



Original Article

Factors Associated with Risk Perception towards Coronavirus 2019 (COVID-19) Among Students of Sirindhorn College of Public Health, Khon Kaen Province, Thailand

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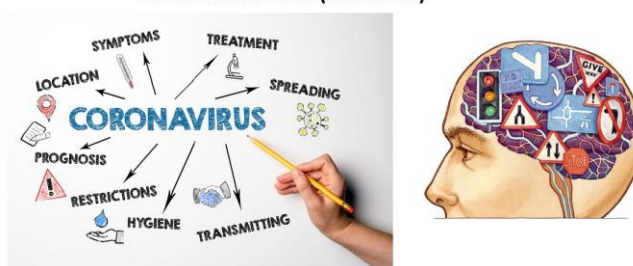
Logistic regression models.

ABSTRACT

This cross-sectional study aimed to identify factors associated with risk perception towards COVID-19 among Sirindhorn college of public health Khon Kaen province students. Various health education and psychological models suggest that a primary driver of habits is risk perception. Protective habits are more likely to be adopted by people who experience greater risk, affecting the likelihood of infection. Two multistage random samplings made up a total of 360 participants. The data were collected via a structured questionnaire from April to May 2020. Frequency, percentage, mean, standard deviation, median, minimum, maximum, and multiple logistic regression models (with 95% CI) were computed to determine the possible associated factors to risk perception towards COVID-19. The finding revealed that more than half of the respondents were of good perception (74.44%; 95 % CI [69.61 to 78.87]), and most of the participants were female (88.33%), with an average age of 20.51 years old (S.D.=1.82). The factors associated with a good risk perception of COVID-19 including knowledge (AOR= 3.44, p-value = 0.023, 95% CI [1.15, 10.27]), and behaviour level of COVID-19 protection presented at a moderate and good level (AOR= 2.47, p-value = 0.045, 95% CI [1.13, 5.41] and AOR= 4.61, p-value = 0.001, 95% CI [2.04, 10.41], respectively). There should be the campaign for increasing the behaviour focus on the new normal behaviour. Moreover, the college should have a COVID-19 consult system to decrease the number of participants worried about COVID-19.

GRAPHICAL ABSTRACT

Factors Associated with Risk Perception Towards Coronavirus 2019 (COVID-19)



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Introduction

A new coronavirus was first detected in Wuhan city, China, in 2019 [1–4]. Active case finding and isolation, quarantine, travel limits, regular hand washing, wearing face masks, respiratory hygiene, avoiding public meetings, and social distancing are the interventions of choice in the absence of successful vaccination or care. However, the success of such initiatives depends profoundly on the public's ability to comply, which in turn is affected by the perception of public danger in relation to the pandemic [5]. There were the highest numbers of infectious cases in January 2020. COVID-19 pandemic has affected many countries around the world. The coronavirus's initial discovery was pneumonia of unknown origin, which could not be treated with effective drugs or vaccines. This virus is transmitted from person to person through aerosol from the patient's respiratory system. Symptoms are pain, stuffy nose, runny nose, sore throat, diarrhoea, ageusia, anosmia or skin rash, or change in skin colour of fingers and toes. World Health Organization (WHO) has declared this outbreak an international public health emergency.

In the global infection situation on 30 September 2020, there were 33,875,113 cases, 65,996 severe cases, and 1,013,195 deceased cases. The top three countries with confirmed cases were the United States (7,406,729 cases), India (6,229,474 cases), and Brazil (4,780,317 cases). In Thailand, the Ministry of Public Health (MoPH) reported 3,564 accumulated patients undergoing treatment at 131, and the death toll at 59 [6–9].

Several COVID-19 preventive measures have been emphasized by WHO. Moreover, The Centres for Disease Control and Prevention (CDC) [10] in the United States recommended actions like washing hands often with soap or 70% alcohol, correctly wearing a mask, using proper sneezing, and coughing etiquette, keeping hands and feet clean, keeping a distance of at least one meter, checking yourself for symptom every day. In Thailand, MoPH has declared that COVID-19 was a legally dangerous infectious disease. MoPH

has released measures for virus prevention and transmission to both the general population and vulnerable groups in several areas, both in the public and private sectors. The measures conform to the guidelines of the WHO and the Centre for disease control and prevention (CDC) in the United States [10]. Particularly, in schools where there are many students, the schools have released a manual to cope with COVID-19. The manual contents include knowledge about COVID-19, sanitation, hygiene, environmental and social health, health education, environmental health practices, and school education. This manual is the guideline that can be applied to students, school administrators, teachers, staff, including parents and guardians.

Due to the various measures that are strong and effective, the number of the infected and the deceased has declined in a controlled situation in Thailand. However, the global infection situation has not improved; therefore, it is necessary to maintain an ongoing standard of infection control and prevention, especially for the students who like to stay together as a group and do activities together. In this case, there is a high chance of spreading to others if they have improper health behaviours. Several factors are involved with preventive behaviours, but one of the factors affecting preventive behaviours is perceived susceptibility. Individuals will protect themselves if they have perceived susceptibility to the COVID-19 because it can establish the appropriate and correct preventive behaviours. Because the COVID-19 is a new epidemic, the studies on the perceived susceptibility and transmission are limited. Thus, we addressed this topic to gain basic data to plan for and foster the students' appropriate health behaviours to prevent and spread the COVID-19.

Material and methods

Study population

The sample size required for this study was determined by using the formula to estimate for multiple logistic regression [11]. The final sample of this study was 360 participants. For sampling,

the technique of two multistage random samplings was conducted as follows;

1. Selecting the sample from each program (Total populations = 568 people) by stratifying random

sampling. Proportional allocation technique was used to calculate proportion in each program.

2. Selecting the sample from each program by simple random sampling.

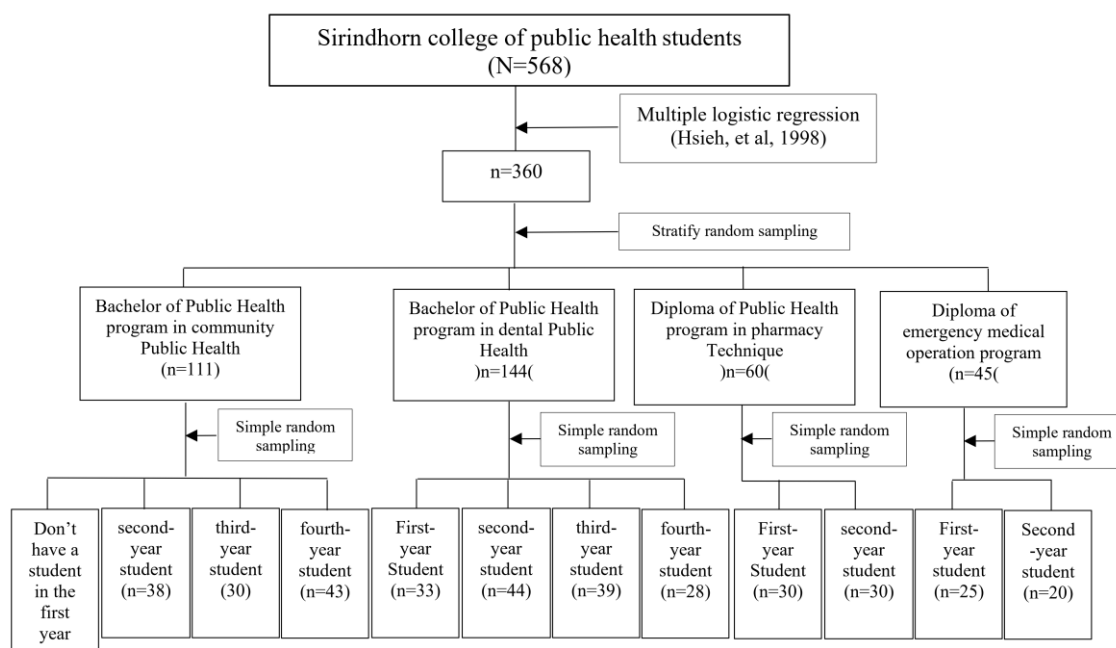


Figure 1: Sample of this study

The study was conducted from April to May 2020 among Sirindhorn College of Public Health, Khon Kaen students. A self-administered questionnaire was used to collect the data. The primary outcome (Risk perception) has been classified into two categories: 1) Good risk perception and 2) poor risk perception.

Ethical consideration

The Ethical committee of Sirindhorn College of Public Health Khon Kaen approved (reference no. HE 6320004) this study's ethical approval.

Data analysis

The participants' characteristics were described as frequency and percentage for categorical variables and mean and standard deviation for continuous variables. Crude and adjusted odds ratios (AOR) and their 95% confidence intervals (95% CI) were calculated using multiple logistic regression analysis to estimate the association

between independent variables with good risk perception towards COVID-19 [12]. To obtain AOR., independent variables were tested for their association with good risk perception towards COVID-19 variables in the bivariate model first. Then those variables with a p-value less than 0.25 were included in the multivariate modelling. Backward elimination was used as the method for variable selection to obtain the final model. All analyses were performed by using Stata software version 16.0. The p-value less than 0.05 was considered statistically significant.

Result and Dissection

General information and Knowledge regarding COVID-19

According to Table 1, the average (S.D.) age of 360 respondents was 20.51 (1.82) years, and their age ranged from 17 years to 39 years. The most common age group was 20 years (34.17%).

Almost all of them (88.33%) were females. Almost half of them were studying in bachelor of the public health program in dental public health (40.00%). Almost all participants did not have the congenital disease and the accommodation, and they stayed in COVID-19 pandemic responded private house .345) 95.83%) of

participants responded no activities within 14 days ago, and 281) 78.06 (%were in wash hand. 316 (87.78%) participants responded knowledge regarding COVID-19 presented at a moderate level, and 141 (39.17%) voiced worry about the COVID-19 infection within 14 days less than seven days.

Table 1: General information for sample size (n = 360)

General information and knowledge regarding COVID-19	Number (n)	Percentage (%)
Gender		
Male	42	11.67
Female	318	88.33
Age y(ea)rs)		
<20	78	21.67
20	123	34.17
21	107	29.72
≥ 22	52	14.44
Mean ± S.D.= 20.51 ± 1.82, (Min :Max) (17 :3)		
Program		
Bachelor of Public Health program in community Public Health	111	30.83
Bachelor of Public Health program in dental Public Health	144	40.00
Diploma of Public Health program in pharmacy Technique	60	16.67
Diploma of Emergency Medical operation Program	45	12.50
Accommodation in COVID-19 pandemic		
College dormitory	97	26.94
Business dormitory	20	5.55
Private house	243	67.50
Congenital Disease		
No	335	93.06
Yes	25	6.94
Activities within 14 days ago		
Meeting (20 persons or moreover)	4	1.11
Religious activity	1	0.28
Expo	6	1.67
Sport competition	2	0.56
Concert	1	0.28
No travel to locations at risk of infection	345	95.83
Wash hand (>5 times)		
Yes	281	78.06
No	79	21.94
Knowledge regarding COVID-19		
Good	44	12.22
Moderate	316	87.78
Poor	0	0.00
Worried about the COVID-19 infection within 14 days		
Everyday	107	29.72
More than 7 days	43	11.94
Less than 7 days	141	39.17
No	69	19.17

Protective behaviours to COVID-19 and risk perception towards COVID-19.

According to Table 2, 166 (46.11%) participants reported protective behaviours to COVID-19,

presented at a moderate level. 268 (74.44) participants have the risk perception towards COVID-19 presented at a good level.

Table 2: Level of protective behaviours to COVID-19 and Risk perception towards COVID-19 (n=360)

of protective behaviours to COVID-19	Number (n)	Percentage (%)
Level of protective behaviours to COVID-19		
Good	148	41.11
Moderate	166	46.11
Low	46	12.78
Level of risk perception towards COVID-19		
Good	268	74.44
Moderate	83	23.06
Low	9	2.50

Reported protective behaviours to COVID-19

According to Table 3, all the students responded correctly to all knowledge questions. Among 360 participants who heard about COVID-19, they were found with protective behaviours to COVID-19 as follows: 85.28 wearing a mask outside the house, 98.33% washing hands frequently with soap and water, 90.28% washing hands with alcohol gel, keeping distancing from others as least 1-2 meters, 98.06% avoiding touching the ear, eye, nose, and mouth, 95.56% cleaning the

cell by disinfectant solution, 68.33% taking clothes and cleaning them whenever coming back from outside, 96.11% exercising to keep the body healthy during the pandemic of COVID-19, 79.44% consulting the public health personnel when contracting with someone at risk of COVID-19, 42.78% wearing a mask only in suggested places or thinking to have diseases, 83.33% measuring temperature every day, and 98.33% consuming food or taking vitamins to make a healthy body.

Table 3: Protective behaviours to COVID-19 (n=360)

Protective behaviors to COVID-19	Yes n (%)	No n (%)
1. Wearing a mask outside the house	307(85.28)	53(14.72)
2. Washing frequently hands with soap and water	354(98.33)	6(1.67)
3. Washing hands with alcohol gel	325(90.28)	35(9.72)
4. Keeping distancing from others as least 1-2 meters	293(81.39)	67(18.61)
5. Avoiding touching ear, eye, nose, and mouth	353(98.06)	7(1.94)
6. Cleaning the cell phone with disinfectant solution	344(95.56)	16(4.44)
7. Taking off clothes and clean whenever coming back from outside	246(68.33)	114(31.67)
8. Exercising to keep the body healthy during the pandemic of COVID-19	346(96.11)	14(3.89)
9. Consulting the public health personnel if contact with someone at risk of COVID-19.	286(79.44)	74(20.56)
10. Wearing a mask only in suggested places or thought to have diseases	154(42.78)	206(57.22)
11. Measuring temperature every day	300(83.33)	60(16.67)
12. Consuming food or taking vitamins for making a healthy body	354(98.33)	6(1.67)

Factors associated with risk perception towards COVID-19(Bivariate Analysis)

The bivariate analysis revealed that program, congenital disease, knowledge regarding COVID-

19, and protective behaviours level on COVID-19 significantly associated with risk perception towards COVID-19 (Table 4).

Table 4: Factors associated with good risk perception towards COVID-19 (n=360)

Factor	Number	%of good risk perception	Crude OR	95 %CI	p-value
Gender					0.402
Male	42	69.05	1(Ref.)		
Female	318	75.16	1.35	0.67 to 2.74	
Age (Year)					0.461
<20	78	80.77	1(Ref.)		
20	123	73.17	0.64	0.33 to 1.29	
21	107	73.83	0.67	0.33 to 1.37	
≥ 22	52	69.23	0.54	0.24 to 1.21	
Program					0.002
Bachelor of Public Health program in community Public Health	111	63.96	1(Ref.)		
Bachelor of Public Health program in dental Public Health	144	84.03	2.96	1.64 to 5.35	
Diploma of Public Health program in pharmacy Technique	60	68.33	1.22	0.62 to 2.37	
Diploma of Emergency Medical operation Program	45	77.78	1.97	0.88 to 4.40	
Accommodation in COVID-19 pandemic					
College dormitory	97	76.29	1(Ref.)		
Business dormitory	20	62.50	0.52	0.11 to 2.34	
Private house	243	74.12	0.89	0.52 to 1.54	
Congenital Disease					0.234
No	335	73.73	1(Ref.)		
Yes	25	84.00	1.87	0.62 to 5.60	
Wash hand (>5 times)					0.96
No	79	74.68	1(Ref.)		
Yes	281	74.38	0.98	0.55 to 174	
Knowledge regarding COVID-19					0.005
Low to moderate	316	75.43	1(Ref.)		
Good	44	50.00	3.07	1.05 to 9.00	
Protective behaviors level on COVID-19					0.001
Low	46	56.52	1(Ref.)		
Moderate	166	71.08	1.89	0.96 to 3.71	
Good	148	83.78	3.97	1.91 to 8.23	

Factors associated with risk perception towards COVID-19

The factors associated with risk perception towards COVID-19 included knowledge regarding to COVID-19 presented at a good level (AOR= 3.44, p-value = 0.023, 95 %CI [1.15, 10.27]) and

protective behaviour on COVID-19 presented at a moderate and a good level (AOR= 2.47, p-value = 0.045, 95 %CI [1.13, 5.41 [and AOR= 4.61, p-value = 0.001, 95 %CI [2.04, 10.41], respectively) (Table 5)

Table 5: Factors associated with good risk perception towards COVID-19 (n=360)

Factor	Number	%of good risk perception	Crude OR	AOR	95 %CI	p-value
Knowledge level regarding COVID-19						0.023
Low to moderate	316	75.43	1(Ref.)	1(Ref.)		
Good	44	50.00	3.07	3.44	1.15 to 10.27	
Protective behaviours level on COVID-19						0.001
Low	46	56.52	1(Ref.)	1(Ref.)		
Moderate	166	71.08	1.89	2.47	1.13 to 5.41	
Good	163	83.78	3.97	4.61	2.04 to 10.41	

The first objective of this study was to investigate the risk perception of COVID-19. We found that most participants had a good risk perception of COVID-19 during the pandemic's first wave. Since the participants were health science students, the content included courses related to various diseases and epidemiology, making them aware of the risk of developing the disease when there was an outbreak. Moreover, almost all participants did not travel to locations at risk of infection, such as 20 or more meetings, trade shows, sporting events or concerts, etc., indicating risk awareness if traveling in such places. Furthermore, more than half of them who observed handwashing were predicted by the perceived risk perception of being infected. More than half of them who observed handwashing were predicted by the perceived risk perception being infected when WHO had announced the outbreak of COVID-19 in late December 2019 to be a Public Health Emergency of International Concern (PHEIC). Thailand is introducing measures to prevent the transmission of the infection to reduce the pandemic's impact on society from the family, the community, the provincial to the national level and has issued warning announcements through various media day-to-day report of the disease's outbreak. This makes the participants aware of the risk of the outbreak thoroughly. A study in China showed the students had a high-risk perception of COVID-19 [13]. Although the risk perception differed from Myanmar, less than one-fourth of respondents had a high level of risk perception towards COVID-19 [14].

The second goal was to identify factors associated with good risk perception towards COVID-19. This study found that knowledge regarding COVID-19 presented at a good level and protective behaviours on COVID-19 presented at a moderate and good level associated with good risk perception towards COVID-19. These findings were also consistent with a study conducted previously [13], in which they assessed the risk perception of COVID-19 and its related factors among college students in China during quarantine and reported that the college student's higher knowledge level ($p < 0.01$) had higher risk perception of COVID-19. Our findings are also in line with that of Afzal et al. [15], in which they assessed community-based assessment of the knowledge, attitude, practices, and risk factors regarding COVID-19 among Pakistanis residents during a recent outbreak. They showed that the knowledge was positively correlated with attitude and practices whereas negatively correlated with risk factors ($P < 0.05$). The attitude was negatively correlated with risk factors and positively correlated with practices. The risk factors and practices were positively correlated with each other. Practices and risk factors were positively correlated, indicating that maintaining practices to visit crowded places, smoking, and daily meeting unknown persons would increase the risk while washing hands properly, maintaining a safe distance, and using masks would reduce the risk factor. Similarly, some previous MERS studies have shown that knowledge is positively correlated with risk perception [16–18]. Furthermore, Similar MERS-related knowledge was significantly

correlated with preventive behaviours and risk perception [18]. The higher knowledge level of COVID-19, such as transmission mode, main symptoms, preventive measures, the more they can fully realize that COVID-19 has strong infectious power, a long incubation period, improve risk perception, and the disease is hidden and hard to detect [19,20]. Hence, the risk perception level is higher.

The protective behaviours on COVID-19 in this study was also consistent with the study a survey on risk perception and medical masks' uses [21], in which they assessed the "The more I fear about COVID-19, the more I wear medical masks", reporting that the risk perception is the main factor which drives wearing medical masks in public. According to a study [22], they assessed public perceptions and protective behaviours regarding Lyme disease among the general public in the Netherlands. They reported that higher levels of knowledge and moderate/high levels of worry were significant predictors of checking the skin. Significant predictors of wearing protective clothing were unemployed/retired, higher knowledge levels, higher levels of worrying about LD, and higher levels of perceived efficacy of wearing protective clothing. However, in a different study on risk perceptions and their relation to risk behaviours [23], it was shown that higher risk led to less protective behaviours, and risk perceptions could affect protective behaviours that could affect risk perceptions. Based on a study with rather similar findings to ours [24], they assessed the impacts of knowledge, risk perception, emotion, and information on citizens' protective behaviours during the outbreak of COVID-19. This cross-sectional study in China reported that the respondents perceived the high severity of the epidemic (AOR = 1.90, $p < 0.001$), and had high negative emotion (AOR = 1.36, $p = 0.005$). Negative emotions had been widely associated with health-damaging behaviours and poor clinical outcomes. While, reported good health (AOR = 1.94, $p < 0.001$), high attention paid to the governmental media (AOR = 4.16, $p < 0.001$) and

trusting the governmental media (AOR = 1.97, $p < 0.001$) were more likely to be embraced as protective behaviours. However, good behaviour is still essential despite some conflicts, especially when an epidemic is difficult to control. Risk perception may be a strong motivating factor for behavioural change, particularly if the individual perceives control over the risk behaviour [25].

Conclusion

Most students of Sirindhorn College of Public Health Khon Kaen had a good risk perception of COVID-19 during the pandemic's first wave. It is assumed that the knowledge was positively correlated with attitude and practices whereas negatively correlated with risk factors ($p < 0.05$). The attitude was negatively correlated with risk factors and positively correlated with practices. The risk factors and practices were positively correlated with each other. Practices and risk factors were positively correlated, indicating that maintaining practices to visit crowded places, smoking, and daily meeting unknown persons would increase the risk while washing hands properly, maintaining a safe distance, and using masks would reduce the risk factor. There should be the campaign for increasing the behaviour focus on the new normal behaviour.

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Authors' contributions

All authors contributed toward data analysis, drafting and revising the paper and agreed to be responsible for all the aspects of this work.

Conflict of Interest

We have no conflicts of interest to disclose.

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