Research Article

Knowledge, understanding, attitude, and preventive behavior toward COVID-19: A study among high school students in Loei Pittayakom, Thailand

Phitsiree-Phengmeesri

Loei Pittayakom School, Kut Pong, Thailand

Correspondence to: Phitsiree-Phengmeesri, E-mail: pitsiree.p20@gmail.com

Received: August 04, 2021; **Accepted:** October 27, 2021

ABSTRACT

Background: COVID-19 pandemic has affected humanity in several aspects of life. Not only create health problems, but also economic and social problems. To cope with this pandemic, we need to know and understand how to have the COVID-19 preventive behavior. Hence, this study will be focusing on factors that influence people to have COVID-19 preventive behavior. **Objectives:** The aim of this study is to assess knowledge, attitude, and COVID-19 preventive behavior of high school students. **Materials and Methods:** The study was conducted using a questionnaire. A total of 325 students participated. Knowledge, attitude without presence of rules, and attitude with presence of rules toward COVID-19 preventive behavior were assessed. Independent *t*-test and analysis of variance were used to analyze differences between outcomes and socio-demographic. COVID-19 preventive behavior was analyzed by a generalized linear model. **Results:** Students revealed a good level of COVID-19 related knowledge, correctly answering 4.48 (standard deviation [SD] = 0.70) questions in a total of 5, good levels of attitude both without and with the presence of rules, average score was 11.05 (SD = 1.16) of four questions and 15.86 (SD = 2.07) of six questions, respectively, and a good level of COVID-19 preventive behavior, the average scores at 44.28 (SD = 6.68), in a total of 11 questions. **Conclusion:** This study revealed a good level of knowledge, attitude both without and with the presence of rules and COVID-19 preventive behavior among high school students at Loei Pittayakom School, Thailand. Mainly, the factor that may influence them to get a high score in all four sections is staying active with news and the latest information presented on the internet. In addition, the study demonstrated that there was a relationship between attitude with the presence of rules and COVID-19 preventive behavior. Therefore, having regulations can lead to having preventive behavior.

KEY WORDS: COVID-19; Preventive Behavior; High School Students

INTRODUCTION

COVID-19 pandemic has affected humanity in several aspects of life. Not only create health problems, but also economic and social problems. According to the statistics, the number of people who died because of COVID-19 infection is approximately 4 million[1] and its trend seems to increase constantly. COVID-19 or Coronavirus is an infectious disease which is caused by severe acute respiratory syndrome (SARS) coronavirus 2.[2] It can be spread by sneezing, coughing, speaking, or breathing through droplets from person to person. Having difficulty breathing, fever, cough, and shortness of breath could be the signs of COVID-19 which may occur within 2–14 days[3] after getting the virus. The symptom that can ensure us of having COVID-19 is the loss of taste and smell[4] as it is a good indicator for the mild case of COVID-19. However, COVID-19 infection can cause

Access this article online	
Website: http://www.ijmsph.com	Quick Response code
DOI: 10.5455/ijmsph.2021.08078202127102021	

some severe diseases such as pneumonia, SARS; SARS, kidney failure, and death in some cases.[5]

COVID-19 pandemic affected Thailand economy, especially the tourism sector which was 15% of Thailand's gross domestic product[6] and resulted in no international tourists since March 2020.[7] Hence, there were several hotels that had to close down due to negative consequences of the pandemic. Furthermore, there were many firms needed to lay off employees to cut the overhead cost so the employers could save their companies. These increased the number of unemployed workers and directly caused unemployment issues. The unemployment rate was 1.96% during January until March 2021 which illustrated that there were 758,000 workers who were jobless.[8] The majority of the people develop mental health issues due to COVID-19 consequences. When the people who used to work daily have no jobs, they will be stressed and worried because of lack of money to pay their expenses. Furthermore, they experience difficulty taking care of the family. The government gave the compensation to those who were affected by the pandemic using applications for online registration. However, there was a restriction to some of them who could not access the internet therefore did not get the compensation provided from the government. Although the government had public health measures to deal with this spreading such as lockdown, curfew and isolation, the figure was still rising and unable to be controlled. This indicates that self-prevention is indeed crucial.

To cope with this pandemic, we need to be able to prevent transmission of COVID-19 thoroughly and effectively either by getting vaccination or protecting ourselves. The previous studies showed that the adolescent group had a low-moderate level of COVID-19 related knowledge and resulted in moderate level of COVID-19 preventive behavior[9] and were not included in the first national vaccine roll out plan. Hence, this research aimed to study high school student groups and to assess knowledge, attitude, and COVID-19 preventive behaviors.

MATERIALS AND METHODS

Participants and Procedure

This was a cross-sectional observational study. An online questionnaire was purposely developed and made available through Google From between March 30, 2021 and May 26, 2021. Grade 10–12 students who were eligible for the study about knowledge, attitude without and with the presence of rule toward COVID-19 preventive behavior were invited to participate in the study. The invitation was sent to email and Google Classroom to make sure that all participants receive an invitation. In this invitation, information about the objectives of the study as well as the ethical guarantee of confidentiality and anonymity in the data collected as stated in the informed consent were explained. Participation was completely free and voluntary, and no personal data were collected from any participant. COVID-19 related knowledge, attitudes toward preventive behavior without and with the presence of rules were assessed. All students enrolled in the academic year 2020/2021 in Loei Pittayakom School in Loei. They were selected from three different study programs including Science-Math, Math-English, and language. A total of 325 students who participated in the study (response rate: 20.16%).

Instruments

The questionnaire was developed based on a literature review including[1] information provided by and guidelines from the Department of Health, Ministry of Public Health in Thailand, WHO and CDC[2] studies already performed on the same topic in other countries where several common items were used to assess each of the dimensions analyzed in this study. The proposed items were then grouped, and redundant items were removed. A preliminary version of the instrument was reviewed by two infection control specialists and a researcher in the field in Thailand to validate its content. A pretest was then performed with a small sample of higher education students to test for comprehension and difficulty. All the questions remained without modifications. The psychometric characteristics of the questionnaires were tested, as described in the statistical analysis subsection.

The final version of the questionnaire contained 30 questions; the first four were about personal information (gender, study program, and grade) and the remaining questions were divided into four sections.

COVID-19 related knowledge: This part has five questions that asked about general knowledge of COVID-19; Spreading, Prevention and Basic symptoms. To explain, there is one correct answer from four choices which has one point per question and providing an incorrect answer received 0 points. The sum of all items was made hence higher scores corresponded to a higher level of knowledge. The score varies from 0 to 5, with ≥4 as a good level, >3 but <4 as a moderate level, and ≤2 as a poor level.

Attitude toward COVID-19 preventive behavior without the presence of rules: This scale was composed of four items, and response categories consisted of a three-point Likert scale (from 1-disagree, to 3 agree) with the highest score corresponding to more positive attitudes toward preventive behaviors without presence of rules. Some items on the scale were inverted for the analysis. A sum of all the items was made to obtain a score. The "Attitude toward COVID-19 preventive behavior without presence of rules" factor consisted of four items and varied from 4 to 12 and the higher values corresponded to a more positive attitude toward COVID-19 preventive behavior without presence of rules.

Attitude toward COVID-19 preventive behavior with presence of rules: This scale was composed of six items, and response categories consisted of a three-point Likert scale (from 1-disagree, to 3 agree) with the highest score corresponding to more positive attitudes toward preventive behaviors with presence of rules. Some items on the scale were inverted for the analysis. A sum of all the items was made to obtain a score. The "Attitude towards COVID-19 preventive behavior with presence of rules" factor consisted of six items and varied from six to 18 and the higher values corresponded to a more positive attitude toward COVID-19 preventive behavior with presence of rules.

Preventive behavior towards COVID-19: This part was composed of 11 questions, and each provided a statement about preventive behavior that should be followed in this period of global pandemic. These questions will be answered using a five-point scale (From 1-Never to 5-Always). The score will be the same as the scale that the students answered. A high score on this scale indicated good preventive behaviors, ranging from 11 to 55, with ≥44 as a good level, >33 but <43 as a moderate level, and ≤32 as a poor level.

Statistical Analysis

The analysis was performed using SPSS for windows, version 26. To analyze psychometric characteristics of the scales, an exploratory factor analysis, using principal component analysis with varimax rotation, was carried out. Reliability was analyzed through the calculation of item-total correlation coefficients and Cronbach's alpha (α) for the scales of the questionnaire. The descriptive analysis was presented in absolute (n) and relative (%) frequencies, mean (M), and standard deviations (SD). To assess the differences between the outcome variables (Knowledge, attitudes both without and with the presence of rules toward preventive behavior) and the socio-demographic characteristics, considering the sample size, independent t-test and the analysis of variance were used as appropriate. The correlations between the outcomes of the study were calculated by Pearson's correlation. Finally, a generalized linear model was calculated to determine the predictive variables of the preventive behaviors. Exp (β) and the respective 95% confidence intervals were presented. Statistical significance was defined as $P < 0.05$.

RESULTS

This study comprised a total of 325 high school students. The socio-demographic characteristics of the sample are presented in Table 1. Most of the participants were female (n = 217, 66.8%) and male (n = 108, 33.2%). In terms of level, the majority of the participants were in grade 12 (n = 128, 39.4%). Grades 10 and 11 have similar numbers (n = 83, 25.5% and n = 114, 35.1%). In matters of program, most of the participants were in Science-Math program which consisted of 234 (72%). The figure of participants in Math-English and Language was relatively close at 50 (15.4%) and 41 (12.6%), respectively [Table 1].

Students revealed a good level of knowledge about COVID-19, 4.48 (SD = 0.70) questions in a total of 5. There were differences in level of knowledge according to the study program. Students who studied in the Science-Math program showed higher levels of knowledge at a mean of 4.52 (SD = 0.64) compared to other faculties. Meanwhile, the lowest goes to 4.36 (SD = 0.80) from Math-English program. Looking more precisely at each question, it found that the questions that the students answered correctly were (1) what are the basic ways of preventing yourself from COVID-19? (2) How long is the COVID-19 incubation period? (3) What organ system does COVID-19 affect? More than 90% of the participants answered correctly.

In contrast, the question that the respondents answered incorrectly was: (1) What are the signs of having COVID-19? Over 30% of the students answered question (1) incorrectly [Table 2].

Regarding attitudes without the presence of rules toward COVID-19 preventive behavior with the presence of rules, the table showed that students from three different programs had a good level of attitude toward COVID-19 preventive behavior with the presence of rules 11.05 (S.D = 1.16) questions in total of 4. The mean of the students who studied in the Science-Math program is at 11.15 (S.D = 1.13), which was the highest. Students who were in the Math-English and Language program had the mean at 10.56 (S.D = 1.21) and 11.10 (S.D = 1.09), respectively. To be more precise, it was discovered that the questions that the students chose "agree" as their choice the most were: (1) Do you agree or disagree with wearing masks to reduce the risk of COVID-19 infection all the time? (2) Do you agree or disagree that washing hands help decrease the spread of COVID-19? (3) Do you think that it is important to practice social distancing? The percentages were the same which was 80.6%, While the question that the students chose "agree" the least was: (1) Do you think that quarantines are essential? The percentage was 68.6% [Table 3].

Moving on to the attitude with the presence of rules towards COVID-19 preventive behavior, the mean for this part was at 15.86 (S.D = 2.07) with six questions. According to the table, students who studied in the Science-Math program 16.06 (S.D = 1.95). Meanwhile, both groups of the students who studied in the Math-English and Language program were relatively close. Their means were at 15.2 (S.D = 2.36) and 15.54 (S.D = 2.16). Little more detail, Table 4 showed us that If there is a curfew for 3 months, will you follow this regulation? and If the department store required you to wear a mask all the time, would you agree to follow?

Table 1: Differences in socio-demographic characteristic of participants (n=325)

Socio-demographic Characteristic	*n* (%)	COVID-19 related Knowledge (Range 0–5)		Attitude toward preventive behavior without presence of rules (Range 4–12)		Attitude toward preventive behavior with presence of rules (Range 6–18)		Preventive Behavior (Range 11–55)	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Gender									
Male	108 (33.2)	4.37	0.78	10.87	1.30	15.69	2.29	44.65	6.91
Female	217 (66.8)	4.53	0.65	11.14	1.07	15.95	1.95	44.10	6.58
Study Program									
Science-Math	234 (72)	4.52	0.64	11.15	1.13	16.06	1.95	44.52	6.96
Math-English	50 (15.4)	4.36	0.80	10.56	1.21	15.20	2.36	42.76	5.81
Language	41 (12.6	4.41	0.87	11.10	1.09	15.54	2.16	44.78	5.86
Grade Level									
Grade 10	83 (25.5)	4.36	0.73	10.92	1.10	15.39	2.04	42.53	5.77
Grade 11	114 (35.1)	4.44	0.74	10.75	1.30	15.54	2.13	44.00	7.01
Grade 12	128 (39.4)	4.59	0.62	11.41	0.96	16.46	1.88	45.66	6.69
Total	325 (100)	4.48	0.70	11.05	1.16	15.86	2.07	44.28	6.68

SD: Standard deviation

Table 2: Frequency and percentage on level of knowledge infection prevention of the participants (n = 325)

Variables	Correct answered (%)
How does COVID-19 spread?	283 (87.1)
How to prevent COVID-19 infection?	319 (98.1)
What are the symptoms of having COVID-19?	218 (67.1)
How long is the COVID-19 incubation period?	317 (97.6)
What organ system does COVID-19 affect?	319 (98.2)

have the highest "agree" response percentage, at 87.3%. The lowest "agree" response percentage goes to this question (If there is a regulation from the government that you need to isolate yourself for 3 months, do you agree to follow?), at 35.70% [Table 4].

Finally, in the preventive behavior section, it was at the mean of 44.28 (S.D = 6.68) out of 11 questions. The mean of students who studied in the Science-Math program and Language were relatively equal, at 44.52 (S.D = 6.96) and 44.78 (S.D = 5.86). However, the lowest mean was shown at 42.76 (S.D = 5.81) in the Math-English program. In addition, it was seen that the top three questions that the participants chose "always" as their choice the most were: (1) Using public transport when needed, (2) You use your own personal belongings, and (3) You provide spoons for each dish, sharing food with others. The percentages were 64.6%, 59.4% and 56.3%, respectively. Conversely, the top three questions that the respondents chose "always" the least were: (1) You keep your distance around 1–2 m while you are in public areas, (2) exercise regularly and have enough rest and (3) wash your hands with soap before having food. The figures were 24%, 28.3%, and 30.8%, respectively, [Table 5].

The analysis of the correlations between the outcomes of the study - attitudes toward preventive behaviors with and without presence of rules-revealed the existence of positive and statistically significant correlations between COVID-19 preventive behavior (r = 0.269**, $P < 0.01$) and (r = 0.409**, $P < 0.01$) [Table 6].

Gender, grade level, study program, COVID-19 related knowledge, attitude toward preventive behavior with and without presence of rule altogether could predict the adoption of COVID-19 preventive behavior statistically significant at 19.1% ($R^2 = 0.191$, $P < 0.01$). Results from the generalized linear model indicated that the attitude toward preventive behavior with presence of rules had a statistically significant effect on the COVID-19 preventive behaviors adopted (Beta = 0.363, $P < 0.01$). Therefore having a positive attitude toward preventive behavior with the presence of rules predicted the adoption COVID-19 preventive behaviors [Table 7].

DISCUSSION

The results regarding knowledge, attitude without and with the presence of rules toward COVID-19 preventive behavior revealed that students who participated in this study had a good level of COVID-19-related knowledge, average score 4.48 in a total of 5, which consisted of COVID-19 symptoms, transmission and prevention. Furthermore, students also reinforced good levels of attitude both without and with the presence of rules, average score was 11.05 in total of 12 and 15.86 in total of 18, respectively. Furthermore, the students scored 44.28 in a total of 55 which indicated a good level of COVID-19 preventive behavior.

Table 3: Frequency and percentage on level of attitude with the presence of rules toward COVID-19 preventive behavior of the participants (n = 325)

Variables	Agree (%)	Neutral (%)	Disagree
Do you think that it is important to practice social distancing?	262 (80.6)	62 (19.1)	1 (0.3
Do you agree or disagree with wearing masks to reduce the risk of COVID-19 infection all the time?	262 (80.6)	52 (16)	11 (3.4)
Do you agree or disagree that washing hands help decrease the spread of COVID-19?	262 (80.6)	62 (19.1)	1 (0.3)
Do you think that quarantines are essential?	223 (68.6)	97 (29.8)	5 (1.5)

Table 4: Frequency and percentage on level of attitude toward COVID-19 preventive behavior with the presence of rules of the participants (n=325)

Variables	Agree	Neutral	Disagree
If the department store required you to wear a mask all the time, would you agree to follow?	284 (87.3)	40 (12.3)	1 (0.3)
If there is a regulation from the government that you need to isolate yourself for 3 months, do you agree to follow?	116 (35.7)	202 (62.2)	6 (1.8)
If the stores force you to always keep your distance while you're in there, do you agree to follow?	229 (70.4)	93 (28.6)	3 (0.9)
If there is a curfew for 3 months, will you follow this regulation?	284 (87.3)	31 (9.5)	10 (3.1)
If the department store forces you to always scan QR code before and after entering each shop in the store, do you think you will follow?	213 (65.5)	99 (30.5)	13 (4)
If there is a school rule for the students to stay apart around 1–2 m while studying in class, are you willing to follow?	183 (56.3)	123 (37.9)	19 (5.8)

Table 5: Frequency and percentage on level of COVID-19 preventive behavior (n = 325)

Variables	Always (%)	Usually (%)	Sometimes (%)	Rarely (%)	Never (%)
You go out when it is essential	133 (40.9)	97 (29.8)	82 (25.2)	13 (4)	0 (0)
You keep your distance around 1-2 m while you are in public areas	78 (24)	105 (32.3)	115 (35.4)	25 (7.7)	2 (0.6)
Using public transport when needed	210 (64.6)	56 (17.2)	27 (8.3)	9 (2.8)	23 (7.1)
Washing hands with soap frequently	110 (33.8)	107 (32.9)	88 (27.1)	18 (5.5)	2 (0.6)
Wash your hands with soap before having food	100 (30.8)	98 (30.2)	83 (25.5)	35 (10.8)	9 (2.8)
You wash your hands with soap when you sneezed or after using toilets	140 (43.1)	103 (31.7)	58 (17.8)	19 (5.8)	5 (1.5)
Washing hands after touching door knobs and handrail.	180 (55.4)	79 (24.3)	49 (15.1)	13 (4)	4 (1.2)
Avoid touching face, eyes, mouth and nose	113 (34.8)	91 (28)	88 (27.1)	23 (7.1)	10 (3.1)
You use your own personal belongings.	193 (59.4)	78 (24)	44 (13.5)	10 (3.1)	0 (0)
You provide spoons for each dish, sharing food with others.	183 (56.3)	88 (27.1)	50 (15.4)	3 (0.9)	1 (0.3)
Exercise regularly and have enough rest	92 (28.3)	69 (21.2)	96 (29.5)	47 (14.5)	21 (6.5)

Table 6: Pearson's correlation coefficient between the study outcomes

Variable	COVID-19 Related Knowledge	Attitude toward preventive behavior with presence of rules	Attitude toward preventive behavior without presence of rules	Preventive Behavior
COVID-19 Related Knowledge	1			
Attitude toward preventive behavior without the presence of rules	0.116*	1		
Attitude toward preventive behavior with the presence of rules	0.223**	0.486**	1	
Preventive Behavior	0.033	0.269**	0.409**	1

*Correlation is significant at 0.05, **Correlation is significant at 0.01

Most participants had a good knowledge of COVID-19 as the majority of participants could access the internet with their smartphones while they were encouraged to study about the pandemic. By following news and receiving information from various sources resulting in increasing public knowledge about COVID-19 pandemic, consistent with a previous study by Glomjai *et al*.[10] that assessed knowledge and preventive behavior toward COVID-19 in Phayao province and found

Table 7: Generalized linear model predicting behaviors

Generalized linear model predicting behaviors	B	SE	*P*	Beta
Study Program	0.201	0.486	0.679	0.021
Grade Level	0.857	0.458	0.062	0.102
COVID-19 Related Knowledge	–0.628	0.504	0.213	–0.065
Attitude toward preventive behavior without the presence of rules	0.512	0.337	0.130	0.089
Attitude toward preventive behavior with the presence of rules	1.176	0.194	0.000	0.363

$R = 0.437$, $R^2 = 0.191$, $F = 10.716$, $P < 0.01$

that participants had a good level of both knowledge about COVID-19 due to receiving information from various sources such as news from television, and local village health volunteers. COVID-19 situation in Thailand during the period of this study, numbers of COVID-19 cumulative confirmed cases kept rising from 28,339 to 159,792 during April 1, 2021, to May 30, 2021,[11] this steep rising affected the public as well as awareness of students toward COVID-19. Analyzing question items about COVID-19 related knowledge found that most participant answer correctly were "How to prevent COVID-19 infection?," correctly answered 98.1%, "How long is the COVID-19 incubation period?, correctly answered 97.6%, and "What organ system does COVID-19 affect?," correctly answered 98.2%. This indicated that participants understood and were aware of COVID-19 transmission and infection with or without presence of rules, resulting in having a high level of preventive behavior. Moreover, all participants, as youth and in the formal school system under Thai context were supervised by both teachers and their parents and rules, mostly students obeyed and followed what they were instructed.

Petpaiboon[9] conducted a study among high school students in an international high school in Bangkok to assess COVID-19 related knowledge, attitude, and COVID-19 preventive behavior and found that students had moderate level of knowledge while attitude scores with and without the presence of rules were at high level still COVID-19 preventive behavior score was at moderate. This may because of being young, students listened and learned but it came to an action attitude was one of a key predictor for preventive behavior adoption. A study in Portugal by Alves *et al*.[12] indicated that university students had good knowledge, attitude scores, and low preventive behavior scores toward COVID-19. Having a positive attitude toward COVID-19 preventive behavior was one of a key predictor for preventive behavior adoption. Poonaklom *et al*.[13] studied Factors Associated with Preventive Behaviors towards Coronavirus Disease among Adults in Kalasin Province, Thailand, 2020 found that participants level of knowledge about COVID-19 was moderate while score on attitude and preventive behavior were at high level and attitude toward preventive behavior was one of an associated factors for preventive behavior adoption.

Limitations

The study was conducted during the COVID-19 pandemic therefore restrictions and public health measures such as isolation and quarantine may encourage the participants to be aware of COVID-19 more than usual. Furthermore, it may help improve personal hygiene. Furthermore, they were motivated to access more information from news and the internet that reinforce the severity of COVID-19 pandemic. This may be the reason why they revealed a good knowledge and attitude toward COVID-19 preventive behavior. In addition, the interview was completed through the online questionnaire. Hence, if the participants did not understand the questions clearly, they were not capable of asking any questions as it was not a face to face interview. As a result, they may answer incorrectly.

CONCLUSION

Participants had good levels of knowledge, attitude, and behavior toward COVID-19. With the presence of rules, it encouraged participants to adopt higher preventive behavior toward COVID-19 than without one. To maintain or improve the level of preventive behavior of rules and regulations among participants could be introduced as well as updating knowledge about COVID-19 to strengthen awareness and attitude toward COVID-19 prevention and keep level of COVID-19 prevention according to ongoing situations. The school should update the latest information about COVID-19 and COVID-19 prevention to the students via Health Education class. Furthermore, the school should reinforce about COVID-19 updates through the school's social media channels regularly to increase the level of awareness of COVID-19 subsequently increasing the level of preventive behaviors among the students.

ACKNOWLEDGMENT

This research was conducted with the support of Loei Pittayakom School. Thanks to all participants, for their cooperation in answering the questions.

REFERENCES

1. Worldometer. Coronavirus Cases; 2020. Available from: https://www.worldometers.info/coronavirus [Last accessed on 2021 Jul 27].
2. Amboss. COVID-19 (Coronavirus Disease 2019); 2021. Available from: https://next.amboss.com/us/article/fI0kXh?q=covid-19#Z82f1d759ff02927000d2ccd223409135 [Last accessed on 2021 Jul 31].
3. Centers for Disease Control and Prevention. Symptom of COVID-19; 2021. Available from: https://www.cdc.gov/coronavirus/2019-ncov/symptoms-testing/symptoms.html [Last accessed on 2021 Jul 30].
4. Seladi-Schulman J. Can a Loss of Taste and Smell Be a

Symptom of COVID-19?; 2020. Available from: https://www.healthline.com/health/coronavirus-loss-of-taste-loss-of-smell#an-early-symptom [Last accessed on 2021 Jun 25].
5. World Health Organization. Coronavirus. Geneva: World Health Organization; 2021. Available from: https://www.who.int/thailand/health-topics/coronavirus [Last accessed on 2021 Jul 29].
6. Major Impact from COVID-19 to Thailand's Economy, Vulnerable Households, Firms; Report; 2020. Available from: https://www.worldbank.org/en/news/press-release/2020/06/30/major-impact-from-covid-19-to-thailands-economy-vulnerable-households-firms-report [Last accessed on 2021 Jul 27].
7. COVID19: The Impact on Thailand's People and Economy; 2020. Available from: https://www.worldbank.org/en/news/infographic/2020/08/25/covid19-the-impact-on-thailands-people-and-econom [Last accessed on 2021 Jun 22].
8. Bangkok Post. Q1 Jobless Rate at 12-Year High Amid Virus Outbreaks; 2020. Available from: https://www.bangkokpost.com/business/2120831/q1-jobless-rate-at-12-year-high-amid-virus-outbreaks [Last accessed on 2021 Jul 27].
9. Tawan Petpaiboon. Knowledge, Attitude and Preventive Behavior toward COVID-19 among a Group of Students in Bangkok; 2020. Available from: https://www.ejmanager.com/mnstemps/67/67-1618460440.pdf?t=1621937829 [Last accessed on 2021 Jul 30].
10. Glomjai T. Knowledge and Preventive Behavior Toward COVID-19 in Phayao Province; 2020. Available from: https://he01.tci-thaijo.org/index.php/bcnpy/issue/view/16582 [Last accessed on 2021 Jun 19].
11. COVID-19 Confirmed Cases. Available from: https://ourworldindata.org/covid-vaccinations [Last accessed on 2021 Jul 27].
12. Alves RF, Samorinha C, Precioso J, *et al*. Knowledge, attitudes and preventive behaviors toward COVID-19: a study among higher education students in Portugal; 2020. Available from: https://www.emerald.com/insight/content/doi/10.1108/JHR-07-2020-0254/full/html [Last accessed on 2021 Jun 20].
13. Poonaklom P, Rungram V, Abthaisong P, Piralam B. Factors Associated with Preventive Behaviors towards Coronavirus Disease (COVID-19) among Adults in Kalasin Province, Thailand; 2020. Available from: http://www.osirjournal.net/index.php/osir/article/view/211 [Last accessed on 2021 Jul 31].

How to cite this article: Phengmeesri P. Knowledge, understanding, attitude, and preventive behavior toward COVID-19: A study among high school students in Loei Pittayakom, Thailand. Int J Med Sci Public Health 2021;10(2):255-261.

Source of Support: Nil, **Conflicts of Interest:** None declared