowledge levels [15], which could increase their awareness of health protocol implementation. Table 3 also reveals that the average scores for response efficacy and self-efficacy were above 3, indicating high efficacy beliefs. COVID-19 self-efficacy is related to a person's ability to deal with the virus or attempt to stop the chain of transmission.

Table 3. Mean scores for risk perception and efficacy belief

No	Variables	Mean ± SD
1	Perceived vulnerability	3.67 ± 1.17
2	Perceived severity	2.48 ± 1.08
3	Perceived threat	3.02 ± 1.15
4	Response efficacy	4.43 ± 0.74
5	Self-efficacy	4.08 ± 0.79

The average scores displayed in Table 3 demonstrate that the respondents' perceived vulnerability scores were above 3 (3.67 ± 1.17), indicating that perceived vulnerability was high. This is in line with previous research on perceived vulnerability indicating that students perceive a high risk of being infected with COVID-19. This perception is related to a characteristic of the COVID-19 virus: which is more transmissible and contagious than SARS and H1N1 [16]. The average perceived threat score was also over 3 (3.02 ± 1.15), indicating that the respondents' perceived threat was high. Previous research explained that the COVID-19 pandemic causes an increase in perceived threat. The news from the media regarding the number of deaths of patients infected with COVID-19 increases anxiety, leading to an increase in risk perception regarding death from COVID-19 [17]. The respondents' average perceived severity score was below 3 (2.48 ± 1,08), indicating that their beliefs that COVID-19 could cause disease complications were low. Respondents in this study had an age range of 17–25 years. Perceived severity is closely related to sociodemographic, sociopsychological, and knowledge variables. The low perceived severity of the respondents in this study could be due to the young age of the respondents in this study, as COVID-19 risk factors increase with advancing age [18].

Table 3 also reveals that the average scores for response efficacy and self-efficacy were above 3, indicating high efficacy beliefs. COVID-19 self-efficacy is related to a person's ability to deal with the virus or efforts to break the chain of transmission. A high response efficacy indicates that a person feels able to deal with the COVID-19 virus through preventive measures. High response efficacy to COVID-19 could increase self-protection in preventing the transmission of the COVID-19 virus. A previous study concluded that high response efficacy could be caused by the desire for the COVID-19 pandemic to end soon, which motivates people to implement health protocols to help break the transmission of the COVID-19 virus [19]. Knowledge could increase awareness in implementing health protocols. Self-efficacy refers to a person's belief in their effectiveness in dealing with a threat. Our results regarding the respondents' self-efficacy are in line with the findings of previous research that students have high self-efficacy against COVID-19 [20].

The normality test results indicated a skewed distribution, thus bivariate analysis was performed using the Mann–Whitney test for data with two groups and the Kruskal–Wallis test for data with three or more groups. The results of the bivariate analysis between the independent variable and the dependent variable showed a significance value of <0.05, revealing a relationship between the two variables, as shown in Table 4.

Table 4 indicates a significant relationship between gender and perceived severity (P = 0.00) and perceived threat (P = 0.01). The data showed that men had higher perceived severity and perceived threat compared with women. This is in line with the research of Abir *et al*. (2020) who reported that men had a higher perception of risk than women [21]. This is because they are more concerned about the occurrence of infection and feel frustrated because they do not know how long this pandemic situation will last. The high expression of angiotensin-converting enzyme 2 in men makes them more susceptible to COVID-19. In addition, high smoking and drinking rates in men contribute to their susceptibility to infection with the COVID-19 virus [22].

A significant relationship was also found between the chronic disease history and perceived severity (P = 0.04). The group with a history of chronic disease had higher perceived severity than the group who did not have a history of chronic disease. Research by Ahuja *et al*. (2021) found a relationship between risk perception and disease history; people with a history of chronic illness have a high perception of risk for COVID-19 [23]. A history of disease increases the high risk of disease severity when infected with COVID-19. COVID-19 patient data indicate that patients with a history of chronic diseases, such as diabetes and hypertension, have significantly higher morbidity and mortality than those without a history of chronic disease [24].

In addition, a history of supplement use was significantly associated with perceived vulnerability. Respondents who used supplements had a higher perceived vulnerability than respondents who did not. People who consume supplements tend to be well-educated. A high perceived risk of COVID-19 is also found in people who have a high educational status [25]. Therefore, people who consume supplements may have a high risk perception of COVID-19.

According to previous research, the risk perception of COVID-19 plays a role in changing supplement consumption patterns [26]. Fadliyah *et al* (2021) found that the pandemic caused people to consume supplements more often than they did before the pandemic [27].

Table 4. The differences in mean scores of COVID-19 risk perception and efficacy beliefs among variables

Independent Variable		Dependent Variable									
Variables	Category	Perceived vulnerability		Perceived severity		Perceived threat		Response efficacy		Self-efficacy	
		Mean ± SD	P	Mean ± SD	P	Mean ± SD	P	Mean ± SD	P	Mean ± SD	P
Gender	Female	3.62 ± 1.18	0.06	2.39 ± 1.07	0.00*	2.95 ± 1.14	0.01*	4.45 ± 0.71	0.47	4.06 ± 0.79	0.20
	Male	3.93 ± 1.04		2.88 ± 1.04		3.37 ± 1.14		4.34 ± 0.86		4.17 ± 0.83	
Education level	Under graduate	3.66 ± 1.19	0.65	2.46 ± 1.09	0.18	3.04 ± 1.17	0.17	4.42 ± 0.74	0.68	4.09 ± 0.80	0.63
	Profession	3.86 ± 0.83		2.73 ± 0.83		2.73 ± 0.70		4.50 ± 0.67		4.05 ± 0.65	
History of chronic disease	Yes	4.00 ± 1.41	0.51	3.50 ± 0.58	0.04*	3.50 ± 1.00	0.32	5.00 ± 0.00	0.08	4.25 ± 0.50	0.75
	No	3.67 ± 1.17		2.47 ± 1.08		3.01 ± 1.15		4.42 ± 0.74		4.08 ± 0.80	
Smoking history	Yes	3.67 ± 1.32	0.95	2.22 ± 0.97	0.56	3.00 ± 1.41	0.92	4.22 ± 1.09	0.74	4.33 ± 0.71	0.35
	No	3.67 ± 1.17		2.48 ± 1.09		3.02 ± 1.15		4.43 ± 0.73		4.08 ± 0.80	
Supplement use	Yes	3.85 ± 1.16	0.01*	2.41 ± 1.05	0.55	3.03 ± 1.24	0.95	4.60 ± 0.62	0.00*	4.18 ± 0.81	0.03*
	No	3.57 ± 1.16		2.52 ± 1.10		2.88 ±1.10		4.33± 0.78		4.03 ± 0.78	
COVID-19 vaccination dose 1	Already	3.98 ± 1.05	0.02*	2.84 ± 1.13	0.01*	3.31 ± 1.19	0.03*	4.52±0.71	0.23	4.28 ± 0.70	0.04*
	Not yet	3.61 ± 1.18		2.41 ± 1.06		2.97 ± 1.14		4.41± 0.74		4.05 ± 0.80	
COVID-19 vaccination dose 2	Already	4.03±0.94	0.07	2.78 ± 1.02	0.08	3.36 ± 1.15	0.06	4.42± 0.73	0.88	4.33 ± 0.68	0.05
	Not yet	3.64 ± 1.18		2.45 ± 1.09		2.99 ± 1.15		4.43± 0.74		4.06 ± 0.80	
Parental income	Low	3.98 ± 1.05	0.04*	2.84 ± 1.13	0.593	3.31 ± 1.19	0.91	4.52± 0.71	0.43	4.28 ± 0.70	0.371
	Medium	3.61 ± 1.18		2.41 ± 1.06		2.97 ± 1.14		4.41± 0.74		4.05 ± 0.80	
	High	4.03 ± 0.94		2.78 ± 1.02		3.36 ±1.15		4.42± 0.73		4.33 ± 0.68	
	Very high	3.64±1.18		2.45 ± 1.09		2.99 ± 1.15		4.43± 0.74		4.06 ± 0.80	
Region of residence	Western Indonesia	3.69 ± 1.16	0.57	2.47 ± 1.09	0.04*	1.75 ± 0.71	0.22	4.44 ±0.73	0.10	4.08 ± 0.79	0.66
	Central Indonesia	3.56 ± 1.24		2.82 ± 1.09		3.03 ± 1.13		4.13± 0.92		4.17 ± 0.78	
	Eastern Indonesia	3.25 ±1.39		2.82 ±1.03		3.00 ±1.35		4.25± 0.71		3.87 ± 0.10	
Adhere to Health Protocols	Always	3.68 ± 1.17	0.72	2.43 ±1.08	0.21	2.99 ± 1.15	0.60	4.57± 0.65	0.00*	4.16 ±0.77	0.00*
	Sometimes	3.65 ± 1.19		2.68 ± 1.05		3.12 ± 1.11		3.82 ±0.78		3.73 ± 0.80	
	Rarely	3.33 ± 0.58		3.00 ± 2.00		3.33 ± 2.08		4.00 ±1.73		4.33 ± 0.58	

Note : *p-value less than 0.05 is statistically significant

COVID-19 vaccination (dose 1) was significantly related to perceived vulnerability (P = 0.02), perceived severity (P = 0.01), and perceived threat (P = 0.03). This indicates a significant relationship between having received the first dose of the COVID-19 vaccination and the perceived risk of COVID-19. Thus, respondents who had received the first dose of the COVID-19 vaccine had a higher perception of risk than those who had not. This finding is in line with research that reported a reduced hesitation to receive the COVID-19 vaccine in individuals with a higher perception of risk of COVID-19 [28]. Furthermore, concerns about COVID-19 increase individuals' willingness to receive the COVID-19 vaccine.

We also observed a significant relationship between perceived vulnerability and parent income. Students with high parental income had the highest average perceived vulnerability score, followed by those with low, very high, and moderate parental income. Conversely, a previous study found that individuals with low socioeconomic status had a higher perception of individual risk of COVID-19 [29]. This could be explained by the relatively high mobility of people with low socioeconomic compared with people with higher socioeconomic status. In addition, people with lower socioeconomic status have less access to healthcare [30].

Table 4 also reveals a significant relationship between region of residence and perceived severity (P = 0.04). The highest perceived severity was observed in respondents who lived in Central and Eastern Indonesia. In these areas, many cities and districts are included in the list of disadvantaged areas. People in underdeveloped areas have limited access to healthcare and thus experience delayed diagnosis and treatment. Such delays lead to an increase in disease severity in disadvantaged areas[31]. This may explain why respondents from Central and Eastern Indonesia had a higher perceived severity than respondents living in western Indonesia.

A history of supplement use was significantly related to response efficacy (P = 0.00) and self-efficacy (P = 0.03). Respondents who consumed supplements had higher efficacy beliefs than those who did not. Supplement users might believe that taking supplements could strengthen the body. Proper supplement use could also boost the immune system, prevent the spread of the COVID-19 virus, and slow the progression of COVID-19 [32]. Previous study has also shown that supplements use reduces the risk of COVID-19 in women [33]. Because supplement could increase immunity, thus it could decrease the risk of COVID-19. Supplement users might be more confident that they could protect themselves from the COVID-19 virus. The most common supplements among the respondents were vitamin C, multivitamins, and Imboost.

Table 4 also reveals a significant relationship between COVID-19 vaccination and self-efficacy (P = 0.04). Respondents who had received the first dose of the COVID-19 vaccine had higher self-efficacy than respondents who had not. This suggests that people who have received the first dose of the COVID-19 vaccine are confident that they could implement health protocols. Along with health protocol implementation, vaccines represent a key effort to control the COVID-19 disease. Respondents who received the COVID-19 vaccine were likely more aware of the dangers of the COVID-19 virus and thus prioritized vaccination. Notably, previous research reported that consistent implementation of health protocols could reduce the transmission of the COVID-19 virus in China regardless of individuals' COVID-19 vaccination status [34].

Furthermore, adherence to health protocols demonstrated a significant relationship with self-efficacy and response efficacy (P < 0.0001). Individuals who sometimes implement health protocols had low response efficacy and self-efficacy compared with people who always implemented health protocols. Individuals who occasionally adhered to health protocols, including mask-wearing, handwashing, and social distancing, demonstrated low compliance with these measures. These individuals may not have believed that they could implement health protocols and may have felt uncertain that the implementation of health protocols could effectively prevent virus transmission. Individuals with low involvement in preventing the transmission of the COVID-19 virus are ignorant of the virus, thus they have a high risk of contracting it [35].

Conclusion

The pharmacy students' risk perception was high, whereas their perceived severity was low. They also had high efficacy beliefs in dealing with COVID-19 pandemic. Risk perception was influenced by were gender, history of chronic disease, history of taking supplements, having received the first COVID-19 vaccine dose, parental income, and area of residence. Efficacy beliefs were affected by a history of taking supplements use, having received the first COVID-19 vaccination dose, and the application adherence to of health protocols.

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Declarations

Author contribution	:	Lolita Lolita proposing the topic and research methodologies, Muhammad Muhlis and Azis Ikhsanudin drafting the proposal and performing analysis, Hasna Luthfiah Saraswati presenting the data and discussion, Daraporn Rungprai, Lindha Kurniawati and Nurbidayah Syarifah presenting the proof reading. All authors have approved the manuscript and have made significant contributions to this study.
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Additional information : No additional information is available for this paper.

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