



Knowledge of Health and Preventive Behavior in Protecting Against COVID-19 Among 5th Year High School Students in Lampang Province, Thailand.

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Abstract

The purpose of this study is to 1) investigate the health knowledge of 5th year high school students, 2) examine the preventive behavior for COVID-19 of 5th year high school students, and 3) explore the relationship between health knowledge and preventive behaviors for COVID-19 among 5th year high school students in Lampang province, Thailand. The study's sample group consisted of 308 5th year high school students in Lampang province, Thailand. Data was collected using a questionnaire, and statistical analyses included percentages, means, standard deviations, and Pearson's correlation coefficient. The statistical significance level was set at 0.05.

The study found that the overall average knowledge of health and preventive behavior against COVID-19 of 5th year high school students in Lampang Province, Thailand, was high. The study also revealed that there was a significant positive correlation between knowledge of health, such as skills in accessing health information and services, communication, self-management, and decision-making, and preventive behavior against COVID-19, with statistical significance at the 0.05 level.

Keywords: Health knowledge; Disease prevention behavior; COVID-19

Introduction

COVID-19 (Ministry of Public Health, 2020) is the second disease declared as a pandemic, after the H1N1 influenza in 2009. The outbreak started on March 11, 2020, following the A/H1N1 influenza pandemic in 2009, and has been reported by the World Health Organization (WHO, 2023) to have confirmed cases of 215,937,536 and deaths of 4,461,999 worldwide. Due to its easy mode of transmission and control difficulty, COVID-19 (Ministry of Public Health, 2020) is the second disease declared as a pandemic after the H1N1 influenza 'A', virus in 2009. COVID-19 is transmitted through respiratory droplets when coughing, sneezing, or direct contact with the infected person's secretions. After being infected, individuals may experience symptoms similar to those of regular flu, such as fever, cough, difficulty

breathing, fatigue, or they may develop severe symptoms, leading to pneumonia, respiratory failure, and death. In addition, currently, receiving the COVID-19 vaccine may not provide complete protection against infection, as the virus is easily transmitted through respiratory droplets from coughing, sneezing, and direct contact with infected secretions. However, Thailand has been praised as one of the top 5 countries in the world for successfully reducing the spread of COVID-19 through measures such as lockdowns to stop or contain the spread of the virus (Eric Topol, 2020).

The public health sector in Thailand places a high importance on increasing health literacy (HL) among the population, as seen in the goals outlined in the 12th National Health Development Plan (2017-2021).

The plan aims to increase the health literacy of individuals, communities, localities, and networks, with the ultimate goal of reducing preventable illnesses and deaths. Given the changing health landscape, it is necessary to promote personal health behavior changes through learning activities and environmental factors in order to increase health knowledge and encourage healthy behavior. Developing health literacy is related to positive health outcomes, such as overall health status, reduced healthcare costs, increased health knowledge, shorter hospital stays, and reduced frequency of healthcare service utilization (Vacharaporn Choeisuwan, 2017).

After reviewing research related to promoting healthy behavior to prevent health problems in Thailand and other countries (during the years 2010-2022 under the Health Promotion Model framework) (Pender et al., 2006), no research related to promoting healthy behavior for preventing COVID-19 infection was found. This is because COVID-19 is a new and unprecedented disease. Additionally, healthy behavior to prevent COVID-19 infection comes from the recommendations for preventing COVID-19 infection by the World Health Organization (WHO, 2020) issued on May 3, 2020. These included: 1) not touching one's eyes, nose, or mouth when in contact with surfaces suspected of contamination with droplets, 2) keeping at least a 1-meter distance from others, and 3) washing hands regularly with soap or alcohol-based hand sanitizer. Therefore, healthy behavior to prevent COVID-19 infection is of utmost importance and every teenager should prioritize practicing these recommendations to prevent infection.

However, student groups are considered a primary risk group of the population for the spread of COVID-19 virus infection because of their close proximity to each other in school areas. Consequently, students risk spreading the virus among their families and elderly family members. Therefore, it is important for students to practice preventive behavior against the COVID-19 virus infection. This is why the researchers are interested in studying the student's health knowledge and preventive behavior against the COVID-19 virus infection among 5th-year high school students in Lampang province, Thailand, in order to provide them with the necessary knowledge and skills to

protect themselves from the COVID-19 virus infection.

Objectives

1. To study the health knowledge of 5th year high school students in Lampang province, Thailand.
2. To study the behavior of preventing COVID-19 among 5th year high school students in Lampang province, Thailand.
3. To study the relationship between health knowledge and behavior of preventing COVID-19 among 5th year high school students in Lampang province, Thailand.

Research hypothesis

Knowledge about health is related to the behavior of preventing COVID-19 among 5th grade high school students in Lampang province, Thailand.

Research methodology

The population and sample group were 1,332 5th grade high school students in Lampang province, Thailand. The appropriate sample size was calculated using Taro Yamane's formula (1973) with a margin of error of 0.05. Therefore, the sample group used in this study was 308 people.

The tool used in this study was a questionnaire consisting of 3 sections as follows:

Section 1: General information of the questionnaire respondent.

Section 2: Health-related knowledge of the questionnaire respondent, divided into 4 skills: information and health service access skills, communication skills, self-management skills, and decision-making skills.

Section 3: The preventive behavior of COVID-19 infection among the questionnaire respondents. For Sections 2 and 3 of the questionnaire, the scoring criteria can be interpreted as follows:

score level	Level of Practice
4.21 – 5.00	There is the highest level of practice.
3.41 – 4.20	There is a high level of practice.
2.61 – 3.40	There is a moderate level of practice.
1.81 – 2.60	There is a low level of practice.
1.00 – 1.80	There is the lowest level of practice.

The statistics used in data analysis include percentages (used to describe personal factors data) mean and standard deviation (used to describe knowledge about health and preventive behaviors against COVID-19) and inferential statistics (used to test hypotheses about the relationship between health knowledge and preventive behaviors against COVID-19 among 5th-year high school students in Lampang province, Thailand). The Pearson product-moment correlation coefficient was used to analyze the correlation coefficient, with the following interpretation criteria: (Puangrat Taweerat, 1997)

A value of 0.81 or higher. There is a high correlation between them.

A value between 0.61 and 0.80. There is a relatively high correlation between them.

A value between **0.41** and **0.60**. There is a moderate correlation between

them.

A value between 0.21 and 0.40. There is a relatively low correlation

between them.

A value lower than 0.20. There is a low correlation between them.

Results

1. Health knowledge of 5th year high school students in Lampang Province, Thailand.

The study results of health knowledge of the questionnaire respondents were analyzed in 4 skills: health information and service access skills, communication skills, self-management skills, and decision-making skills. The average value (\bar{X}) was calculated as shown in Table 1.

Table 1 Mean and Standard Deviation of Health Knowledge of Questionnaire Respondents.

Health knowledge	\bar{X}	SD	Level of Practice
1. Health Information and Service Access Skill.	3.88	0.789	High
2. Communication skills.	4.17	0.710	High
3. Self-management skills.	4.48	0.554	Highest
4. Decision-making and action-taking skills.	3.50	0.501	High
Total	4.01	0.681	High

According to Table 1, which shows the mean and standard deviation of health knowledge among the respondents, it was found that the respondents had a high level of health knowledge overall ($\bar{X} = 4.01$). When classified by skill, it was found that the respondents had the highest level of proficiency in one skill, which was self-management skills ($\bar{X} = 4.48$), and had a high level of proficiency in three skills, namely communication skills ($\bar{X} = 4.17$), followed by access to health information and services skills ($\bar{X} = 3.88$), and decision-making and action skills ($\bar{X} = 3.50$) in descending order.

When considering each skill individually, the results can be explained as shown in tables 2-5.

Table 2 Mean and Standard Deviation of Health Information and Service Access Skill

Health Information and Service Access Skill.	\bar{X}	SD	Level of Practice
1. Respondent searches for information on how to protect themselves from COVID-19 from online media.	4.00	0.813	High

2. Respondent stops working in the community and sees a doctor immediately when they have symptoms such as fever, cough, runny nose, sore throat, difficulty breathing, or shortness of breath.	3.98	1.077	High
3. Respondent uses the Mor Chana application to preliminarily screen for the risk of COVID-19 infection.	3.69	1.208	High
4. Respondent gets immediate answers and clarifications from health officials when they have questions or concerns about protecting themselves from COVID-19.	3.88	1.027	High
Total	3.88	0.789	High

From Table 2, which shows the mean and standard deviation values of accessing health information and services skills of the respondents, it was found that the respondents had a high level of overall skills in accessing health information and services ($\bar{X} = 3.88$). When considering each item, it was found that the respondents had a high level of skills in every item, with the highest level of skill being in searching for information on how to protect themselves from COVID-19 through online media ($\bar{X} = 4.00$). The second highest level of skill was in stopping work in the community and quickly seeing a doctor when experiencing symptoms such as fever, cough, runny nose, sore throat, difficulty breathing, or shortness of breath ($\bar{X} = 3.98$). The respondents were able to find answers from healthcare personnel immediately when they had questions or concerns about protecting themselves from COVID-19 ($\bar{X} = 3.88$). Lastly, the use of the Mor Chana application to screen for the risk of COVID-19 infection was found to have a mean score of 3.69.

Table 3 Mean and Standard Deviation of Communication Skills

Communication skills	\bar{X}	SD	Level of Practice
1. Respondent recommends that family members clean their hands with soap and water or alcohol gel.	4.38	0.771	Highest
2. Respondent suggests that people around them dispose immediately of their used masks in a trash can with a lid.	4.20	0.849	High
3. Respondent advises people around them to use their elbow to cover their mouth and nose before coughing or sneezing every time they don't have a mask.	3.85	1.127	High
4. Respondent tells their family members not to go to crowded or densely populated areas.	4.29	0.811	Highest
Total	4.17	0.710	High

From Table 3, which shows the average and standard deviation of communication skills among respondents, it was found that the overall level of communication skills of the respondents was high ($\bar{X} = 4.17$). When considering individual categories, it was found that the respondents had the highest level of proficiency in two categories, which were recommending that family members clean their hands with soap and water or alcohol gel ($\bar{X} = 4.38$) and recommending that family members not enter crowded areas or areas with a large number of people ($\bar{X} = 4.29$). They also had a high level of proficiency in two other categories, which were recommending that family members dispose of their face masks in a garbage bin with a lid immediately ($\bar{X} = 4.20$) and recommending that family members cover their mouth and nose with their elbow and avoid coughing or sneezing without a face mask ($\bar{X} = 3.85$), respectively.

Table 4 Mean and Standard Deviation of Self-Management Skills.

Self-management skills	\bar{X}	SD	Level of Practice
1. Respondent carries hand sanitizer with them to clean their hands every time they leave the house.	4.41	0.851	Highest
2. Respondent wears a face mask or cloth mask every time they leave the house.	4.78	0.537	Highest
3. Respondent uses a tissue to cover their mouth and nose when coughing or sneezing if they are not wearing a mask.	4.38	0.824	Highest
4. Respondent minimizes the time spent outside the house when it is necessary to go to shop at the market or shopping mall.	4.37	0.790	Highest
Total	4.48	0.554	Highest

From Table 4, which shows the average and standard deviation of self-management skills of the survey respondents, it was found that the respondents had the highest level of overall self-management skills ($\bar{X} = 4.48$). When considering each item, it was found that the respondents had the highest level of practice in wearing a mask or cloth face covering every time they left home ($\bar{X} = 4.78$), followed by carrying hand sanitizer for cleaning hands every time they left home ($\bar{X} = 4.41$). They were also able to use a tissue to cover their mouth and nose when coughing or sneezing if they did not wear a mask ($\bar{X} = 4.38$) and to limit their time outside as much as possible when visiting the market or shopping in a department store ($\bar{X} = 4.37$), in that order.

Table 5 Mean and Standard Deviation of decision-making skills.

Decision-making skills	\bar{X}	SD	Level of Practice
1. Respondent practices using their hands to cover their mouth and nose while coughing and sneezing.	3.50	0.617	High
2. Respondent uses recommended practices when it is necessary to go to crowded places such as shopping malls, markets, etc.	3.53	0.573	High
3. Respondent uses recommended precautionary measures when returning from high-risk areas or areas with COVID-19 outbreaks, or when coming into contact	3.51	0.585	High

with people who have returned from high-risk areas.			
4. Respondent uses recommended practices when it is necessary to perform outdoor activities such as shopping for groceries or attending a meeting.	3.48	0.596	High
Total	3.50	0.501	High

Table 5 shows the average standard deviation of the decision-making skills of the respondents. It was found that the respondents had a high level of practice in decision-making skills overall ($\bar{X} = 3.50$). When considering each item, it was observed that the respondents had a high level of practice in all items, including going to crowded places such as shopping malls and markets ($\bar{X} = 3.53$), behavior when returning from risky areas or areas with an outbreak of Coronavirus Disease 2019, or coming into contact with people from risk areas ($\bar{X} = 3.51$), using hands to cover mouth and nose while coughing and sneezing ($\bar{X} = 3.50$), and engaging in out-of-home activities such as paying markets and attending meetings when necessary ($\bar{X} = 3.48$), respectively.

2. Preventive Behavior Against COVID-19 of 5th-year High School Students in Lampang Province, Thailand.

The study results of preventive behaviors against COVID-19 of 5th year high school students in Lampang province, Thailand, were analyzed for the average (\bar{X}) and the results are shown in table 6.

Table 6 shows the average and standard deviation of behaviors to prevent COVID-19 infection.

Communication skills	\bar{X}	SD	Level of Practice
1. Respondent washes their hands with alcohol or soap and water when they go out, meet or interact with people outside their household.	4.63	0.546	Highest
2. Respondent wears a face mask when going outside, meeting people, or engaging in activities with individuals who are not members of their household.	4.80	0.435	Highest
3. Respondent engages in activities that involve close contact or conversation with people outside their family, without maintaining a distance of at least 2 meters.	4.09	1.839	High
4. Respondent travels to areas at risk or places with a COVID-19 outbreak.	3.55	1.024	High
5. Respondent checks their own ATK after engaging in risky activities or returning from high-risk areas.	4.31	0.854	Highest
6. Respondent isolates themselves from others and monitors their symptoms or report to authorities when they have a history of exposure or have been in close	4.41	0.788	Highest

Communication skills	\bar{X}	SD	Level of Practice
contact with high-risk individuals.			
7. Respondent avoids sharing personal items with others.	4.61	0.613	Highest
8. Respondent avoids activities that have a high risk of spreading the virus, such as parties, concerts, and large gatherings.	4.39	0.706	Highest
9. Respondent follows the D-M-H-T-T-A measures strictly when they are with people they know.	4.40	0.651	Highest
10. Respondent uses a serving spoon when eating with their family or coworkers.	4.53	0.677	Highest
11. Respondent measures their body temperature before and after traveling to different places.	4.16	0.869	High
Total	4.35	0.452	Highest

Table 6 shows the average standard deviation of the Coronavirus Disease 2019 prevention behavior. It was found that the respondents had the highest level of practice in general ($\bar{X} = 4.35$). The highest level of practice was observed in going out, meeting, talking, or participating in activities with outsiders who are not family members ($\bar{X} = 4.80$), followed by avoiding sharing personal belongings with others ($\bar{X} = 4.61$), washing hands with alcohol or soapy water when going out, meeting, talking, or doing activities with outsiders who are not family members ($\bar{X} = 4.60$), and traveling to risky areas or locations with the least outbreaks of COVID-19 ($\bar{X} = 3.55$), respectively

3. Results of Hypothesis Testing.

The correlation between health knowledge and preventive behavior against COVID-19 among 5th-year high school students in Lamphang Province, Thailand, was analyzed. The statistical method used was the Pearson Product Moment Correlation Coefficient to test the correlation between two variables. The hypothesis was accepted when the statistical significance level was less than 0.05. The results of the test are as follows:

Table 7 Results of testing the correlation between health knowledge and COVID-19 prevention behavior.

Health knowledge	COVID-19 prevention behavior			
	R	Sig.	direction of correlation	level of correlation
1. Health Information and Service Access Skill.	0.507	0.000*	same direction	average
2. Communication skills.	0.363	0.000*	same direction	relatively low
3. Self-management skills.	0.255	0.000*	same direction	relatively low
4. Decision-making and action-taking skills.	0.415	0.000*	same direction	average

*Statistically significant at the 0.05 level.

From table 7, the results of testing the correlation between knowledge about health and prevention behavior against COVID-19 can be explained as follows:

Data access and health service skills have a moderate positive correlation with COVID-19 prevention behavior, with a correlation coefficient of 0.507 that is statistically significant at the 0.05 level, in line with the hypothesis.

Communication skills have a relatively low positive correlation with COVID-19 prevention behavior, with a correlation coefficient of 0.363 that is statistically significant at the 0.05 level, in line with the hypothesis.

Self-management skills have a relatively low positive correlation with COVID-19 prevention behavior, with a correlation coefficient of 0.255 that is statistically significant at the 0.05 level, in line with the hypothesis.

Decision-making skills have a moderate positive correlation with COVID-19 prevention behavior, with a correlation coefficient of 0.415 that is statistically significant at the 0.05 level, in line with the hypothesis.

Discussion of Results

Based on the results of hypothesis testing, the relationship between health knowledge and preventive behavior against COVID-19 among 5th year high school students in Lampang province, Thailand, was found to be statistically significant at the 0.05 level. Health knowledge, including skills in accessing health information and services, communication skills, self-management skills, and decision-making skills, was positively correlated with preventive behavior against COVID-19. This supports the hypothesis that was set.

1. The skill of accessing health information and services has a moderate positive correlation ($r=0.507$) with the behavior of preventing COVID-19 infection, which is statistically significant at the 0.05 level, as hypothesized. This is because high school students have the necessary skills to access health information and COVID-19 services easily, consistent with the study by Konkanok Lattanand & Chanpen Ninwatcharamanee (2019), which found that access to health information and services differed

significantly at the 0.05 level. Furthermore, it is consistent with the study by Thanee Glomjai, Junya Kaewjiboon, and Taksika Chachvarat (2020), which found that most of the sample group had knowledge about preventing COVID-19 infection.

2. Communication skills are positively correlated with the behavior of preventing COVID-19 infection, with a relatively low correlation coefficient ($r = 0.363$) that is statistically significant at the 0.05 level, consistent with the hypothesis. This is because the group of students have the ability to apply their health knowledge as a skill in preventing COVID-19 infection by using communication methods to disseminate information about the disease. This can be easily done to ensure the safety of themselves and others from COVID-19 infection, which is in line with the study by Natawat Khanaruksombut (2020), which found online health communication strategies as a way to advertise and promote health products in situations where the public has to stay at home. The main concept of advertising is to sell health-related information that expresses concern for consumers.

3. The skill of self-management is related to the behavior of preventing COVID-19 infection, with a relatively low positive correlation ($r=0.255$) that is statistically significant at the 0.05 level, as hypothesized. This is because the student group has a behavior of preventing COVID-19 infection by using health knowledge and self-management skills that can be easily applied to protect themselves from the virus. This is consistent with a study by Jongkolnee Tuicharoen, Nichakhan Wongprakhob, Krittakorn Munsraket & Tidarat Nimkratoke (2020), which found that creating understanding helps prevent and takes care of people in the community, which is important in delaying the spread of the disease, preventing outbreaks, and controlling the spread of the COVID-19 virus. In public health, key actors in the community are health volunteers, community leaders, and people in the community, who are important resources that can help prevent the spread of the disease. The participation of people in the community (in line with the context of the area) can lead to faster and more effective work, benefiting the healthcare system, social services, and the economy.

4. The skill of decision-making in selecting actions is positively correlated at a moderate level ($r=0.415$), which is statistically significant at the 0.05 level, with

the behavior of preventing coronavirus disease 2019 infections. Therefore, promoting the correct decision-making (in selecting actions related to protecting oneself from coronavirus disease 2019) especially in terms of self-practices (when it is necessary to go to crowded places such as department stores and markets) is consistent with the study by Veera Kongsonnon and Amornsak Po-am (2019). This study found that correct decision-making is significantly related to the behavior of prevention and control of dengue fever infections recommended by the Thai Health Promotion Foundation.

In summary, knowledge about health is a factor that is related to the behavior of preventing COVID-19 among 5th year high school students in Lampang province, Thailand. Therefore, when students have good health knowledge and good health prevention behavior, they can become good role models for their families, communities, and surrounding society. This provides a greater potential to monitor and control COVID-19 infections in the community.

Recommendations

1. It is recommended to promote learning and practical skills for the group of students that can be used in their daily lives.
2. It is recommended to promote health knowledge and prevention behaviors related to COVID-19 among the group of students and to extend this knowledge to their families, communities, and society to increase their skills and knowledge in preventing the spread of COVID-19.

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