

A Cross Sectional Online Survey: Knowledge and Hygiene Practice and Pathogen Spreading Prevention among High School students in Bangkok.

Pinyada Vesuwan¹, Umphawan Sangiemrak², Kronchanok Duangboonchuay³, Nunticha Praphanturakit⁴, Kantapatra Kraiarb⁵, Witchayaporn Chianmaroeng⁶, Yanisa Namwat⁷

¹Yothinburana School, ²Triamudomsuksa School, ³Satriwithaya School, ⁴Samsenwittayalai School, ⁵Samsenwittayalai School, ⁶Assumption Convent School, ⁷Kwongchow School

Bangkok, Thailand

Corresponding author's email address: Pinyada0308@gmail.com

Abstract

Background: From the COVID-19 pandemic, there were millions of people who passed away, an unidentified number of people who had been infected had to live their lives with a post COVID-19 syndrome. Keeping hygiene practice continuously could prevent infectious disease. **Objective:** To assess hygiene knowledge and pathogen spreading prevention practice and to study factors that affect Hygiene and Pathogen spreading prevention practice. **Methods:** This study is predictive correlation research to study the factors that affecting hygiene behavior and pathogen spreading prevention. **Results:** 478 samples in this study, 84.3% of respondents were female. Majority of respondents studied in Grade 12 (n=256, 53.6%) and most respondents studied in the Math-Science program (n=334, 69.9%). Majority of respondents' parents worked as an employee (m=209, 43.7%). The biggest monthly household income group was 40,001-80,000 Baht (n=138, 28.9%). Most respondents reported that they were informed news and knowledge regarding hygiene and pathogen spreading prevention from social media and Youtube (n=328, 68.6%). 77.4% (n=370) of respondents indicated that they didn't have congenital disease. Most respondents showed a moderate level of Hygiene and Pathogen Spreading Prevention Knowledge (M=10.92) and level of hygiene practice was at a good level (M=66.05, SD=7.81). Gender (Beta=0.147, p<0.001), Class level (Beta=0.093, p>0.01) and hygiene and pathogen spreading prevention knowledge (Beta=0.157, p>0.001) predicted hygiene behavior adoption. **Conclusion:** Most respondents showed a moderate level of Hygiene and pathogen spreading prevention knowledge (M=10.92) and level of hygiene practice was at a good level (M=66.05, SD=7.81). Gender (Beta=0.147, p<0.001), Class level (Beta=0.093, p>0.01) and hygiene and pathogen spreading prevention knowledge (Beta=0.157, p>0.001) predicted hygiene behavior adoption.

Keyword: hygiene knowledge, hygiene practice, pathogen spreading prevention

Introduction

The Covid-19 epidemic from December 2019 until now led to almost 525 million infected people and 6.28 million people around the world were dead. Thailand has a high number of infected people reaching 23,413 people per day on 13 August 2021¹. Moreover, the report said that the first infected person, a tourist from China, was found on 12 January 2020. The first infected person in Thailand was found on 31 January 2020. The report said that he did not go abroad but worked as a taxi driver in Thailand usually. (Newly Emerging Contagious Disease, Communicable Disease Academic Development Section, 2021) COVID-19 is a contagious disease caused by the Corona Virus. The disease can be spread from person to person through the respiratory system, such as through droplets of mucus from the nose or saliva from the mouth. But these droplets don't go very far because of their weight, so they tend to fall on objects or surfaces and when those objects or surfaces are touched without cleaning the contact organs, then bring it to the eyes, nose or mouth. (World Health Organization, 2021) This is a non-strict hygiene behavior that causes infection and spreads pathogen vastly. Hygiene is a concept related to cleanliness, health, and practices that aid in healing. (Health and prevention of the spread of pathogen (Holland, 2018) The term hygiene is often confused with cleanliness. Hygiene focuses on preventing the spread of pathogen, such as washing hands, etc. Personal hygiene is important in today's society as keeping the body

clean helps to inhibit the growth of bacteria and reduce the spread of pathogens that may cause illness. In addition, Hygiene at home and in daily involves in practices that prevent or reduce the spread in the home. Thus, if there is bad home hygiene, disorganized congestion or lack of ventilation, it may affect the spread or accumulation of pathogen which directly effect on health. Health literacy refers to knowledge, motivation, and the ability to assess, analyze and apply the information obtained which is another important factor in the epidemic situation of COVID-19. Due to the current situation, it is imperative that health knowledge should be taken into consideration and decision-making in daily life, maintain your health from COVID-19². From environmental studies research and operations of slum in Bangkok during the COVID-19 epidemic, the results revealed that slum areas are the riskiest because the patterns of living and behaviors risk affected the health and hygiene. Although the government has measurements to prevent the disease, its effect on economic, passive income and expenses of people in slums make adults go to work normally so it may cause the spread of disease. (Environmental Bureau, Department of Health, 2020) The example of urban population in Bangkok such as in Pathumwan, Huai Kwang, Din Daeng, Bang Khen and Chatuchak has been found out that the factors which are riskier than other areas is because of full of too much people, bad ventilation. (Prachachat, 2021) From the Nattawan Kamsaen research that focus on knowledge, attitudes and behaviors to prevent COVID-19 of people in U-Thong District, Suphan Buri Province. According to the correlation analysis results, it was found that education level, knowledge and attitudes about COVID-19 infection was a positive correlation with self-protection behaviors from COVID-19 infection. The statistically significant at the 0.05 level has shown that people with good education will have knowledge of COVID-19 infection at a high-level and also a positive attitude towards COVID-19. There will be more behaviors to protect themselves from the infection³. From the COVID-19 situation, controlling epidemic is important to take action at all levels to stop the spread of COVID-19 and prevent epidemics that may emerge or recurrence that may occur in the future. Good hygiene is a significant basis for disease prevention and the spread of pathogen. This research aims to study the knowledge of hygiene, attitudes and hygiene behaviors after the COVID-19 outbreak, among high school students in Bangkok because the school is one of the crowded places. From the study of⁴. Concerning knowledge, attitudes and behaviors of preventing the spread of pathogen of high school students in Nakhon Pathom province, it was found that the students had knowledge and understanding about the prevention of the spread of pathogen and behaviors to prevent the spread of pathogen in the middle and low levels, if there is an outbreak again, it may spread easily especially if the lack of knowledge of hygiene and the proper practice of sanitary behavior.

Purpose of the research

1. To assess hygiene knowledge and pathogen spreading prevention
2. To study factors that affect hygiene and pathogen spreading prevention practice

Study Methods

This study is Predictive Correlation Research to study the factors that affecting hygiene behavior and preventing the spread of pathogen.

Sampling

The sample group consisted of students in Grade 10-12 in the Bangkok metropolitan area who can access internet, being a social media member. The selection criteria are as follows: 1. Willingness to cooperate in research 2. Willingness to participate in the research project of the total population of unknown numbers calculated by the formula of Yamane (Taro Yamane) [], the level of error was set at the significant level of 0.05. A total of 400 samples 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, pathogenetic cycle, Infection cycle, epidemic, infectious prevention and control 2. Create a questionnaire based on research conceptual framework and research objectives consisted of 3 parts as following:

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 prevention of the spread of pathogen 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 the spread of pathogen. A high score means a high level of comprehension. A low score means a low level of comprehension.

3) The level of hygiene behavior and prevention of spreading pathogen, 15 items, question types were scaled from 1-5. The high score indicates a high level of willingness. A low score indicates a low level of willingness.

Interpretation

Interpretation of the scores on hygiene behavior and spreading disease prevention 5 levels are: Mean 1.00-2.00 Low level means that the sample has low level of hygiene and disease prevention behaviors.

Mean 2.01-3.00 Moderate level means that the sample has hygiene behavior and disease spread prevention at the middle level.

Mean 3.01-4.00 High Level means that the sample group had high level of hygiene and disease prevention behaviors.

Mean 4.01-5.00 Very High Level means that the sample has a very high level of hygiene and disease prevention behaviors.

Quality inspection of research instruments in this research, the researcher examined the content validity and confidence values (Reliability) by bringing the created questionnaire and propose to 3 experts to check the suitability and accuracy of the 23 questions and the content used in the questionnaire by using Predictive Validity (Reliability). The researcher used a created questionnaire and modified according to the advice of experts and find the confidence value by using the Cronbach' Alpha Coefficient formula which information on factors affecting willingness to donate blood. The confidence values were 0.8 and 0.9.

Data Collection

The researcher created a questionnaire in by Online form in Google and sent inquiries to GRADE h10-12 students via online channels school social group which all students can access to those groups thoroughly.

Data Analysis

1. Using descriptive statistics such as frequency distribution, %age, mean and standard deviation to analyze personal data knowledge of hygiene and preventing the spread of pathogen.

2. Using Multi Regression Analysis to analyze factors affecting hygiene behaviors and prevention of spreading pathogen.

Results

From the study of knowledge and behaviors related to hygiene and prevention of spreading pathogen of the students in grade 10-12 in Bangkok, it was found that there was a total of 478 respondents. Most of the respondents were 403 females, representing 84.3%, and 75 males, representing 15.7%. Most of them are studying at grade 12, 256 students, representing 53.6%, followed by 151 students studying in grade 10, representing 31.6%, and 71 students studying in grade 11, representing 14.9%. Most of the respondents are studying the Math-Science program, 334 students, representing 69.9%, followed by 62 students are studying Art-Math Program, representing 13%, and 82 students are studying other programs, representing 17.2%. Most of the occupations of the respondents' parents were company employees / civil servants / employees ,209 people, representing 43.7%, followed by business owners, 127 people, representing 26.6%, and contractors / freelancers, 59 people, representing 12.3%, parents who worked in Medical Science 31 people, representing 6.5% and other occupations 52 people, representing 10.9 %. The family income per month was divided into 5 groups, consisting of the amount of income; less than 20,000 Baht, 42 people, representing 8.8%, between 20,000-40,000 Baht, 127 people, representing 26.6%, between 40,001-80,000 Baht, 138 people, representing 28.9 %, between 80,001-150,000 Baht, 102 people, representing 21.3%, and more than 150,000 Baht, 69 people, representing 14.4%. The channel to get knowledge about hygiene and prevention of the spreading pathogen, mostly through social media/YouTube, 328 people, representing 68.6%, knowledge from school and book 72 people, representing 15.1%, knowledge from parents 61 people, representing 13.8 %, and personal sickness 77 people, representing 3.6%. For congenital disease, 370 people, representing 77.4%, had no congenital disease, and 108 people, representing 22.6 %, had congenital disease. Most of the respondents had a moderate score on hygiene and pathogen spreading prevention (M=10.92, SD=1.33), female respondents (M=10.98, SD=1.29) getting an average score higher than males (M=10.61, SD=1.51), Grade 12 respondents had the highest scores on hygiene and infectious prevention (M=10.96, SD=1.34), followed by Grade 11 (M=10.89, SD=1.38) and Grade 10 (M=10.87, SD=1.30), respectively. The respondents who are studying in Math-Science had the highest knowledge scores (M=10.95, SD=1.35), followed by the respondents who are studying other studied plans (M=10.90, SD=1.16) and the Art-Math (M=10.81, SD=1.45) respectively. The respondents of parents who work in medical science had the highest score of knowledge (M=11.03, SD=1.43), followed by parents who worked as company employees/employees (M=10.99, SD=1.35) business owners. (M=10.96, SD=1.22), other occupations (M=10.81, SD=1.45) and freelancers (M=10.66, SD=1.33) respectively. The group of monthly family income between 80,001-150,000 Baht had the highest score (M=11.04, SD=1.37) followed by the monthly family income group between 40,001-80,000 Baht (M=10.99, SD=1.42), those with monthly income greater than 150,000 Baht (M=10.88, SD=1.29), those with 20,001-40,000 Baht (M=10.86, SD=1.26) and those with the less family income than 20,000 Baht monthly (M=10.67, SD=1.24). The channels for receiving information about hygiene and pathogen spreading prevention, it was found that the group of respondents with the highest knowledge score is the group who received information from their own illness experience (M=11.06, SD=1.56), followed by the group received information from social media (M=11.02, SD=1.31), received information from school/book. (M=10.74, SD=1.29) and from parents (M=10.56, SD=1.37). The one who had congenital disease had the higher score on hygiene and pathogen spreading prevention (M=11.03, SD=1.23) than those without any diseases (M=10.89, SD=1.36). Most of the respondents had their hygiene behaviors and pathogen spreading prevention were at a good level (M=66.05, SD=7.81), female respondents (M=66.62, SD=7.57) had a higher behavioral score than males (M=62.97, SD=8.38). The respondents at the Grade 12 had the highest behavior scores, followed by the students in Grade 10 (M=65.62, SD=8.04) and Grade 11 (M=64.52, SD=8.73). The respondents who are studying the Math-Science program had the highest score on hygiene behaviors pathogen spreading prevention (M=66.84, SD=7.49), other programs (M=64.76, SD=8.85) and Art-Math programs (M=63.48, SD=7.40). The respondents whose parents worked in medical science received the highest score on hygiene behaviors and pathogen spreading prevention (M=69.52, SD=7.78). The following behavioral is the company employees and employees (M=66.12, SD=7.20), followed by business owners (M=66.02, SD=7.30), the other occupations (M=65.73, SD=10.25), and freelancers (M=64.27, SD=8.16). The scores on hygiene behavior and pathogen spreading prevention of family income per month between 80,001-150,000 Baht received the highest score (M=66.75, SD=6.96), family income per month greater than 150,000 Baht (M=66.50, SD=9.50). The group of family income monthly between 20,000-40,000 Baht (M=65.47, SD=7.25), family income monthly between 40,001-80,000 Baht (M=66.40, SD=7.63) and family

income less than 20,000 Baht ($M=64.14$, $SD=8.80$). The respondents who were informed news and knowledge from school had the highest score of hygiene behaviors and pathogen spreading prevention ($M=69.41$, $SD=7.00$), followed by their parents ($M=66.39$, $SD=8.21$), from social media ($M=65.31$, $SD=7.31$) and from their illness experiences ($M=64.70$, $SD=13.83$). The respondents without any diseases ($M=66.21$, $SD=7.71$) had higher scores on hygiene behavior and infectious prevention than the respondents with congenital disease ($M=65.47$, $SD=8.14$).

Table1 Demographic characteristics of the respondents, knowledge and behavior, hygiene and pathogen spreading prevention scores. (n=478)

Variants	Frequency n (%)	Hygiene and Pathogen Spreading Prevention knowledge (1-15) M (SD)	Hygiene and Pathogen Spreading Prevention behaviors (15-75) M (SD)
Gender			
Male	75 (15.7)	10.61 (1.51)	62.97 (8.38)
Female	403 (84.3)	10.98 (1.29)	66.62 (7.57)
Grade			
Grade 10	151 (31.6)	10.87 (1.30)	65.62 (8.04)
Grade 11	71 (14.9)	10.89 (1.38)	64.52 (8.73)
Grade12	256 (53.6)	10.96 (1.34)	66.72 (7.34)
Studied Program			
Math-Science	334 (69.9)	10.95 (1.35)	66.84 (7.49)

Art-Math	62 (13.0)	10.81 (1.45)	63.48 (7.40)
Others	82 (17.2)	10.90 (1.16)	64.76 (8.85)
Parents' Occupation			
Medical Science	31 (6.5)	11.03 (1.43)	69.52 (7.78)
Company Employees Employees Civil servant	209 (43.7)	10.99 (1.35)	66.12 (7.20)
Business Owners	127 (26.6)	10.96 (1.22)	66.02 (7.30)
Freelancers	59 (12.3)	10.66 (1.33)	64.27 (8.16)
Others	52 (10.9)	10.81 (1.45)	65.73 (10.25)
Family Income (Monthly)			
<20,000	42 (8.8)	10.67 (1.24)	64.14 (8.80)
20,000-40,000	127 (26.6)	10.86 (1.26)	65.47 (7.25)
40,001-80,000	138 (28.9)	10.99 (1.42)	66.40 (7.63)
80,001-150,000	102 (21.3)	11.04 (1.37)	66.75 (6.96)

>150,000	69 (14.4)	10.88 (1.29)	66.50 (9.50)
Knowledge Channel			
School / Books	72 (15.1)	10.74 (1.29)	69.41 (7.00)
Parents	61 (12.8)	10.56 (1.37)	66.39 (8.21)
Social Media/ Youtube	328 (68.6)	11.02 (1.31)	65.31 (7.31)
Sickness History	17 (3.6)	11.06 (1.56)	64.70 (13.83)
Congenital Disease			
Don't have	370 (77.4)	10.89 (1.36)	66.21 (7.71)
Have	108 (22.6)	11.03 (1.23)	65.47 (8.14)
Total	478 (100)	10.92 (1.33)	66.05 (7.81)

From the study of factors affecting hygiene behaviour, it was found that gender, class level, studied program, parent's occupation, family income, channels to gain knowledge about hygiene and pathogen spreading prevention, congenital diseases, and knowledge of hygiene and pathogen spreading prevention are all factors affecting hygiene behaviour and pathogen spreading prevention {Multiple R= .328, F=7.082, p <.001, df (8, 469)} were predicted by 10.8% (R² = 10.8). When considering the regression coefficient (Beta) from the data analysis of all 8 variables, it was found that knowledge of hygiene and pathogen spreading prevention was the most powerful factor predicting behaviour with statistical significance which is a positive result (Beta=.157). It was a statistically insignificant factor (Table 2).

Table 2 Factors that affecting hygiene behaviors and pathogen spreading prevention of respondents (n=478)

Variants	B	S.E.	Beta	t	Sig.	Confidence Interval	
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Gender	3.156	0.955	0.147	3.303	0.001	1.278	5.033
Grade	0.810	0.388	0.093	2.089	0.037	0.048	1.572
Studied Program	-1.076	0.458	-0.106	-2.347	0.019	-1.976	-0.175
Parents' Occupation	-0.097	0.233	-0.019	-0.417	0.677	-0.554	0.360
Family Income	0.238	0.244	0.044	0.973	0.331	-0.242	0.717
Knowledge Channel	-1.594	0.399	-0.176	-3.990	0.000	-2.378	-0.809
Congenital Disease	-1.153	0.824	-0.062	-1.399	0.163	-2.772	0.467
Hygiene and pathogen spreading prevention Knowledge	0.918	0.259	0.157	3.540	0.000	0.409	1.428

Discussion

From a total of 478 respondents, 84.3% of respondents were female. Majority of respondents are studying in grade 12 (n=256, 53.6%) and most respondents are studying in the Math-Science program (n=334, 69.9%). Majority of respondents' parents work as employees (m=209, 43.7%). The biggest monthly household income group was 40,001-80,000 Baht (n=138, 28.9%). Most respondents reported that they received news and knowledge regarding hygiene and pathogen spreading prevention from social media and Youtube (n=328, 68.6%). 77.4% (n=370) of respondents indicated that they didn't have congenital disease. Most respondents showed a moderate level of Hygiene and Pathogen Spreading Prevention Knowledge (M=10.92) and level of hygiene practice was at a good level (M=66.05, SD=7.81). Gender (Beta=0.147, p<0.001), Class level (Beta=0.093, p>0.01) and hygiene and pathogen spreading prevention knowledge (Beta=0.157, p>0.001) predicted hygiene behavior adoption. Knowledge of hygiene and pathogen spreading prevention of respondents was at a moderate level, this result is consistent with Napatsawan Reawreab's⁵. That conducted a study to assessed knowledge about COVID-19 among people in PangNag Province and found that respondents had a good level of knowledge regarding COVID-19 prevention. However; the result was inconsistent with Rinrada Dejsuwannachai's⁶ . which studied at high school in Bangkok about COVID-19 prevention knowledge and found that the sample group had a moderate score of the knowledge. This may be because the study period of the studies was different. Rarinda Dejsuwannachai conducted her study in the middle of 2021 when Thailand was experienced a huge number of COVID-19 infection, when people had a less awareness of pathogen spreading and prevention [Number of infectious patients, June 2021]. Concerning hygiene and pathogen spreading prevention practice was at a good level (M=66.05, SD=7.81). It could be attributed to respondents who had been through the COVID-19 pandemic from early 2020 until 2022, News and knowledge regarding hygiene and pathogen spreading and COVID-19 measures were implemented consistently for a few consecutive years which people could be unconsciously aware. [Behavior Research 2022] Female respondents showed a higher score regarding hygiene and pathogen spreading prevention knowledge (M=10.98, SD=1.29) than male respondents (M=66.62, SD=7.57). This could be because females pay attention to detail better than males⁷ . This study was in line with Rarinda Dejsuwannachai's⁶ . studied that female students had a higher score of both knowledge and COVID-19 prevention than male students. Regina Ferreira Alves⁸ . conducted a study to assess knowledge, attitude and COVID-19 preventive behavior among university students in Portugal and found that female students had a higher COVID-19 related knowledge and preventive behavior score than male students' and consistent with the study of Napatsawan Reawreab⁹ , and Tawan Petpaiboon⁵ . GRADE 12 students showed the highest score of both hygiene and pathogen spreading prevention knowledge (M=10.96, SD=1.34) and hygiene and pathogen prevention practice (M=66.72, SD=7.34). This could be attributed to the fact that current GRADE 12 students had been facing the COVID-19 pandemic situation since 2020, hence they had acquired knowledge and understanding about pathogen spreading prevention at a good level. The respondents who studied in the Math-Science program obtained the highest score of both hygiene and pathogen spreading prevention knowledge (M=10.95, SD=1.35) and hygiene and pathogen spreading prevention practice than male respondents (M=66.84, SD=7.49). This is because a lot of science subjects were offered in math and science curriculum, therefore the students who studied in this program had more science related knowledge than students who studied in other programs, this finding were in line with Supakan Vathanakitanond, Regina Ferreira Alves's study¹⁰ . and Rinrada Dejsuwannachai's¹¹ . The respondents whose parents worked in the health science field showed the highest score of both hygiene and pathogen spreading prevention knowledge (M=11.03, SD=1.43) and hygiene and pathogen spreading prevention practice than male respondents (M=69.51, SD=7.78). Those who work in the health science field have an in-depth knowledge and understanding regarding this matter, therefore their children have a high possibility to learn from their parents¹² . Considering the monthly household income group, 80,001-150,000 Baht group had the highest score of both hygiene and pathogen spreading prevention knowledge (M=11.04, SD=1.37) and hygiene and pathogen spreading prevention practice than male respondents (M=66.75, SD=6.96)⁶ . For channels in which respondents received news and knowledge about hygiene and pathogen spreading prevention, respondents who had a direct experience by themselves showed the highest knowledge score regarding hygiene and pathogen spreading prevention (M=11.06, SD=1.56). While respondents who received news and knowledge regarding hygiene and pathogen spreading prevention practice from their parents reported the highest hygiene and pathogen spreading prevention practice score (M=66.39, SD=8.21). This may be because parents can answer and explain all questions until fully understanding. The

respondents who reported having congenital disease had a higher knowledge score ($M=11.03$, $SD=1.23$) than those who had none. On the contrary, those who reported not having any congenital diseases showed a higher practice score ($M=66.21$, $SD=7.71$). This could attribute that the respondents without any diseases paid more attention to health and hygiene than the one who had congenital disease. For this reason, they are healthier. Gender ($Beta=0.147$, $p<0.001$), Class level ($Beta=0.093$, $p>0.01$) and hygiene and pathogen spreading prevention knowledge ($Beta=0.157$, $p>0.001$) predicted hygiene behaviour adoption of respondents.

Limitation

Because the focus of the population study is high school students, thus the level of knowledge test is basic for the population. As a result, the knowledge of the students may not be able to be measured relative to the actual standards.

Conclusion

A total of 478 respondents, 84.3% of respondents were females. Majority of respondents studied in Grade 12 ($n=256$, 53.6%) and most respondents studied in the Math-Science program ($n=334$, 69.9%). Majority of respondents' parents worked as an employee ($n=209$, 43.7%). The biggest monthly household income group was between 40,001-80,000 Baht ($n=138$, 28.9%). Most respondents reported that they received news and knowledge regarding hygiene and pathogen spreading prevention from social media and Youtube ($n=328$, 68.6%). 77.4% ($n=370$), the respondents indicated that they didn't have congenital disease. Most respondents showed a moderate level of Hygiene and Pathogen Spreading Prevention Knowledge ($M=10.92$) and level of hygiene practice was at a good level ($M=66.05$, $SD=7.81$). Gender ($Beta=0.147$, $p<0.001$), Class level ($Beta=0.093$, $p>0.01$) and hygiene and pathogen spreading prevention knowledge ($Beta=0.157$, $p>0.001$) predicted hygiene behaviour adoption.

Recommendation

Health education of Hygiene practice and pathogen spreading prevention should be provided to respondents to improve hygiene practice via online channels which respondents can usually access easily. However, to reinforce hygiene practice for this group of respondents. The results revealed that parents were the most influential person. Hence, parents should take this important part in developing their children's hygiene practice and pathogen spreading prevention.

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