

# A Cross sectional online study : Hygiene Knowledge and Behaviours among High School students in Thailand

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## Abstract

Since COVID-19 has emerged in 2019, students were one of groups that were hardly affected. There were many clusters of infection in schools. To evaluate level of knowledge and behaviour regarding hygiene and to study factors influencing hygiene behaviour. This study is predictive correlational research that studies factors affecting hygiene practice which study a total of 215 high school students, grade 10-12. 76.7% of participants were females. Majority of participants are studying in grade 12 (n=85, 39.5%) and most participants are studying in the Math-Science program (n=165, 76.7%). Majority of participants' parents work as a freelancer (m=69, 32.1%). The biggest monthly household income group was 20,000-40,000 BAHT (n=72, 33.5%). Most participants reported that they received news and knowledge regarding hygiene and infectious prevention from social media and Youtube (n=142, 66.0%). 82.8% (n=178) of participants indicated that they didn't have any congenital disease. Most participants showed a moderate level of Hygiene and Infectious Prevention Knowledge (M=10.65) while hygiene practice was at a good level (M=71.12, SD=8.95). There were no predictive factors for hygiene practice among participants. Participants showed a moderate level of hygiene knowledge while hygiene practice was at a good level.

Keyword: hygiene knowledge, hygiene practice, infectious disease

## Background

Coronavirus 2019 (COVID-19) pandemic has affected the international population, this causes behaviour change in humans along with social inequalities. For instance, deprivation of economic development due to lack of human resources during COVID-19 pandemic, which caused personnel isolation. In addition, students who had to be absent to prevent the circumstance<sup>1</sup>. consequently an effect on parents to stop working and look after schoolchildren instead. As a result, pressure from the total situation affects mental health in both parents and children. Furthermore, the government's by prescribing measures for students to study via online, thus online learning also has affected children's own health problems. According to a survey conducted by Thailand Physical Activity Knowledge Development Center (TPAK), 7 health problems during online classes include body aches or body aches, stress and anxiety problems; especially students preparing to go to secondary or higher-education level, homework increase problems, lack of physical activity, less exercise activity<sup>2</sup>. and unfavorable environment issues, leading to concentrated disruption<sup>3</sup>. Therefore, solving this problem with online learning could rather be considered as a solution that harms children's health. Educational institutions are considered as a place that is at risk of the spreading of COVID-19 due to a large group of students who want to try and learn new things which often gathering as a group participation in various activities. Therefore, it is considered that there is a high risk of COVID-19 infection.

According to the research, it was found that between the ages of 10-19 years, the middle school age, there was a rate of 827.50 cases of COVID-19 per 100,000 population<sup>4</sup>. From this statistic, we found that when the outbreak occurs among students, it will affect the surrounding society such as teachers, parents, etc. An announcement from the Ministry of Education said that schools under the jurisdiction can open on-site learning all over the country to prevent the spread of epidemic "reduce risk and strengthen immunity" which educational institutions must have a self-assessment preparation for the opening of the semester. On the other hand, Students

have to take care of their own hygiene, such as eating fresh and well-cooked food, avoiding living in crowded area, keeping social distancing, wearing a mask and washing hands frequently. Hygienic habits are the fundamental of a vital lifestyle because it can prevent risks that may arise from infectious diseases. An example of hygienic behaviour that we can easily follow in everyday life is washing hands. This is a method that can be done at all ages with no charge and it can prevent diseases caused by touching dirtiness. However; if there is without hygiene, both personal and household, can increase the spread and accumulation of disease, which may affect health issues. Thus, good hygiene is an important basis for preventing the spread of diseases. According to Phitsinee-Phengmeesri research conducted cognitive studies, attitude and COVID-19 prevention about case study from Loei Pittayakom Secondary School in Loei, Thailand, the samples were found to be knowledgeable, having attitudes and behaviours for the prevention of COVID-19 at a good level. There should be contributed hygiene behaviours for COVID-19 prevention together with providing knowledge about COVID-19 and increase awareness and attitudes towards the prevention of aforementioned circumstances. In addition, schools should indicate the latest information about COVID-19 through the school's social media consistently to stimulate students' awareness<sup>5</sup>. of the impact of COVID-19. The prevention of COVID-19 pandemic is a significant action to take it seriously. Thus, good hygiene is a fundamental behaviour of preventing disease. For this reason, the researchers have focused on studying the level of knowledge of hygiene, attitudes about hygiene and behaviours after the COVID-19 pandemic. Due to differences in knowledge range, attitudes, decisions and behaviours in the ages of secondary school, these can affect the response to prevention of COVID-19. In addition, Bangkok, where is the high population and density may also take a higher risk of the disease spreading. Furthermore, the school is considered one of the congested places. If there is the first outbreak, the infection may be easily spread in case of lack of knowledge and proper awareness.

### Objectives of this study

1. To evaluate level of knowledge and behaviour regarding hygiene
2. To study factor influencing hygiene behaviour

### Conceptual Framework

Having knowledge, hygiene behaviours and infectious prevention correctly is required and preventing infection correctly. The purpose of this research is to study the factors affecting hygiene behaviour and infectious prevention. Under the framework of Pender's Theory of Health Promotion, health promoting behaviours are derived from 3 factors: 1) personal factors, 2) cognitive factors that are specific to behaviours, health and social support, and 3) outcome behaviours. In this study, the researcher studied the cognitive factors that are specific to behaviours which consist of benefit perception of obstacles and perception of their ability to practice behaviour. These factors will affect the hygiene behaviours and prevent the spread of pathogens of the samples. (Chart 1)

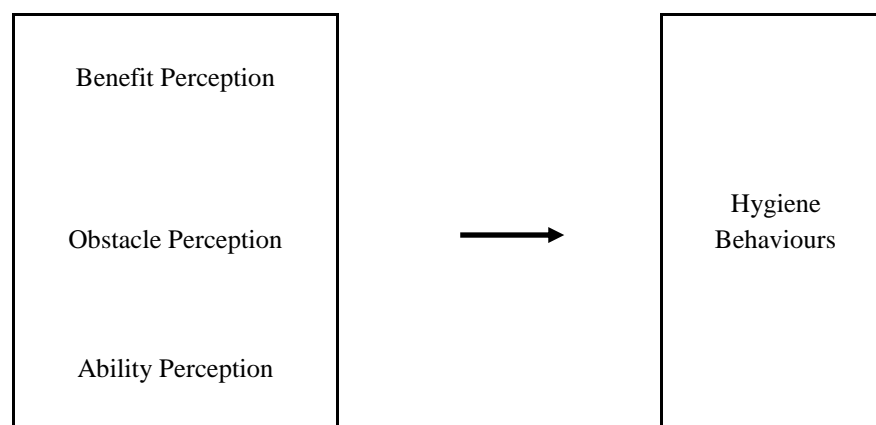


Chart 1

## Study methods

This study focuses on predictive correlation research and study factors affecting hygiene practice.

### Population and Sampling

The population that is used in this study was Thai citizens between ages of 18-60 years who lived in Thailand. The samples were Thai citizens between ages of 18-60 years in Thailand, who can access the internet, being social media members with the following selection criteria: 1. willing and consent to cooperate in research 2. consent to join research, based on the total unknown amount of population, calculated by Yamane's formula (Taro Yamane), by defining a deviation level at a significant level of 0.05. A total samples 400 people were obtained.

### Tools

This research tool was a questionnaire which the researcher has developed according to the research tool development process. The details are as follows. 1. Study about the importance of hygiene. Diseases caused by lack of hygiene, Pathogenesis Disease, Infection cycle, Epidemic, prevention and control 2. Create a questionnaire based on research conceptual framework and research objectives consisted of 4 parts as follows:

1. Demographic data, gender, grade level, study plan, parent's occupation, family income, Channels for receiving information about hygiene and preventing the spread of pathogen, congenital diseases (7 questions)
2. Knowledge and understanding about hygiene and infectious prevention. There are 3 optional questions with 1 correct answer. There are 15 questions covering health knowledge. The importance of hygiene, infectious diseases, prevention and control of infectious. A high score means a high level of comprehension. A low score means a low level of comprehension.
3. Attitudes towards good hygiene, 8 items, question types were scaled from 1-5, interpreting high scores indicates a high level of willingness. A low score indicates a low level of willingness.
4. The level of hygiene behaviours and infectious prevention, 15 items, question types were scaled from 1-5, interpreting the high scores indicates a high level of willingness. A low score indicates a low level of willingness.

The interpretation of the 5 levels of hygiene behaviour scores is;

Mean 1.00-2.00 Low level means that the sample has low level of hygiene behaviours.

Mean 2.01-3.00 Intermediate level means that the sample has moderate hygiene behaviours.

Mean 3.01-4.00 High means that the sample has a high level of hygiene behaviors.

Mean 4.01-5.00 Very high means that the sample has a very high level of hygiene behaviours.

For quality assurance of research instruments in this research, the researcher examined the content validity and reliability values by bringing the questionnaire created and present to 3 experts to check the suitability and accuracy of the xx questions and the content used in the questionnaire by using predictive validity (Reliability). The researcher used a questionnaire created and modified according to the advice of experts to find the reliability value by using the Cronbach' Alpha Coefficient formula. Information on factors affecting willingness to donate blood. The confidence values were 0.65, 0.70 and 0.9

## Data Collection

The researcher created a questionnaire in Online Google Form and sent inquiries to Grades 4-6 students through online channels in school social group which all students can access those groups thoroughly.

## Data Analysis

1. Using descriptive statistics such as frequency distribution, %age, mean and standard deviation, analyse personal information knowledge and understanding of blood donation and attitudes and beliefs about blood donation
2. Using Multi Regression Analysis to analyse factors affecting willingness to donate blood.

## Results

From the study of knowledge and behaviors related to hygiene and infectious prevention of the students in grade 10-12 in Bangkok, it was found that there was a total of 215 respondents. Most of the respondents were 165 females, representing 76.7%, and 50 were males, representing 23.3%. Most of them are studying at Grade 12, 85 students, representing 39.5%, followed by 67 people studying in Grade 10, representing 31.2%, and Grade 11, 63 students, representing 29.3%. Most of the respondents are studying in Math-Science program, 165 students, representing 76.7%, followed by 39 students studying other programs, representing 18.1%, and 11 students studying in Art-Math program, representing 5.1%. Most of the respondents' parents are employees/freelancers, 69 people, representing 32.1%, followed by company employees 55 people, representing 25.6%, business owners 49 people, representing 22.8%, other occupations 23 people, representing 10.7%, and medical sciences 19 people, representing 8.8%. Family income per month was divided into 5 groups; consisting of income less than 20,000 Baht, 63 people, representing 29.3%, income between 20,000-40,000 Baht, 72 people, representing 33.5%, income between 40,001-80,000 Baht, 43 people, representing 20.0%, income between 80,001-150,000 Baht, 15 people, representing 7.0%, and income more than 150,000 Baht, 22 people, representing 10.2%. The channels for obtaining knowledge about hygiene and infectious prevention are mostly via social media/YouTube, 142 people representing 66.0%, from school and books, 36 people, representing 16.7%, from parents, 26 people, representing 12.1%, and personal sickness experiences 11 people, representing 5.1%. The respondents with congenital disease are 178 people, representing 82.2% and the respondents without any congenital disease 37 people, representing 17.2%.

Most of the respondents had a moderate level of knowledge about hygiene and infectious prevention ( $M=10.65$ ,  $SD=1.39$ ), female respondents ( $M=10.68$ ,  $SD=1.39$ ) got an average score higher than males ( $M=10.56$ ,  $SD=1.45$ ), Grade 12 students had the highest scores on hygiene and infection prevention ( $M=10.78$ ,  $SD=1.41$ ), followed by Grade 11 students ( $M=10.90$ ,  $SD=1.34$ ) and Grade 10 ( $M=10.24$ ,  $SD=1.34$ ), respectively. The students who are studying in Math-Science program had the highest knowledge scores ( $M=10.77$ ,  $SD=1.28$ ), followed by the students studying other study programs ( $M=10.38$ ,  $SD=1.66$ ) and Art-Math Program students ( $M=9.82$ ,  $SD=1.60$ ) respectively.

The students' parents working as company employees/civil servants/employees had the highest scores ( $M=10.98$ ,  $SD=1.16$ ), followed by the Medical Science ( $M=10.84$ ,  $SD=1.17$ ), Other occupations ( $M=10.74$ ,  $SD=1.32$ ), Business owners ( $M=10.51$ ,  $SD=1.45$ ) and freelancers ( $M=10.40$ ,  $SD=1.56$ ) respectively. The monthly income group more than 150,000 Baht had the highest score ( $M=11.05$ ,  $SD=1.46$ ), followed by income between 40,001-80,000 Baht ( $M=10.98$ ,  $SD=1.28$ ), followed by income between 80,001-150,000 Baht ( $M=10.73$ ,  $SD=1.27$ ), income between 20,001-40,000 Baht ( $M=10.64$ ,  $SD=1.14$ ) and income less than 20,000 Baht per month ( $M=10.28$ ,  $SD=1.65$ ), respectively.

Regarding the channels for receiving information about hygiene and preventing the spread of infection of the respondents, it was found that the group of respondents with the highest knowledge score is the group who received information from social media ( $M=10.71$ ,  $SD=1.30$ ), followed by received information from their own

illness experience ( $M=10.63$ ,  $SD=1.56$ ), received information from school/books. ( $M=10.61$ ,  $SD=1.62$ ) and from parents ( $M=10.38$ ,  $SD=1.30$ ). The respondents without any congenital disease had higher scores on hygiene and infection prevention ( $M=10.67$ ,  $SD=1.40$ ) than those with congenital disease ( $M=10.62$ ,  $SD=1.34$ ).

Most of the respondents got their hygiene behaviours and infectious prevention score at a good level ( $M=71.12$ ,  $SD=8.95$ ), female respondents ( $M=71.20$ ,  $SD=8.43$ ) had higher behavioural scores than males ( $M=70.86$ ,  $SD=10.57$ ). The students in Grade 12 got the highest behaviour scores ( $M=73.64$ ,  $SD=9.06$ ), followed by the Grade 10 ( $M=69.94$ ,  $SD=7.93$ ) and Grade 11 students. ( $M=68.97$ ,  $SD=9.11$ ) The respondents who are studying in Art-Maths program received the highest score on hygiene behaviours and infectious prevention ( $M=72.18$ ,  $SD=10.09$ ), followed by Math-Science ( $M=71.84$ ,  $SD=8.82$ ) and other studied programs ( $M=67.84$ ,  $SD=8.64$ ).

The respondents whose parents work as company employees/civil servants/employees received the highest scores for hygiene behaviors and infectious prevention ( $M=73.51$ ,  $SD=9.71$ ), followed by business owners ( $M=71.92$ ,  $SD=9.37$ ), Medical Science ( $M=71.21$ ,  $SD=7.00$ ), freelancers ( $M=69.68$ ,  $SD=8.13$ ) and other occupations ( $M=67.96$ ,  $SD=8.86$ ). The family income per month between 80,001-150,000 Baht received the highest score in hygiene behaviors ( $M=73.60$ ,  $SD=12.09$ ), income between 40,001-80,000 Baht ( $M=72.30$ ,  $SD=7.82$ ), income more than 150,000 Baht ( $M=72.18$ ,  $SD=8.02$ ), income between 20,000-40,000 Baht ( $M=71.04$ ,  $SD=9.22$ ) and less than 20,000 ( $M=69.44$ ,  $SD=8.77$ ). The respondents who received the information from school had the highest behavior score ( $M=72.27$ ,  $SD=8.37$ ), followed by from their own illness experience ( $M=72.18$ ,  $SD=5.74$ ), and information from parents ( $M=71.23$ ,  $SD=5.74$ ) and social media ( $M=70.72$ ,  $SD=9.54$ ). The respondents without any congenital disease ( $M=71.66$ ,  $SD=9.00$ ) had higher scores on hygiene behaviors and infectious prevention than those with congenital disease. ( $M=68.54$ ,  $SD=8.34$ ).

TABLE 1 Demographic characteristics of the respondents, knowledge and behavior scores, hygiene and infectious prevention ( $n=215$ ).

<b>Variants</b>	<b>Frequency n (%)</b>	<b>Hygiene Knowledge and infectious prevention M (SD) (0-14)</b>	<b>Hygiene behaviors and infectious prevention M (SD) (80)</b>
<b>Gender</b>			
Male	50 (23.3)	10.56 (1.45)	70.86 (10.57)
Female	165 (76.7)	10.68 (1.38)	71.20 (8.43)
<b>Grade</b>			
Grade 10	67 (31.2)	10.24 (1.34)	69.94 (7.93)

Grade 11	63 (29.3)	10.90 (1.34)	68.97(9.11)
Grade 12	85 (39.5)	10.78 (1.41)	73.64(9.06)
<b>Program</b>			
Math-Science	165 (76.7)	10.77 (1.28)	71.84 (8.82)
Art-Math	11 (5.1)	9.82 (1.60)	72.18 (10.09)
Others	39 (18.1)	10.38 (1.66)	67.84 (8.64)
<b>Occupation</b>			
Medical Science	19 (8.8)	10.84 (1.17)	71.21 (7.00)
Company Employees/ Civil Servant/ Employees	55 (25.6)	10.98 (1.16)	73.51 (9.71)
Business Owners	49 (22.8)	10.51 (1.45)	71.92(9.37)
Contractors/Freelancers	69 (32.1)	10.40 (1.56)	69.68 (8.13)
Others	23 (10.7)	10.74 (1.32)	67.96 (8.86)
<b>Family Income Monthly</b>			
<20,000	63 (29.3)	10.28 (1.65)	69.44 (8.77)

20,000-40,000	72 (33.5)	10.64 (1.14)	71.04 (9.22)
40,001-80,000	43 (20.0)	10.98 (1.28)	72.30 (7.82)
80,001-150,000	15 (7.0)	10.73 (1.27)	73.60 (12.09)
>150,000	22 (10.2)	11.05 (1.46)	72.18 (8.02)
<b>Channel to gain knowledge</b>			
School / Books	36 (16.7)	10.61 (1.62)	72.27 (8.37)
Parents	26 (12.1)	10.38 (1.50)	71.23 (7.57)
Social Media/ Youtube	142 (66.0)	10.71 (1.30)	70.72 (9.54)
Own Sickness Experiences	11 (5.1)	10.63 (1.56)	72.18 (5.74)
<b>Congenital Disease</b>			
Don't Have	178 (82.8)	10.67 (1.40)	71.66 (9.00)
Have	37 (17.2)	10.62 (1.34)	68.54 (8.34)
<b>Total</b>	<b>215 (100)</b>	<b>10.65 (1.39)</b>	<b>71.12 (8.95)</b>

There were no statistically significant factors that could predict hygiene practice among participants. (Table 2)

Table 2 Predictive factors for hygiene practice of participants (n=215)

Variants	B	S.E.	Beta	t	Sig.	Confidence Interval	
						L	U
Gender	-0.049	1.429	-0.002	-0.034	0.973	-2.866	2.768
Grade	1.358	0.791	0.127	1.717	0.088	-0.202	2.918
Studied Program	-1.456	0.810	-0.127	-1.797	0.074	-3.054	0.141
Parents' Occupation	-0.536	0.419	-0.095	-1.279	0.202	-1.361	0.290
Family Income	0.345	0.551	0.048	0.626	0.532	-0.741	1.431
Channel to gain knowledge	-0.638	0.664	-0.067	-0.961	0.338	-1.947	0.671
Congenital Disease	-3.482	1.615	-0.147	-2.156	0.032	-6.666	-0.298
Hygiene Knowledge and Infectious Prevention	0.021	0.439	0.003	0.048	0.962	-0.845	0.887



## Discussion

From a total of 215 participants, 76.7% of participants were females. Majority of participants studied in grade 12 (n=85, 39.5%) and most participants were studying in the Math-Science program (n=165, 76.7%). Majority of participants' parents worked as Freelance (m=69, 32.1%). The monthly household income group had the highest scored was 20,000-40,000 Baht (n=72, 33.5%). Most participants reported that they obtained news and knowledge regarding hygiene and infectious prevention from social media and Youtube (n=142, 66.0%). 82.8% (n=178). Most participants indicated that they didn't have any congenital disease and got a moderate level of Hygiene and Infectious Prevention Knowledge (M=10.65) while hygiene practice was at a good level (M=71.12, SD=8.95). There were no predictive factors for hygiene practice among participants. Female participants revealed a higher knowledge score and behaviour score regarding hygiene, this result is similar to Regina Ferreira Alves<sup>6</sup>. Grade 11 students showed the highest hygiene knowledge, while grade 10 reported the highest score in engaging in hygiene behaviour. This may be because grade 10 students listened and followed what they had been instructed strictly than participants from other classes. This result was in line with Rarinda Dejsuwannachai 's<sup>7</sup>. Participants who studied in the Math-Science program showed the highest hygiene knowledge score, this result was consistent with Arpatatavee Luenarm's<sup>8</sup>. while Art-Math reported the most engaging hygiene behaviours than other groups. Participants whose parents worked as an employee revealed the highest hygiene knowledge score, similar to Wattana Thamajarusilp's<sup>9</sup>. This could be attributed to organisations that their parents worked for were very strict about hygiene and infectious prevention that required organisational members to follow which affected their family members. This finding was different from Arpatatavee Luenarm's that conducted a study and assessed level of COVID-19 prevention knowledge among high school students in 2021. Arpatatavee Luenarm's found that participants whose parents worked in health science field had the highest knowledge score<sup>8</sup>. and in line with Aun Sakulsantiporn<sup>10</sup>. Participants who received the highest hygiene knowledge score learned from social media or online channels because most teenagers these days own a smartphone and could access internet or social media conveniently, therefore they could obtain information provided to online channels easily. While participants who reported the most engaging hygiene practice were the group that received hygiene knowledge from school, this may be because their school had authority to both instruct and reinforce their students on how to behave properly.

## Conclusion

A total of 215 participants, 76.7% of participants were females. Majority of participants studied in grade 12 (n=85, 39.5%) and most participants were studying in the Math-Science program (n=165, 76.7%). Majority of participants' parents worked as Freelancer (m=69, 32.1%). The group that got the highest score is monthly household income between 20,000-40,000 Baht (n=72, 33.5%). Most participants reported that they received news and knowledge regarding hygiene and infectious prevention from social media and Youtube (n=142, 66.0%). 82.8% (n=178). Participants indicated that they didn't have congenital disease. Most participants showed a moderate level of Hygiene and Infectious Prevention Knowledge (M=10.65), Gender (Beta=-0.002, p<0.001), Class level (Beta=0.127, p>0.01) and hygiene and infectious prevention knowledge (Beta=0.003, p>0.001), predicted hygiene behavior adoption. There were no statistically significant factors that could predict hygiene practice of participants.

## References

- 1 Sarutanon Chobpradit. How the COVID-19 crisis has affected social change. Journal of Chaiyaphum Review [internet]. 2520 [Accessed May 7, 2022]. Available from : <https://so02.tci-thaijo.org/index.php/jcr/citationstylelanguage/get/chicago-author-date?submissionId=246255&publicationId=24983>
- 2 Division of Physical Activity for Health from Ministry of Public Health and Non-Communicable Diseases Division from Department of Disease Control [Internet]. 2021 [Accessed May 7, 2022]. Available from : [https://media.thaigov.go.th/uploads/public\\_img/source/230265.pdf](https://media.thaigov.go.th/uploads/public_img/source/230265.pdf)
- 3 Bangkok Business. 'Study online' with 7 health problems that Thai children have to face. How to solve it [internet]. 2521 [Accessed May 7, 2022]. Available from : <https://www.bangkokbiznews.com/social/957001>

- 4 Auttakiat Karnjanapiboonwong. The effects of COVID-19 outbreak with control measures to non-communicable disease risk behavior among Thai people during April 2020. Division of Non Communicable Diseases, Department of Disease Control [Internet]. 2020 [Accessed May 7, 2022]. ;2020:551-564. Available from : <https://he01.tci-thaijo.org/index.php/DCJ/%20article/view/243900/167119>
- 5 Phitsiree-Phengmeesri. . Knowledge, understanding. attitude. and preventive behavior toward COVID-19: A study among high school students in Loei Pittayakom, Thailand. International Journal of Medical Science and Public Health [Internet]. 2021 [Accessed May 7, 2022] ;2021:255-261. Available from [https://www.ijmsph.com/fulltext/67-162806587\\_7.pdf?1653490002](https://www.ijmsph.com/fulltext/67-162806587_7.pdf?1653490002)
- 6 Regina Ferreira Alves, Knowledge. attitudes and preventive behaviours toward COVID-19: a study among higher education students in Portugal, The current issue and full text archive of this journal is available on Emerald Insight [Internet]. 2020 [Accessed May 7, 2022]. ;2020 :35:4 Available from <https://www.emerald.com/insight/publication/issn/2586-3932>
- 7 Rinrada Deshsuwanachai. Knowledge, Attitude and Preventive Behaviour toward COVID-19 among grades 10-12 students in Bangkok. INSTITUTE FOR URBAN DISEASE CONTROL AND PREVENTION JOURNAL [Internet]. 2022 [Accessed May 7, 2022]. ;2022:6:2 Available from [http://www.journalsarchive.com/FILES/IJMSPH/20\\_Knowledge,%20attitude,%20and%20preventive%20behavior%20toward%20COVID-19%20of%20high%20school%20students%20in%20Bangkok,%20Thailand.pdf](http://www.journalsarchive.com/FILES/IJMSPH/20_Knowledge,%20attitude,%20and%20preventive%20behavior%20toward%20COVID-19%20of%20high%20school%20students%20in%20Bangkok,%20Thailand.pdf)
- 8 Arpatravee Luenarm. Willingness to vaccinate against coronavirus disease-19 of high school students International Journal of Medical Science and Public Health [Internet]. 2021 [Accessed May 7, 2022]. ;2021:10:2 Available from <http://www.ijmsph.com/?mno=88643>
- 9 Wattana Thamajarusilp. Willingness to vaccinate against COVID-19 of Adolescents in Thailand: A cross sectional study, International Journal of Medical Science and Current Research (IJMSCR) [Internet]. 2014 [Accessed May 7, 2022]. ;2014: 250-258 Available from <https://zenodo.org/record/6920348>
- 10 Aun Sakulsantiporn. Attitude to vaccinate against coronavirus disease 2019 of high school students in chonburi province. Thailand: A study of grade 10–12 students of princess chulabhorn science school, International Journal of Medical Science and Public Health [Internet]. 2021 [Accessed May 7, 2022]. ;2021:10:2 Available from <http://www.ijmsph.com/?mno=91574>