

Willingness to be vaccinated against COVID-19 among High School Students in Sisaket Province, Thailand

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Abstract: Due to the Coronavirus pandemic in 2019 that is currently mutating and spreading worldwide: the societies, economies, environments and the public's mental health including the elderly, working people and youth are all severely affected as a result. After measures have been promulgated in order to control the spread of the COVID-19 virus impacting the public widely, the government needed to find a solution. One of the most competent ways to curb infection rate is vaccination roll-out, so the government is required to provide effective vaccines for their citizens. The goal of the study is to determine whether high school students in Thailand are willing to be vaccinated against COVID-19, as well as to assess their degree of awareness and risk perception of becoming infected with COVID-19. It was predicted that their risk perception would influence their opinions towards COVID-19 vaccination. For this research, 329 high school students in grade 10-12 at Satreesiriket school in Sisaket Province, Thailand participated during 16 June to 7 July 2021. The students' questionnaire included their level of awareness; risk perception; and willingness to be vaccinated against COVID-19. Descriptive statistics and multiple regression analysis were used to interpret the data. The findings revealed that respondents had good knowledge related to COVID-19 (M=13.25, SD=1.66), low awareness of COVID-19 information (M=1.92, SD=0.94), low perceived risk (M=1.98, SD=1.22), and moderate readiness to vaccinate against COVID-19 (M=3.40, SD=1.59). According to the Pearson's correlation analysis that was statistically significant, knowledge of COVID-19 was positively connected with satisfaction with COVID-19 vaccination ($r=.255^{**}, p=0.01$) with ($r=.255^{**}, p=0.01$). The respondents' willingness to be vaccinated against COVID-19 was predicted by their knowledge of the virus (Beta=.214, $p<0.01$).

Keywords: Corona viruses disease 2019, Willingness to be vaccinated against COVID-19, Reluctance to be vaccinated against COVID-19.

1. INTRODUCTION

Background and importance of the issue

Coronavirus belongs to a large family of viruses causing respiratory diseases. Illness ranges from a mild cold to severe COVID-19 diseases due to coronaviruses such as Middle East Respiratory Syndrome (MERS) and Severe Acute Respiratory Syndrome (SARS) [1].

At the end of 2019, coronavirus started to spread from a wild animal market or fresh fish market in the city of Wuhan, Hebei Province, China. Up until today, the virus has spread and reached almost every corner of the world.

On 3 January 2019, a female tourist travelled from Wuhan to Suvarnabhumi Airport; on 12 January 2019 she had symptoms of a fever and sore throat and consequently admitted to Bamrasnaradura Infectious Diseases Institute where she was tested positive for Coronavirus [2]. By August 2021, the number of people infected had reached over 1 million which included the first key cluster back in 2020 from Lumpinee Boxing Stadium and an underground casino in eastern Thailand region shattering both the society and economy gravely. Since then, the virus widen to all major tourist destinations in Thailand and at the beginning of 2021 nightclubs and lounges became a new cluster for the new Alpha Variant (formerly the UK Variant). The location coupled with a much faster infection rate led to many upper class people being affected which included but not limited to many well-known celebrities, politicians, and leading businessmen [3].

Currently, the most threatening variant yet deemed by the World Health Organisation (WHO) is the Delta Variant, which was first discovered in India and as it is more efficient at penetrating human cells, it spreads more easily and is more transmissible. Furthermore, the New Delta Variant (Delta Plus) copes better with vaccines, is much more infectious than the Alpha Variant and has spread to over 80 countries already [4]. The Delta Variant is more effective at transmitting the virus compared to all existing variants where the latter is able to infect 2 people at a time while the former's infection rate is at 4. Some experts have stated that the Delta Variant is also more transmittable to the unvaccinated population [5]. On 17 August 2021, Anucha Burapachaisri, the government spokesperson explained to the reporter's queries at the end of a cabinet session the reasons the government decided to order 12 more million doses of Sinovac vaccine backed up by other research and existing data. This also coincided with the WHO's approval of cross-vaccination between the first and second dose. Although the 2 doses of Sinovac vaccines is found to be less effective than 2 doses of Astrazeneca vaccines in Thailand, an important discovery was made based on a cross-vaccination strategy. People who received Sinovac vaccine as their first dose and Astrazeneca vaccine as their second dose had 4 times the immunity level against Covid-19 compared to those with 2 doses of Sinovac vaccines. As a result, cross-vaccination was initiated in Thailand for unvaccinated people to help protect the population against most Covid-19 variants including but partly against the Delta Variant [6].

Although the government has previously promoted a vaccination programme, there are people who stated their wishes to be vaccinated while others still have doubts with the vaccines provided by the government. This was partly due to a conflicting array of state news, social media and other news platforms reporting on vaccines and its impacts leading to fears and uncertainties among some groups of the population hesitant about vaccination.

From this current situation, this research aims to study the willingness of high school students grade 10-12 where at the time of the research were not included in the national vaccination programme [7]. This research will determine the knowledge regarding Covid-19, level of awareness in terms of news and information on COVID-19 as well as risk perception of COVID-19, which is the key factor leading to their willingness to be vaccinated.

2. METHODOLOGY

This study is a descriptive research of high school students in grade 10-12 at Satreesiriket school in Sisaket Province during June to July 2021. The sample in the research was taken from the total of 1,679 high school students in grade 10-12 at Satreesiriket school [8] where 329 students opted to participate and the sample size was determined by the Taro Yamane's formula [9]

Research Apparatus

The research apparatus adopted for this research was a questionnaire designed based on existing theory and research and approved by 3 infection control and prevention experts. Of which, the section used to determine the student's knowledge on COVID-19; level of awareness of COVID-19; risk perception of COVID-19; and willingness to be vaccinated against COVID-19 has a Cronbach's alphas equal to 0.80, 1.0, 1.0 and 1.0 respectively. The questionnaire used to conduct research consisted of 5 parts as follow:

Part 1: Personal details section with 5 multiple choices (including gender, grade at school and parent's occupation)

Part 2: To test knowledge on COVID-19 (basic knowledge of COVID-19; transmission method; variants; symptoms; and vaccines). It was divided into 15 questions where a correct answer and an incorrect answer received 1 and 0 points accordingly. The total scores were added up and used to determine the student's understanding of COVID-19 where 80% and over meant a good knowledge and understanding; 60-79% showed moderate knowledge and understanding and less than 60% indicated limited knowledge and understanding of COVID-19.

Part 3: To determine level of awareness of news and information regarding COVID-19 which consisted of 5 multiple choice questions. The total scores indicated various attitudes and perspectives on COVID-19 where over 80% pointed to a high level of awareness; 60-79% indicated a moderate level of awareness while scores less than 60% showed a low level of awareness.

Part 4: To investigate risk perception towards COVID-19 consisting of 4 questions with response options on a scale of 5 ranging from highest risk; high risk; medium risk; low risk; and lowest risk. The scores were added to reflect the level of risk perception with over 80%; 60-69%; and lower than 60% showed a high level; moderate and low level of risk perception respectively.

Part 5: To assess willingness to be vaccinated against COVID-19 where one response was allowed among 5 options: strongly willing; willing; moderately willing; unwilling; and strongly unwilling. The standard response dictated that 5 represented most willing to be vaccinated, at over 90%. 4 represented strongly willing to be vaccinated, at 70-89%. 3 was equivalent to moderately willing to be vaccinated, at 50-69%. 2 indicated a low level of willingness to be vaccinated, at 30-49% and 1 showed a very low level of willingness to be vaccinated, less than 30%.

Data Analysis

1. Employing descriptive statistics ranging from frequency; percentage; average; and standard deviation to analyse general data; knowledge of COVID-19; level of awareness of COVID-19; and risk perception of COVID-19,
2. Analyse factors contributing to preventive behaviour against occurrence of drug resistant infections using inferential statistics namely Pearson's correlation and generalized linear model (GLM).

Protection of participant's confidentiality

This research collected details and responses from senior high-school students at Satreesiriket school anonymously through Google Form sent to the students at the school. Before participating, they were informed of the research objectives, data analysis, data collection, data storage process as well as potential benefits from completing the study. They had to accept the terms and were willing to provide these details and responses to the researchers. If at any point, they choose to opt out, they were able to do so and their details would be kept confidential.

3. RESULTS

The research aimed to study the willingness of senior high school students at Satreesiriket school where a total of 329 students took part. The majority were female (n=199,60.49%) in the order of grade 12 (n=155,47.11%); and grade 10 (n=100,30.4%) respectively. The participant's parents mostly work in agriculture (n=94,28.6%) followed by private business (n=74,22.5%).

Through the study, it was discovered that the participants had a good level of knowledge about COVID-19 scoring on average 13.25 (SD=1.66) where females scored a slightly higher average of 13.27(SD=1.58) in contrast to males at 13.23(SD=1.78).

Grade 11 students scored the highest in the level of knowledge about COVID-19 with an average of 13.66 (SD=1.27) followed by grade 10 students that showed an average of 13.58 (SD=1.47). Students whose parents worked in agriculture scored the highest in knowledge about COVID-19 with an average of 13.55 (SD=1.40). Next were students who owned private businesses where they showed a level of understanding and knowledge of COVID-19 at an average of 13.34 (SD=1.47).

In terms of the level of awareness regarding COVID-19, the participants' levels were found to be low (M=1.92, SD=0.94) where female students had a higher level of awareness when compared to male students (M=2.06,SD=1.19). A group with the highest level of awareness was grade 10 students (M=1.97, SD=0.81) followed by grade 11 students (M=1.93, SD=0.75). Students whose parents were freelancers or owned private businesses showed the highest level of awareness of COVID-19 (M=2.15, SD=1.10) followed by students whose parents worked in public health or education (M=2.00, SD=0.83).

In regards to risk perception of COVID-19, the participants revealed a low level of perception (M=1.98, SD=1.22) where female students showed a higher level of risk perception toward COVID-19 than male students (M=2.06,SD=1.19). Grade 12 students expressed the highest risk perception towards COVID-19 (M=2.23, SD=1.18) and grade 11 students came after (M=1.95, SD=1.41). Student's parents with occupation in public health or education exhibited the highest level of risk perception (M= 2.40,SD=1.35) with student's parents with private owned business or as freelancers in second (M=2.12, SD=1.20).

Regarding the participant's willingness to be vaccinated, it was discovered that they were moderately willing to be vaccinated (M=3.40, SD=1.59) with female students expressing more willingness for vaccines than male students (M=3.45, SD=1.56). Grade 11 students were most willing to be vaccinated (M=4.22, SD=1.29) followed by grade 10 students (M=3.36,SD=1.52). Students whose parents were freelancers or owned private businesses were most willing to be vaccinated (M=3.66,SD=1.54) followed by students whose parents work in public health or education (M=3.60, SD=1.57).

Table 1: Demographic factors; scores on knowledge regarding COVID-19; level of COVID-19 news and information awareness; risk perception of getting COVID-19; and willingness to be vaccinated against COVID-19.

Demographic factors	Number (%)	Knowledge of COVID-19 (range 0-15) M (SD)	Level of awareness of COVID-19 (range 0-5) M (SD)	Risk perception of COVID-19 (range 0-5) M (SD)	Willingness to be vaccinated against COVID-19 (range 1-5) M (SD)
Gender		13.25 (1.66)	1.92(0.94)	1.98(1.22)	3.40(1.59)
Male	130 (39.5)	13.23 (1.78)	1.78 (0.87)	1.87 (1.25)	3.32 (1.62)
Female	199 (60.5)	13.27 (1.58)	2.02 (0.97)	2.06 (1.19)	3.45 (1.56)
Grade at school					
Grade 10	100 (30.4)	13.58 (1.47)	1.97 (0.81)	1.63 (1.03)	3.63 (1.52)
Grade 11	74 (22.5)	13.66 (1.27)	1.93 (0.75)	1.95 (1.41)	4.22 (1.29)
Grade 12	155 (47.1)	12.85 (1.83)	1.88 (1.09)	2.23 (1.18)	2.86 (1.56)
Occupation of student's parents					
Medical personnel / teacher/ professor	53 (16.1)	13.26 (1.68)	2.00 (0.83)	2.40 (1.35)	3.60 (1.57)
Civil servant / state enterprise employee	49 (14.9)	12.71 (2.02)	1.61 (0.81)	2.12 (1.20)	3.47 (1.61)
Owned private business	74 (22.5)	13.15 (1.76)	1.85 (0.96)	1.58 (0.95)	3.38 (1.43)
Agriculturist	94 (28.6)	13.55 (1.40)	1.95 (0.90)	1.95 (1.23)	3.10 (1.70)
General employee / freelancers / other	59 (17.9)	13.34 (1.47)	2.15 (1.10)	2.05 (1.27)	3.66 (1.54)
Total	329 (100)	13.25 (1.66)	1.92 (0.94)	1.98 (1.22)	3.40 (1.59)

From the analysis of Pearson's correlation, it was found that the knowledge related to COVID-19 had a positive correlation with the willingness of receiving vaccines against COVID-19 ($r=.255^{**}$, $p=0.01$) which is statistically significant.

Table 2: Pearson's correlation coefficient between variables

Variables	Knowledge of COVID-19	Level of awareness of COVID-19	Risk perception of COVID-19	Willingness to be vaccinated against COVID-19
Knowledge of COVID-19	1			
Level of awareness of COVID-19	0.001	1		
Risk perception of COVID-19	-.113*	-0.033	1	
Willingness to be vaccinated against COVID-19	.255**	0.05	-0.096	1
**Correlation is significant at 0.01				
*Correlation is significant at 0.05				

From the analysis of the generalized linear model (GLM), it was discovered that the most significant variable in determining the willingness of being vaccinated against COVID-19 for this group of participants was their level of knowledge related to COVID-19 (Beta=. 214, p<0.01).

Table 3: The generalized linear model predicting the willingness to be vaccinated against COVID-19

	β	SE	EXP (β)	p	95% IC	
Gender	0.195	0.173	0.06	0.261	-0.145	0.535
Grade at school	-0.367	0.101	-0.201	0	-0.565	-0.169
Occupation of student's parents	-0.148	0.059	-0.133	0.012	-0.263	-0.033
Knowledge of COVID-19	0.214	0.051	0.224	0	0.113	0.315
Level of awareness of COVID-19	0.068	0.089	0.04	0.444	-0.107	0.244
Risk perception of COVID-19	-0.057	0.07	-0.044	0.415	-0.195	0.081

4. DISCUSSION

Data collection for this research was distributed through an online form with the responses collected from 329 students. From this, it was revealed that senior high school students at Satreesiriket school had a low level of knowledge of COVID-19 based on the research standard. The most common mistake was found on question regarding the current type of COVID, i.e. "SARS-CoV-2" where students often mistakenly selected "SARS-Cov". 11% of students would answer this question wrongly (N=37), so it was inferred that some students did not have sufficient knowledge of COVID-19 leading to their random selection of responses on some questions. For questions with only 2 response options, it was more likely for the students to select a correct answer. However, the students still exhibited a moderate level of COVID-19 which ultimately balanced out and resulted in a good level of understanding of COVID-19 overall.

Nevertheless, when the number of response options were expanded under a section assessing the level of awareness of COVID-19, it pointed out a low level of awareness of COVID-19. This also reflected the student's interest and enthusiasm towards following COVID-19 related news and information. From this, it was gathered that the students had some basic and general knowledge and awareness of COVID-19 to a certain level. This may have been due to an initial panic of worldwide pandemic under an incredible pace leading to their exposure and interest in learning about COVID-19, mainly what it was and what it entailed. Subsequently, over time the students may not have enough time and commitment to follow the news closely or have diminishing interest in the news.

Furthermore, during the time of research students were studying from home which could also lead to a low level of risk perception and knowledge on COVID-19 which in turn reflected their willingness of being vaccinated. This research highlights that the higher level of knowledge on COVID-19, the more willing the students were in getting vaccinated. But although the level of knowledge on COVID-19 was high, the risk perception was relatively low partly because the students were not able to carry out their normal activities outside.

Similarly, a positive correlation between the willingness to be vaccinated and the low awareness level of COVID-19 indicates that the students still followed the news but infrequently. As previously indicated, at the time of research, students were studying online from home meaning that their contact with the outside world was limited to family members. Since not all student's parents worked as medical personnel, this means that they might not have direct experiences with infected COVID-19 patients which could lead to a low level of risk perception. Moreover, the level of infections were considerably low at the time of research [10] resulting in a low level of risk perception across all grades at high school.

All of the mentioned factors affect the student's willingness to be vaccinated. As students studied online from home for a long period of time, they were eager to get back to their normal life, however they were not included in the national vaccination programme and were uncertain of the vaccines provided by the government at a time from reports of side effects they heard from others, news or other social media platforms [11,12]. All of these reasons led students to be both willing and unwilling at the same time resulting in a moderate willingness to be vaccinated against COVID-19 overall.

This finding coincides with other studies on knowledge and understanding of COVID-19 namely a research on knowledge, attitude and behaviour against COVID-19 among undergraduate students in Portugal. 262 students took part by completing a form of which full-time female students were the majority. Furthermore, female undergraduates scored higher in all aspects - knowledge; attitudes; and protective behaviours against COVID-19 than male undergraduates [13]. The same result was positively reflected in terms of cooperation and level of knowledge.

Moreover, when examining the research topic on willingness to be vaccinated against COVID-19 of Belgian citizens, it was discovered that 34% of the total participants of 2,060 positively confirmed that they were getting vaccinated. Out of these, 39% were uncertain about vaccination; 18% may not get vaccinated and 9% decided not to be vaccinated [14].

Another research investigating attitudes and satisfaction with vaccines against COVID-19 and mainly concentrating on the elderly population took place in the United Kingdom. It found that the majority of people who thought negatively towards vaccines against COVID-19 were less educated and had lower incomes. Some of these stem from the lack of trust in the government and public health service as they were worried about potential side effects. In contrast, young people aged 18-29 years old were less negative towards vaccination against COVID-19 than the elderly which was statistically significant [15].

Both of these studies reflect the uncertainty of the students at Satreesiriket school towards vaccines provided by the government. As a result, their responses were only moderately willing to be vaccinated. This indicates that although the majority of the population are willing to be vaccinated, they were uncertain about the government vaccination management; possible side effects; and various false news affecting their decision making towards getting vaccinated. Ultimately, they were only moderately willing to be vaccinated.

Although the risk is higher, the willingness to be vaccinated remains low. This is due to sparse news uptake and awareness. The key factor that would boost the population's willingness to be vaccinated is by providing comprehensive information about COVID-19 and educating them of the risk involved and lastly by importing quality vaccines that reassures the population. All of these factors are believed to encourage a more positive attitude towards willingness to be vaccinated among students at Satreesiriket school.

Limitation

Existing knowledge and news awareness during the school's online teaching from home could potentially affect the student's level of risk perception. Under a national COVID-19 lockdown measure imposed by the government at the time of research, the student's physical and mental states; social and economic conditions worsens. As tourist attractions closed down and citizens were not allowed outside, their level of risk perception was limited which in turn could affect the attitudes and judgement of the students at Satreesiriket school.

5. CONCLUSION

From the collection of the form on willingness to be vaccinated against COVID-19 from senior high school students at Satreesiriket school, it was pointed out that the majority of 329 participants that took part were female. Through an analysis of the results using various descriptive statistics, it underlined that senior high school student's level of knowledge related to COVID-19 at Satreesiriket school were good but their level of awareness of COVID-19 were considerably low. This was also true for their risk perception of COVID-19 which was also low and their willingness to be vaccinated against COVID-19 that was moderate. The relationship between their knowledge of COVID-19 and their willingness to be vaccinated were positively correlated and were statistically significant. The generalized linear model discovered that the most significant factor that affected and predicted the willingness to be vaccinated against COVID-19 of this participant's group was their knowledge regarding COVID-19 which in turn impacts their willingness to be vaccinated too.

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