

Factors Associated with COVID-19 Preventive and Control Behaviors among People in High Incidence Border Community, Thailand - Myanmar

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ABSTRACT

Introduction: The COVID-19 pandemic has posed a significant threat to global public health for over a year, affecting communities worldwide, including those residing in border areas between Thailand and Myanmar. Mae Sai District, located in the northernmost part of Chiang Rai Province in northern Thailand, serves as a prominent border crossing between the two countries, characterized by high population mobility and a substantial presence of foreign workers, thereby rendering its inhabitants susceptible to COVID-19 transmission. This study aimed to determine factors associated with the prevention and control of COVID-19 behaviors among people in Mae-Sai District, Chiang Rai Province.

Methods: An analytical cross-sectional study was conducted to collect data in Thai-Myanmar borders in Mae Sai District, Chiang Rai Province, Thailand. A validated questionnaire was used to collect the characteristics, predisposing factors, reinforcing factors, and enabling factors related to COVID-19 prevention and control behaviors. The questionnaire was assessed by three experts, and the content validity index (CVI) before use. The Kuder-Richardson coefficient (KR-20) was calculated and yielded a value of 0.73, indicating good reliability. The questionnaires were completed via face-to-face interviews. The data were summarized and analyzed by descriptive statistics and Spearman rank correlation.

Results: A total of 346 participants were recruited for the study, with a majority (59.8%) being females, and 28.3% belonging to the age group of 50 to 59 years. Most participants (53.2%) were married, and a significant proportion (76.6%) had previously experienced COVID-19 infection, with 39.0% opting for home isolation. Encouragingly, a vast majority (96.8%) had received the COVID-19 vaccine, and 52.3% had received at least two doses of vaccination. Predisposing factors, namely attitude ($r = 0.25$; p -value < 0.001) demonstrated notable associations with COVID-19 prevention and control behavior. Additionally, reinforcing factors such as social support ($r = 0.39$; p -value < 0.001) and participation ($r = 0.45$; p -value < 0.001), along with enabling factors like service ($r = 0.35$; p -value < 0.001), also positive correlations with COVID-19 prevention and control behavior.

Conclusion: The study's findings underscore the importance of targeted training programs to enhance the population's knowledge, understanding, and awareness of preventing communicable and emerging diseases, including COVID-19. As COVID-19 continues to be a major human threat, particularly in border areas with high population mobility and foreign workers, empowering the community with relevant knowledge and strategies for prevention is crucial to effectively combat the spread of the virus.

Keywords: Prevention and Control, Cross-border community, COVID-19 outbreak

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Introduction

Since its emergence in Wuhan, China in December 2019, the Coronavirus Disease-2019 (COVID-19), caused by the severe acute respiratory syndrome coronavirus 2, has rapidly spread across the globe, becoming one of the deadliest pandemics of this decade [1, 2]. As the pandemic situation escalated, countries worldwide, including Thailand, were impacted. In response, the Thai government established a national committee to address the issue. As of the late stage of the pandemic in Thailand, the country reported 4.7 million confirmed cases, with 4.6 million patients recovered, accounting for 97.9% of all cases, and 33,935 deaths [3]. In the northernmost part of Thailand, Mae Sai District is the northernmost district of Chiang Rai Province in northern Thailand. The area is characterized by high population mobility and a substantial presence of foreign workers, making it susceptible to COVID-19 transmission. Mae Sai District has encountered the second-highest number of COVID-19 cases in Chiang Rai Province. The accumulated number of confirmed cases was 21,890, and there were 12 reported deaths [4].

The spread and severity of infectious diseases are associated with at least three main factors. The first factor is the disease pathogen, the second factor involves the behaviors and resistance of the population, and the third factor is related to societal systems and various preparedness measures, whether they are strong or weak [5]. Therefore, preventive and control behaviors against the COVID-19 virus, access to resources and healthcare services, communication of policies regarding COVID-19 prevention, and receiving support from family or community members in situations where the virus is spreading, are crucial factors.

During the COVID-19 outbreak, Chiang Rai took various preventive measures, including organizing meetings with public health agencies and establishing a center to monitor the COVID-19 situation. Some border checkpoints with neighboring countries were closed, and screenings at entry and exit points were increased. The public in Chiang Rai was repeatedly urged to work together to prevent the spread of the virus. Accurate information about the disease, effective prevention, and control measures have proven crucial during the pandemic. Guidelines from the World Health Organization (WHO) included physical distancing, mask-wearing, avoiding crowds, proper ventilation, regular handwashing, and practicing good coughing etiquette [6]. Additionally, the Thai Ministry of Public Health implemented various preventive measures such as massive lockdowns, the DMHTT (distancing, mask-wearing, hand washing, testing temperature, Thai chana application), and home isolation [7, 8]. Despite these measures and guidelines at the national and provincial levels, a lack of awareness and participation among the public could hinder the efforts to control and prevent the spread of COVID-19.

The PRECEDE model [9], which was developed in the early 1970s has been effectively applied worldwide to address a broad range of health issues. The PRECEDE model, which stands for the Predisposing, Reinforcing, and Enabling Constructs in Educational Diagnosis and Evaluation, posits that achieving healthiness or adopting healthy behaviors is influenced by various factors. These predisposing factors encompass knowledge, attitudes, beliefs, values, and perceptions. Notably, media perception serves as a pivotal method of health communication, significantly contributing to the enhancement of knowledge and the cultivation of health protection skills, particularly in the context of the ongoing COVID-19 pandemic [10]. Reinforcing factors play a crucial role in supporting the cultivation of desired health behaviors, including elements such as warnings, commendations, and encouragement [11]. Ultimately, enabling factors, which encompass skills or physical components such as the availability and accessibility of resources or services, facilitate the correct adoption of health behaviors. The literature review found that Rojpaisarnkit's research applied the PRECEDE model [12] to identify the determinants influencing disease prevention behaviors. The study revealed a range of factors falling under individual attributes, predisposing factors, enabling factors, and reinforcing factors that impact COVID-19 disease prevention behaviors [13]. As a result, this study incorporated the following factors based on the PRECEDE model, encompassing predisposing factors (such as perception and attitude), enabling factors (accessibility service), and reinforcing factors (including social support and participation). In the literature review, there was no study on behavior in preventing and controlling COVID-19 among people in border communities in Thailand - Myanmar.

To address these challenges, this research aims to study causal factors encompassing predisposing, enabling, and reinforcing aspects that are related to COVID-19 preventive and control behaviors. Utilizing the PRECEDE framework as the conceptual framework for analysis, this research seeks to identify the underlying causes and elements contributing to the current situation, allowing for more effective planning of corrective actions and disease management, prevention, and control. Understanding the factors influencing COVID-19 prevention and control behavior in the Mae Sai border area of Chiang Rai Province is essential for developing targeted strategies and interventions to mitigate the spread of the virus effectively. By analyzing the Predisposing, Reinforcing, and Enabling aspects through the PRECEDE FRAMEWORK, this research aimed to provide valuable insights that can contribute to strengthening public health efforts in combatting the COVID-19 pandemic in this vulnerable region.

Methodology

Study Design, and Study Setting

An analytical cross-sectional study was applied. The study was conducted among a population aged more than 20 years old who lived in Mae Sai sub-district, Mae Sai district, Chiang Rai province. Data collection between the period of July, 1st 2022 December, 15th 2022.

Sample Size Calculation

The population used in this study was people aged 20 years and over, including Thai people and migrant workers. Selected by simple random sampling. The total number of population groups is 14,026 people. The sample size was calculated by the W.G. Cochran [14] formula at a confidence level of 95.0% with a tolerance of $\pm 5.0\%$

$$n = \frac{0.36(1 - 0.36)}{\frac{(0.05)^2}{(1.96)^2} + \frac{0.36(1 - 0.36)}{14,026}}$$

$n = 345.33$ and abounding to 346

Inclusion and Exclusion Criteria

The study included participants who met the following criteria: aged 20 years and older, residing in the Mae Sai Subdistrict of Mae Sai District, Chiang Rai Province, for a minimum of 1 year, not employed as public health officials or volunteers involved in COVID-19 surveillance, prevention, and control, capable of speaking, listening, and communicating in the Thai language, and willing to participate in the research voluntarily. Excluded from the study were individuals who did not fully meet the specified questionnaire requirements and those with disabilities related to visual impairment, hearing impairment, communication difficulties, and mobility.

Research Instruments

A structured and validated questionnaire was utilized to collect information, comprising five parts. Part I gathered personal data, including sociodemographic information, history of COVID-19 infection, and vaccination status. Part-II focused on predisposing factors, with questions related to perception (10 items), and attitude (10 items), Part-III addressed reinforcing factors, covering social support (10 items) and participation (10 items). Part IV examined enabling factors, consisting of questions related to services (10 items). Part V focused on COVID-19 prevention and control behavior (10 items).

The questionnaire was created by the researcher, content validity was assessed by three experts, and the content validity index (CVI) method was used to improve the content validity. Reliability was also examined by administering the tool to a sample of 30 individuals in Pongpha Subdistrict, Mae Sai

District, Chiang Rai Province, which was similar in characteristics to the target population. The Kuder-Richardson coefficient (KR-20) was calculated and yielded a value of 0.73, indicating good reliability.

Data Analysis

The descriptive analysis was conducted for all sections of the questionnaires using the SPSS version 23. The data were presented in the form of the frequency and percentage in all categorical data, Variables in part-II to Par-V were analyzed and interpreted in five levels [15]: low while scored $< 60\%$, moderate while scored 60-79% and high while scored 80-100%. Spearman rank correlations were used to detect the correlation at the significant level of $\alpha=0.05$.

Ethics Consideration

This study and its protocols had been approved for conducting research in human subjects by the Human Research Ethics Committee of Chiang Rai Provincial Public Health Office (CRPPHO No. 94/2565) and the Human Research Ethics Committee of Mae Fah Luang University (No. COA139/2022). All participants were clearly explained the research objectives and processes, confidentiality, risks, and benefits. and participants' rights before obtaining the informed consent in written form.

Results

General characteristics of participants

The majority of the participants were females (59.8%), and 28.3% were aged between 50 and 59 years (mean age = 43.67, SD = 12.55). 53.2% of the participants were married, 91.9% identified as Buddhist, and 32.9% had completed elementary school education. Regarding healthcare coverage, 67.9% were under the Universal Coverage Scheme, and 50.0% were employed. A substantial proportion of participants (76.6%) reported having experienced COVID-19 illness in the past, with 39.0% having been isolated at home. Furthermore, 96.8% of participants had received the COVID-19 vaccine, with 52.3% having received at least two doses of vaccination (Table 1).

Table 1 Characteristics of participants (n=346)

Characteristics	n	%
Total	346	100.0
Sex		
Male	139	40.2
Female	207	59.8
Age (years)		
20-29	58	16.8
30-39	76	22.0
40-49	76	22.0

Characteristics	n	%
50-59	98	28.3
≥ 60	38	11.0
<i>Mean=43.67, SD=12.88, Min =20, Max =78</i>		
Marital status		
Single	127	36.7
Married	184	53.2
Widowed/Divorced	35	10.1
Religion		
Buddhist	318	91.9
Christian	17	4.9
Islamic	10	2.9
Unreligious	1	0.3
Education		
Unlettered	90	26.0
Elementary School	114	32.9
Secondary School	39	11.3
High School	52	15.0
Bachelor's degree	34	9.8
Master's Degree	6	1.7
Medical treatment rights		
Universal Coverage	235	67.9
Scheme		
Social Security Fund	36	10.4
Stateless People	34	9.8
No rights	30	8.7
Civil Servant Medical	11	3.2
Benefit Scheme		
Occupation		
Employee	173	50.0
Merchant	63	18.2
Agriculturist	27	7.8
Housekeeper	24	6.9
Government Officer	13	3.8
Government Employee	4	1.2
Self-Employed.	6	1.7
State Enterprise	3	0.9
Unemployed	17	4.9
Students	13	3.8

Characteristics	n	%
Freelance	1	0.3
History of COVID-19		
infected		
Yes	265	76.6
No	81	23.4
Place of treatment		
Chiangrai Prachanukroh	34	12.8
Hospital		
Mae Sai Hospital	62	17.9
Kasemrad Sriburin	8	2.3
Hospital Mae Sai		
Community isolation	26	7.5
(CI)		
Home isolation (HI)	135	39.0
History of vaccination		
Yes	335	96.8
No	11	3.2
Number of vaccinations		
(Dose)		
1	4	1.2
2	181	52.3
3	140	40.5

According to predisposing found that the level of perception about COVID-19 was high (95.4%), moderate (2.9%) and low (1.7%). Level of attitude towards COVID-19 were high (93.4%), moderate (5.2%) and low (1.4%). In the aspect of reinforcing found that, the level of social support was high (88.2%), moderate (3.8%) and low (8.1%). Level of participation were high (73.7%), moderate (16.5%) and low (9.8%). Regarding enabling found that, the level of service system was high (81.8%), moderate (12.1%) and low (6.1%). Level of COVID-19 prevention and control behavior were high (84.7%), moderate (14.2%) and low (1.2%) (Table2).

Table 2 Level of predisposing, enabling, reinforcing, and COVID-19 prevention and control behaviors (n=346)

Factors	Levels					
	High		Moderate		Low	
	n	%	n	%	n	%
Independent variables						
Predisposing						
Perception	330	95.4	10	2.9	6	1.7
Attitude	323	93.4	18	5.2	5	1.4
Reinforcing						
Social support	305	88.2	13	3.8	28	8.1
Participation	255	73.7	57	16.5	34	9.8
Enabling						
Service	283	81.8	42	12.1	21	6.1
Dependent variable						
Prevention and control behavior	293	84.7	49	14.2	4	2.1

According to the correlation of predisposing, reinforcing, enabling, and COVID-19 prevention and control behaviors, it was found that predisposing (perception) showed no statistically significant correlation with COVID-19 prevention behavior ($r=0.21$; $p\text{-value}=0.695$). Predisposing (attitude) exhibited a low positive correlation with COVID-19 prevention and control behavior, which was statistically significant ($r=0.25$; $p\text{-value} < 0.001$), reinforcing (social support) displayed a low positive correlation with COVID-19 prevention and control behavior, which was statistically significant ($r=0.39$; $p\text{-value} < 0.001$). Reinforcing (participation) demonstrated a low positive correlation with COVID-19 prevention and control behavior, which was statistically significant ($r=0.45$; $p\text{-value} < 0.001$). Enabling (service) also exhibited a low positive correlation with COVID-19 prevention and control behavior, which was statistically significant ($r=0.35$; $p\text{-value} < 0.001$) (Table 3).

Table 3 Factors association with COVID-19 prevention and control behaviors

Factors	COVID-19 Preventive and Control Behaviors	
	r	p-value
Predisposing		
Perception	0.02	0.695
Attitude	0.25	<0.001**
Reinforcing		
Social support	0.39	<0.001**
Participation	0.45	<0.001**
Enabling		
Service	0.35	<0.001**

** Correlation is significant at $\alpha = 0.01$ (2-tailed)

Discussion

The majority exhibits high levels of disease prevention and control behaviors consistent with the study of it is found that behaviors related to preventing the disease caused by the COVID-19 virus align predominantly at a high level [16, 17]. This might be due to the effective dissemination of guidelines for preventing the spread of COVID-19 from the national healthcare management system in Thailand. These guidelines have been distributed to the public at various levels, spanning from central to community levels [18]. Individuals have received information from various sources about COVID-19 and its statistics. Emphasizing the severity of the disease's impact on health, potentially leading to fatal outcomes, these reports have influenced the public's correct adoption of infection prevention and control behaviors.

Predisposing factors (perception) do not correlate with COVID-19 prevention and control behaviors. The cause may be due to the area in the Thai-Myanmar border community, Mae Sai District, Chiang Rai Province, where there is a diversity of ethnicities and a limitation in communication between staff. With employers hiring foreigners and migrant workers, there is still a lack of awareness about the prevention, and control of behavior. This was supported by a previous study, which found that language and cultural differences are significant factors. The main reason that should not be overlooked is the problem of communication, stemming from language differences, where employees are unable to understand the local language, causing difficulty in communication [19].

Predisposing factors (attitude) are positively correlated with COVID-19 prevention and control behaviors. Individuals possessing sound knowledge and

positive attitudes will collectively adhere rigorously to the governmental safety protocols to safeguard themselves and those in their vicinity from contracting the infection [20]. As a result, the all-encompassing public education campaign conducted through diverse communication channels, spearheaded by the Center for COVID-19 Situation Administration (CCSA) and executed by public health professionals, has played an indispensable role in enhancing public knowledge, comprehension, and confidence in the government's endeavors to manage the pandemic. Consequently, this has fostered a positive mindset among the populace toward the instituted preventive measures and strict adherence to regulations. Witnessing the favorable outcomes stemming from these initiatives, individuals are cultivating a sense of personal responsibility in contributing to the containment of COVID-19 spread in Thailand [21].

Reinforcing (social support) is positively correlated with COVID-19 prevention and control behaviors. Social support from family, friends, health volunteers, and health personnel motivates people to change their behavior [22, 23]. Therefore, in the situation of the COVID-19 epidemic, government officials, including local government and public health officials, along with network partners in the community, village health volunteers, and related networks, should be involved in helping to encourage self-sustaining healthy practices.

In addition, reinforcing (participation) showed a positive correlation with COVID-19 prevention and control behaviors. Citizen participation and involvement of local governments are essential for performing or providing any public service. Local people in communities have played a vital role in the success of DMHTT policies during the COVID-19 pandemic. Their active participation in distancing, mask-wearing, handwashing, temperature checks, testing, and the Thai Chana application, along with collaborative efforts to raise awareness, has been instrumental in controlling the spread of the virus and safeguarding public health [24]. When people feel that they not only receive services but also belong to and have ownership of their locality [25], they are more likely to take part in relevant work or matters. People's involvement contributes to successfully managing problems and carrying out various operations. Findings from China revealed that nearly one-third of community members proactively sought information on COVID-19 [26]. Establishing partnerships with communities can help dispel COVID-19-related rumors and fallacies and alleviate unnecessary fear in community settings. If community stakeholders are not equipped with evidence-based knowledge of COVID-19, they will not be able to disseminate this critical information to residents of their communities [27-29].

Enabling (service) positive correlation with COVID-19 prevention and control behaviors. One potential explanation is that the pandemic's impact on the healthcare system has led to necessary adaptations due to various limitations in service delivery aimed at curbing the pandemic's spread. For instance, many public hospitals were compelled to suspend outpatient medical services and implement strategies to regulate local and external travel for a specific duration. Consequently, individuals faced restricted access to hospital facilities, despite their ongoing need for health services to preserve their well-being [30]. A report highlighted a shift in people's approach to healthcare during the COVID-19 crisis, guided by the Ministry of Public Health, Thailand. This transformation involved transitioning from a hospital-based reactive approach to a proactive community-based approach within primary healthcare settings [31].

Conclusion

In conclusion, the complex interplay of different factors influencing COVID-19 prevention, and control, including, attitudes towards COVID-19 preventive and control measures, social support, participation, and access to health services are related to behaviors for COVID-19 prevention and control. Policymakers and public health authorities should take into account the importance of addressing communication barriers, fostering a positive attitude, encouraging appropriate behaviors, promoting social support, and involving the community to effectively combat the pandemic. Perception's influence on COVID-19 prevention and control behavior is not consistent. It can be influenced by a range of factors, including individual variation in perception, the presence of misinformation, cultural and social influences, resource limitations, and pandemic fatigue. Understanding these factors is crucial for public health efforts to effectively promote and sustain preventive behaviors. It highlights the importance of comprehensive and tailored communication strategies that consider the diverse perceptions and challenges individuals may face during the ongoing pandemic. By leveraging these findings, we can enhance our collective efforts to manage and prevent the spread of infectious diseases like COVID-19 in the future.

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