Knowledge and Flu Preventive Behaviors among High School students in Bangkok

Yanisa Namwat

Satriwithaya School, Bangkok, Thailand

Abstract: Influenza is a virus that annually causes approximately 1 billion illnesses and 3-650,000 deaths. Influenza (H1N1) pandemic caused in 2009- 2010 has become a seasonal influenza virus and it is the virus that has been selected as a strain in the production of influenza vaccines with other strains every year. Secondary school students are the population that has a lot of activities in learning and interacting with household members in daily life. If there is an epidemic of influenza high school students are people that affect the speed of disease transmission. This research studied the knowledge and flu preventive behaviors of female secondary school students in Bangkok and identified the sources and channels of the flu information. It was an online cross-sectional survey collecting data in June 2022.

The results of the study found that 304 respondents, median age of 14 years (min-max 11-18 years), had a mean knowledge score of 7.32 (sd=1.97) out of 10. The majority, 252 students, 82.89% (95% CI 78.26 – 86.71), were confident to recommend the flu vaccine to their relatives with high risk of severe flu illness. The prevalence of influenza preventive behaviors were as follows; wearing a mask regularly when visiting public areas, 261 students (85.85%, 95% CI 81.49-89.33), washing their hands regularly, 163 students (53.61%, 95% CI 48.00-59.14), and avoiding crowded areas 124 students (40.79%, 95% CI 35.41-46.40). Overall, 209 students (68.75%, 95% CI 63.33 – 73.70) practiced good influenza preventive behaviors. Factors associated with good flu preventive behaviors were: good disease knowledge (p<0.001), confidence in the influenza vaccine (p=0.004), and studying at the upper high school level (p=0.035). The channels of flu information with most frequent access were websites, Line, and Twitter, at 65.5, 53.9, and 52.6%, respectively, and the main sources of knowledge were parents, journalism, and schools.

 In conclusion, the students in a secondary school in Bangkok had good influenza prevention behaviors, despite the moderate knowledge score. Some behaviors were still less practical. To communicate knowledge or suggest ways to prevent disease, the most followed channels should be used: websites and social media. Parents and schools also play an important role as a source of knowledge for students.

Keywords: knowledge, behavior, prevention of influenza, infectious disease, secondary school students.

1. INTRODUCTION

Background

Influenza is a virus that causes approximately 1 billion [1][2] illnesses per year and 3-650,000 [3][4] deaths per year, especially in young children, pregnant women, persons with certain chronic medical problems, and the elderly which are considered as risk groups to be seriously ill and die more than other groups. Influenza has changed genetics every year, and sometimes new species can form, causing a pandemic. From 1900 to the present, a total of 5 influenza virus pandemics occurred, including the Spanish flu, which occurred in the years 1918–1920, Asian flu (1957), Hong Kong flu (1968), Russian flu (1977), and new influenza (H1N1) in the year 2009.

Each year various types of influenza virus infect humans, mammals, and poultries, and they may cross-infect and interbreed to form new subtypes and may be transmitted from person to person. The 2009 outbreak originated from the swine influenza virus mixed with avian and human influenza [5]. When it infected people, it could easily spread from person to person.

Widespread outbreaks had started in Mexico, Central America and spread to other countries in every region around the world. World Health Organization declared a pandemic.

Vaccination is an important measure to prevent serious illness and death from flu. Some strains that cause disease in the latest season are selected to develop as a vaccine for the next season. Currently, influenza virus (H1N1) 2009 is a selected strain to continue producing seasonal influenza vaccine every year constantly since the pandemic has passed [6].

In addition to the vaccine, health behaviors that reduce the chance of exposure to disease, such as wearing a mask, frequent hand washing, and social distancing, can directly diminish the risk of disease and outbreak. These measures are widely implemented during the COVID-19 pandemic, so people's behavior today may differ from before the outbreak which may affect the prevention and control of disease in the future.

The 2009 Pandemic influenza (H1N1) pandemic initially found higher infections in young and early adult populations than seasonal influenza [7][8], and the COVID-19 outbreak was expanding to all age groups including students. Secondary school students are a demographic group that interacts with other people at school and in the family. Therefore; the knowledge and behavior of students are very important for the prevention and control of influenza and other respiratory diseases.

Objectives

1. To assess knowledge about influenza in high school students in Bangkok.

2. To determine the prevalence of flu preventive behaviors in secondary school students in Bangkok.

3. To identify the sources and channels of influenza information and knowledge among secondary school students in Bangkok and find related factors to have good influenza preventive behaviors.

Research Conceptual Framework

Good influenza preventive behavior is the result of many factors. This research adapted a conceptual framework from the health belief model. It includes the perception of risk and perception of the severity of the disease, recognizing the benefits of prevention as well as other predisposing factors, for example, the perception of illness in the family members or close relatives, etc., which will affect the feeling of awareness of the disease and influenza preventive behaviors.

2. RESEARCH METHOD

This study was a cross-sectional survey. The sample group is students studying at the secondary school level 1-6 at a school in Bangkok which is a female school. The selection criteria are as follows: 1.) Willingness and consent to participate in the research; 2.) Able to answer online questionnaires. The sample size was calculated using the Open Epi (Open source Epidemiology Statistics for Public Health [9], yielding approximately 304 samples.

This research tool was a questionnaire that the researcher developed under the research conceptual framework. The questionnaire was divided into; 1) demographic, social and psychological data 2) confidence in the influenza vaccine 3) knowledge, which reflected the perception of risk, the severity of the disease, and the effectiveness of measures 4) Flu preventive behaviors.

Influenza vaccine confidence means respondents strongly agree (score 4 and 5 out of 5) to recommend that a family member who is at risk of severe illness to get the vaccine.

Interpretation of knowledge level from 10 questions, 1 point each. Knowledge was at a good level, which was 8-10 points, moderate level knowledge was 5-7 points, and low-level knowledge was 0-4 points.

The 5-point Likert scale was used for 12 questions on flu preventive behavior frequency. Scores ranged from 1-5 with meanings as follows: 1= "never or very rare", 2="rare", 3="occasionally", 4="often", and 5="regularly". Therefore; the lowest possible score was 12 points, and the full score was 60. Good flu preventive behavior was defined as a total score of 48-60 points, the moderate level was 36-47 points, and the low level was less than 36 points.

The prevalence of self-defense against influenza was the proportion of respondents who answered do that behavior regularly among total respondents.

Data Collection Method

The researcher created the questionnaire as an online form and sent an invitation message to grade M.1-6 students (equivalent to grade 7 – 12) via online channels and verbal invitations. Data collection by self-administered was done during 5-15 June 2022.

3.   DATA ANALYSIS

Descriptive statistics were used: frequency, percentage, median, quartile range, mean, and standard deviation in the analysis of demographic data, general information, hygiene, knowledge, and behavior against influenza, using Chi-square inferential statistics, the factors associated with good influenza prevention behaviors were analyzed. using OpenEpi (Open Source Epidemiologic Statistics for Public Health, Version).

4.   RESEARCH RESULTS

From the survey, there were 304 respondents, all female students, aged 11-18 years, median age 14 years (Q1-Q3 13-16 years). The characteristics in Table 1, the distribution of M.1 to M.6. were as follows: The highest respondents were 84 (27.63%), 54 (17.76%) and 51 (16.78%) students from M.2, M.6, and M.1 respectively. Approximately one-third, 107 (35.20%), had a household size of 4 members. Of all respondents, 149 (49.01%) experienced influenza illness, 156 (51.32%) had relatives who experienced influenza, 98 (32.24%) had underlying medical problems, and 222 (73.03%) knew that close relatives had chronic medical problems. In the question of confidence to recommend the relatives with underlying health conditions to have influenza vaccination was found that the most confident were 250 respondents or 82.89%.

Table 1: Demographic Characteristics and Vaccine Confidence

Variant	Frequency	
	Number	**(%)**
Total	**304**	**(100.00)**
Grade*		
M.1	51	(16.78)
M.2	84	(27.63)
M.3	43	(14.14)
M.4	43	(14.14)
M.5	29	(9.54)
M.6	54	(17.76)
Numbers of Family Members		
2-3 persons	57	(18.75)
4 persons	107	(35.20)
5 persons	64	(21.05)
6 persons or more	76	(25.00)
Own Experience on Influenza		
Ever	149	(49.01)
Never	155	(50.99)
Family Members' or Relatives' Experience on Influenza		
Ever	156	(51.32)
Never	146	(48.03)
Not Answer	2	(0.66)
Underlying medical problems		
Have	98	(32.24)
Don't have	206	(67.76)
Relatives' underlying medical problems		
Have	222	(73.03)
Don't have	82	(26.97)
Confidence in Influenza Vaccination		
Up to the most	252	(82.89)
Moderate to the least	52	(17.11)

*Remark: *Grade M. 1-6 equivalent to grade 7 - 12*

The knowledge of influenza was a full score of 10, with an average score of 7.34, with a good knowledge of 52.96%. In Table 2, the 2 highest correct rates (i.e. proportion of students choosing the correct answer) were: If you are sick with influenza should stop working or going to school (91.45%), followed by Influenza can be transmitted by direct contact with

the patient's cough, droplets, sneezes, snot, or saliva (90.46%). The 3 least correct rates were: Most influenza patients are self-recovering or just taking medication according to symptoms such as paracetamol without hospitalization (39.47%), those who are infected with influenza can spread the virus from the onset of illness and the duration of the infection was up to 7 days (49.34%), and when you have been sick with influenza, there will be a chance of recurrence (49.67%).

Table 2: Individual knowledge scores for each item

Questions	Correct %
1. Influenza can be transmitted directly from the patient's cough, sneeze, snot, or saliva droplets.	90.46
2. Influenza can be transmitted through hands or objects contaminated with mucus, or saliva, such as handkerchiefs, doorknobs, glasses, computer keyboards, etc.	85.2
3. Influenza has common flu-like symptoms such as high fever, headache, muscle aches, cough, sore throat, nausea, vomiting, or diarrhea may also occur.	82.24
4. Most influenza patients can recover by themselves or take medication according to symptoms such as paracetamol without hospitalization.	39.47
5. Patients with chronic diseases such as asthma, heart disease, diabetes, elderly people with low immunity, when infected with influenza, need to see a doctor urgently.	83.22
6. Patients with influenza symptoms, if there is still a high fever, difficulty breathing, or taking antipyretics for 48 hours but the fever has not reduced, must see the doctor immediately.	86.51
7. There is currently a seasonal influenza vaccine. It is recommended to inject once a year.	76.32
8. If you have been sick with influenza, there can be a recurrence.	49.67
9. If you have got the flu, you should stop working or studying and take a rest.	91.45
10. People infected with influenza can spread it from the onset of illness and the infective period is not more than 7 days.	49.34

Table 3 showed the prevalence of regular influenza preventive behaviors for each item which is assessed approximately 2 months before the survey. It found that 261 (85.85%) wore masks when they were in public places, followed by 77.96% carried a reserve mask and alcohol gel when leaving home, 72.37% avoided sharing glasses, straws and spoons with others. The prevalences of behaviors by the least practiced were regular physical exercise (29.28%), wiping the surfaces touched by their hands with disinfectant (35.53%) and keeping the hands clean before touching the face (37.50%).

Table 3: Prevalences* of regular influenza preventive behaviors

Behaviors	Prevalence	
	Number	% (95% CI)[a]
You wear a mask every time you are in public.	261	85.85 (81.49-89.33)
You carry a hygienic mask and hand wash gel with you when leaving home.	237	77.96 (72.97-82.25)
You avoid using glasses, straws, and utensils with others.	220	72.37 (67.09-77.09)
ฬ You avoid contact with patients who have flu symptoms.	185	60.85 (55.27-66.17)
You cover your mouth with a handkerchief or tissue. when coughing or sneezing and wash your hands every time.	184	60.53 (54.93-65.86)
You wash your hands with soap or alcohol gel after picking up things.	163	53.61 (48.00-59.14)
You eat freshly cooked food and eat completely 5 meal groups each day.	141	46.38 (40.86-52.00)

∨ี You get enough sleep for 6-8 hours a day.	140	46.05 (40.53-51.67)
You avoid crowded areas or group activities with many people.	124	40.79 (35.41-46.40)
You wash your hands thoroughly before touching your face, picking your nose, and rubbing your eyes every time.	114	37.50 (32.25-43.07)
You clean the surfaces that are high touch, such as door knobs, light switches, and handrails, with a disinfectant.	108	35.53 (30.36-41.06)
You take good care of your health. Exercise 3-5 days a week for at least 30 minutes a day.	89	29.28 (24.45-34.62)

Remark   *n=304   ᵃ CI = confidence interval

Information sources that were regularly followed as in Figure 1, from highest to lowest respectively, were parents and relatives (75.0%), news agencies or mass media (68.1%), schools (64.8%), friends (54.6%), and the Ministry of Public Health/Department of Disease Control (51.0%). The top 3 channels were website (65.5%), Line 53.9%, and Twitter 52.6%. Others next in line are Youtube, TikTok, TV, and Facebook.
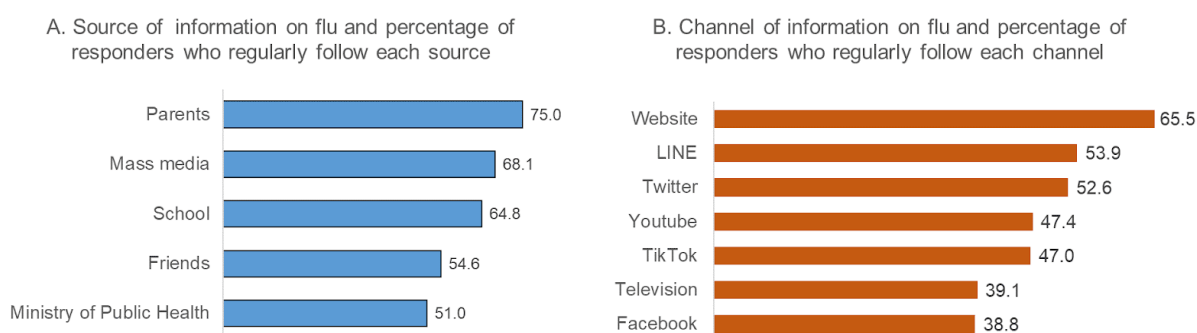

Figure 1

Figure 1 Percentage of responders who regularly follow the flu information from each source (A) and channel (B)

The score of 12 behaviors represented the frequency: If one did all regularly, he would get the highest score of 60. It was found that the average score was 50.97 (sd=6.52) and when the score of 48-60 was classified as "good influenza preventive behaviors", it was found that 209 respondents (68.75%) have good influenza preventive behaviors as shown in Table 4. Factors related to good influenza preventive behaviors were good flu knowledge (78.88% v.s. 57.34%, P-value <0.001), having confidence in the vaccine (72.22% v.s. 51.92%, P-value 0.004), and studying at the upper high school level (75.40% v.s. 64.04% P-value 0.035).

Table 4: Percentage of good influenza preventive behaviors and related factors

Types	N	Good preventive behaviors		χ^2	P
		Number	(%)		
Total	**304**	**209**	**(68.75)**		**-**
Grades					
M. 4-6	126	95	(75.40)	4.25	*0.035
M. 1-3	178	114	(64.04)		
Number of Family Members					
2-3 persons	57	35	(61.40)		
4 persons	107	79	(73.83)	4.345	0.227
5 persons	64	40	(62.50)		
6 persons or more	76	55	(72.37)		
Flu Sickness History (Own)					
Ever	149	107	(71.81)	1.275	0.259
Never	155	102	(65.81)		

Flu Sickness History (Family Members or Relatives)					
Ever	156	106	(67.95)	0.053	0.818
Never	146	101	(69.18)		
Underlying medical problems (Own)					
Have	98	69	(70.41)	0.185	0.667
Don't have	206	140	(67.96)		
Underlying Medical Problems (Relatives)					
Have	222	149	(67.12)	1.021	0.312
Don't have	82	60	(73.17)		
Knowledge Level					
Good (8-10)	161	127	(78.88)	16.35	*<0.001
Moderate to a few	143	82	(57.34)		
Confidence of					
Influenza Vaccination					
Up to the most	252	182	(72.22)	8.267	*0.004
Moderate to the least	52	27	(51.92)		

Remark: A total score is good to very good (48-60 points).

* Statistically Significantly Different

5. DISCUSSION

This research had 304 respondents who were all female students, aged 11-18 years, median 14 years, most of them attending 2nd year of high school, representing 27%, mostly in families with 4-5 members, had own experience of influenza 49.01%, close relatives' experience of influenza at 51.32%, had an underlying disease at 32.24%, had the confidence to recommend the influenza vaccination at 82.89%. Knowledge score was at a good level (52.96%), and influenza preventive behavior score was at a good level (68.75%). Important sources of Influenza are parents, news media, and schools. Frequently followed influenza knowledge channels were websites, and social media (Line, Twitter). Knowledge issues that answered correctly at the least rates were about the self-recovery nature of influenza, the possible recurrent episodes, and the period of infectiousness. The least practiced behaviors included cleaning the high-touch surfaces with disinfectants and keeping hands clean before touching face. Factors that associated with good influenza preventive behaviors were: having a good knowledge of the disease and having confidence in the influenza vaccine and studying at the upper secondary level.

The respondents in this study were high school students, were knowledgeable about Influenza at a good level, about half of the respondents (52.96%), which was lower than that found in Ubon Ratchathani University students in 2011. The sample group of students there had a good knowledge at 65.7% [10]. Besides, the study of the general public at Namon District, Kalasin Province in 2011 found the the sample group had a high level of knowledge at 90.20% [11] of the sample group of high-level knowledge and the study of teachers and nannies at the child caring centers in Surat Thani Province in 2013 also found that teachers and nannies had a high level of knowledge [12], which was likely a result of the same a period of the 2009 influenza pandemic.

In terms of influenza preventive behavior, it was found that more than two-thirds (68.75%) had good flu preventive behaviors, consistent with the study among people who came to the hospitals in Nakhonsawan Province [13] in 2016, which found that 54.2% of the sample group had good behavior and 44.0% of the group had a fair behavior. However; the above findings differed from the behavior of students in Ubon Ratchathani University [10] who found that most of the moderate influenza preventive behaviors were at 57.5% and 39.6% of good behaviors. This difference may be due to the fact that this study occurred during a time when COVID-19 prevention measures were applied continuously. While the study in 2011 in Ubon Ratchathani students was just after the 2009 influenza pandemic which had less impact than the COVID-19 pandemic. However; the 2 studies have similar findings: The sample group had good practice, wash their hands frequently with soap and water, rub their hands with alcohol gel, avoid sharing glasses, straws, and spoons with others. The least behavior is cleaning the high-touch surface area and regularly exercise. These findings may be caused by they did more regularly what were obviously self protection and aware of the direct effect on disease prevention, such as washing hands, not sharing glasses, straws, and spoons with others. On the contrary, they did not do the same with things or places, may be because of

the thought that it was not their duties. Regularly exercise part may not have a direct effect on disease prevention and it may be a behavior that people in general not much practice.

The results of this study found that most of the students had good influenza preventive behaviors, probably caused during the study period there is still an outbreak of COVID-19, which preventive behavior is the same as influenza prevention. Several studies have found the results of the aforementioned study of COVID-19 preventive behaviors, such as, the study on the perception of violence and coronavirus disease 2019 (COVID-19) preventive behaviors among adolescents in Sateng Nok Sub-district, Muang district, Yala Province [14] in 2020 found that 91% had good disease preventive behaviors among adolescents especially the one who studying in health. As a study in 2020 on the relationship between knowledge, health beliefs and protective behaviors and covid-19 personnel control among nursing student, Faculty of Nursing Rajamangala University of Technology Thanyaburi [15] and not only in teenagers or students but also the volunteers of public health in the community showed a very high level of good disease preventive behaviors as reported in A study in village health volunteers, Soi Dao District, Chanthaburi Province and the disease preventive behaviors were at a very good level, representing 80.24% [16] in Kho Hong Municipality, Songkhla Province.[17]

6. CONCLUSION

The respondents who were high school students in Bangkok had moderate to good level of knowledge and influenza preventive behaviors at a good level but there are also knowledge issues and practices or some behavior that can be improved additionally. Factors related to having good disease preventive behaviors were good knowledge of influenza, having Confidence on the Influenza Vaccine and studying in high school. Important sources of knowledge are parents and schools, relevant agencies. Therefore; measures should be taken to provide information, news and knowledge including supporting parents and the school has passed on knowledge and practices to students as the channel that they follow. The news at the public health department and schools should be adapted is website and various social media channels that students follow often including Line and Twitter.

REFERENCES

[1] Tokars JI, Olsen SJ, Reed C. Seasonal Incidence of Symptomatic Influenza in the United States. Clin Infect Dis [Internet]. 2018 May 2 [cited 2022 May 19];66(10):1511–8. Available from: https://academic.oup.com/cid/article/66/10/1511/4682599

[2] US CDC. Key Facts About Influenza (Flu) | CDC [Internet]. [cited 2022 May 19]. Available from: https://www.cdc.gov/flu/about/keyfacts.htm

[3] World Health Organization. Influenza (Seasonal) [Internet]. [cited 2022 May 19]. Available from: https://www.who.int/news-room/fact-sheets/detail/influenza-(seasonal)

[4] Troeger CE, Blacker BF, Khalil IA, Zimsen SRM, Albertson SB, Abate D, et al. Mortality, morbidity, and hospitalisations due to influenza lower respiratory tract infections, 2017: an analysis for the Global Burden of Disease Study 2017. Lancet Respir Med. 2019 Jan 1;7(1):69–89.

[5] Deadly new flu virus in US and Mexico may go pandemic | New Scientist [Internet]. [cited 2022 May 19]. Available from:https://www.newscientist.com/article/dn17025-deadly-new-flu-virus-in-us-and-mexico-may-go-pandemic/?ignored=irrelevant

[6] National Vaccine Institute. Influenza Vaccine Factsheet [Internet]. Factsheet. 2021 [cited 2022 May 19]. p. 1–16. Available from: http://www.nvi.go.th/index.php/files/large/f42af4f3f4cf162

[7] Karageorgopoulos DE, Vouloumanou EK, Korbila IP, Kapaskelis A, Falagas ME. Age Distribution of Cases of 2009 (H1N1) Pandemic Influenza in Comparison with Seasonal Influenza. PLoS One [Internet]. 2011 [cited 2022 Jul 23];6(7). Available from: /pmc/articles/PMC3128617/

[8] US CDC. 2009 H1N1 Pandemic (H1N1pdm09 virus) | Pandemic Influenza (Flu) | CDC [Internet]. [cited 2022 Jul 23]. Available from: https://www.cdc.gov/flu/pandemic-resources/2009-h1n1-pandemic.html

[9] Dean A, Sullivan K, Soe M. Open Source Epidemiologic Statistics for Public Health, Version. [Internet]. 2022 [cited 2022 Jul 10]. Available from: www.OpenEpi.com

[10] Suebsomran P, Sukhumal P, Boomkhao L, Limpiteeprakan P. Association Between Knowledge, Attitudes and Preventive Behaviors of Pandemic Influenza A (H1N1) Among Students at Ubon Ratchathani University [Internet]. [Ubon Ratchathani]: Ubonratchathani University; 2011 [cited 2022 Jul 10]. Available from: https://dric.nrct.go.th/ Search/SearchDetail/272930

[11] Supanyabut S. Affecting Factors and Impacted to Preventive Behavior on the Influenza TypeA (subtype2009 H1N1) of the Population in Namon District, KalasinProvince. JDPC7KK [Internet]. 2011 May [cited 2022 Jul 10];18(2):1–11. Available from: https://he01.tci-thaijo.org/index.php/jdpc7kk/article/view/166366

[12] Rattanamanee K, Khamngoen R, Saetew P. Knowledge, Attitudes, and Practices on the Prevention and Control of Pandemic Influenza Type A H1N1 2009 Among teachers Child Care Providers in Nurseries located in Surat Thani Province. NJPH [Internet]. 2013 [cited 2022 Jul 9];22(3):26–38. Available from: https://he02.tci-thaijo.org/index.php/ tnaph/article/view/4745

[13] Siriphakhamongkhon S, Siriphakhamongkhon S. Factors Affecting Knowledge and Preventive Behaviors of Influenza among the Clients in Nakhon Sawan Province. JDPC3 [Internet]. 2017 [cited 2022 Jul 10];11(2):1–10. Available from: https://he01.tci-thaijo.org/index.php/JDPC3/article/view/208929

[14] Waehayi H. Severity Perception and Preventive Behavior on the Coronavirus disease -2019 among Youth at Sateng-Nok Subdistrict, Muang District, Yala Province. J Community Public Heal [Internet]. 2020 Dec [cited 2022 Jul 10];6(4):158–68. Available from: https://he02.tci-thaijo.org/index.php/ajcph/article/view/247585

[15] Geounuppakul M, Panawatanakul S, Nuntananate P. The Relationship among Knowledge, Health Beliefs and COVID-19 Prevention and Control Behavior of Staff and Nursing Students, Faculty of Nursing Rajamangala University of Technology Thanyaburi. NJPH [Internet]. 2021 Aug [cited 2022 Jul 10];31(2):81–92. Available from: https://he02.tci-thaijo.org/index.php/tnaph/article/view/252573

[16] Meekaew E, Jaidee W, Sangjun S. Factors Related to Health Literacy and Self-Protective Behaviors for Surveillance Operation of Coronavirus Infection Disease 2019 of Village Health Volunteers at Soi-Dao District in Chanthaburi Province. NJPH [Internet]. 2022 [cited 2022 Jul 10];32(1):74–87. Available from: https://he02.tci-thaijo.org/index. php/tnaph/article/view/257443

[17] Inthacharoen A, Kanchanapoom K, Tansakul K, Pattapat S. Factors Influencing Preventive Behavior towards Coronavirus Disease 2019 among People in Khohong Town Municipality Songkhla Province. J Counc Community Public Heal [Internet]. 2021 Aug [cited 2022 Jul 10];3(2):19–30. Available from: https://he01.tci-thaijo.org/index. php/JCCPH/article/view/247672