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RESEARCH ARTICLE

Predictive Factors of COVID-19 Preventive Behaviors among Ethnic Groups in Kheknoi Subdistrict, Khao-Kho District, Phetchabun Province.

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ABSTRACT

This study employed a cross-sectional analytical design to examine COVID-19 preventative behaviors and their associated factors across different ethnic groups within Khek Noi Subdistrict, Khao Kho District, Phetchabun Province. A questionnaire, demonstrating reliability coefficients between 0.76 and 0.95, was administered to a sample of 373 residents. Descriptive statistics and stepwise multiple linear regression were utilized for data analysis. The study found that the sample comprised predominantly Mien ethnicity individuals (68.9%), with a mean age of 51.57 years (SD = 13.281). The majority (52.0%) had a primary school education, worked in agriculture (44.5%), and reported a mean monthly income of 15,571.05 THB (SD = 13,343.82). Most participants resided in nuclear families (76.9%) and identified as Christian (39.4%). High prevalence rates were observed for pre-existing diabetes (49.0%) and a history of COVID-19 infection (75.3%). High levels were reported across several key variables: COVID-19 knowledge (68.6%), positive attitudes towards prevention (63.8%), resource availability for prevention (69.7%), access to information channels (53.6%), and the provision of public health services related to COVID-19 prevention. Stepwise multiple linear regression analysis revealed that resource availability ($\beta = 0.747$, $p < 0.001$), attitudes towards COVID-19 prevention ($\beta = -0.009$, $p < 0.001$), and education level ($\beta = -1.406$, $p = 0.018$) significantly predicted 34.00% of the variance in COVID-19 preventative behaviors. The study recommends leveraging resource availability, attitudes towards COVID-19 prevention, and education level to inform interventions aimed at improving COVID-19 preventive behaviors among ethnic groups in Khek Noi Subdistrict. These factors should be targeted in behavioral change strategies to enhance the effectiveness of COVID-19 prevention efforts.

INTRODUCTION

World Health Organization has declared coronavirus disease 2019 or COVID-19 disease It is an international public health emergency (Public Health of International Concern; PHEIC) since February 4, 2020. This was due to the increasing spread and transmission of COVID-19 globally. On March 1, 2020, Thailand's Ministry of Public Health classified COVID-19 as the 14th dangerous communicable disease. The Thai government also established a COVID-19 Situation Administration Center, chaired by Prime Minister General Prayut Chan-o-cha, to manage the outbreak. Furthermore,

the Cabinet approved proposals by the Committee on Communicable Disease Outbreak Control to mitigate the spread of COVID-19 from Bangkok to other provinces. Thailand faces a high risk of a widespread COVID-19 outbreak, which may lead to large numbers of patients and fatalities. This could severely impact health, the healthcare system, economy, society, and national security. Therefore, the country must fully implement disease surveillance, prevention, and control in the current situation, including risk communication, to raise awareness on preventing and controlling COVID-19. Additionally, it is imperative that Thailand prepares to handle an outbreak scenario to minimize morbidity, damages, and impacts. This requires promoting understanding of COVID-19 prevention and control, as well as encouraging behavior change among the public, healthcare personnel, and related agencies. The goals are to reduce COVID-19 illnesses, transmission, and mortality.

COVID-19 is still endemic in Thailand, especially in crowded communities where people live in close proximity, facilitating viral spread. Meanwhile, the Ministry of Public Health has declared COVID-19 a communicable disease requiring surveillance under the Communicable Disease Act B.E. 2558, categorizing it among severe communicable diseases leading to death. After this declaration, 87,800 COVID-19 cases and 1,881 deaths were still reported (Department of Disease Control, 2023). The Kek Noi subdistrict in Kaeng Kho district, Phetchabun province, is densely inhabited by ethnic minority groups. According to the "Three Doctors" population database, Kek Noi has 12,529 residents in 72 km2, a density of 174 persons/km2 - higher than Thailand's average of 136. Studies on COVID-19 preventive behaviors among ethnic minorities are limited. These communities also lack accurate knowledge for prevention, partly due to distinct languages, cultures, traditions and beliefs. When falling ill with COVID-19, some rely on witch doctors, believing illness is punishment by evil spirits. Data shows higher COVID-19 infection rates among ethnic minorities in Kaeng Kho district, especially the Hmong and Lisu in Kek Noi, compared to ethnic Thais (Department of Health Service Support, 2023).

A review of literature on COVID-19 prevention behaviors reveals two key influencing factors: individual and external factors. Studies have identified age, education level, family structure, monthly income, COVID-19 knowledge, attitudes towards prevention, perceived severity and risk of infection, perceived benefits of prevention, perceived barriers to prevention, social support, and community characteristics as significant influences (Boonsaner, 2022; Inthacharoen et al., 2021; Meekaew et al., 2021; Rungnoy, 2022; Thanormchayathawat et al., 2021). Health literacy also plays a crucial role. However, research on COVID-19 prevention behaviors among ethnic minorities remains scarce. Disease prevention behaviors aim to avoid illness, injury, disability, and health problems. In the current context, COVID-19 poses a significant public health challenge, highlighting the importance of studying these behaviors. Outbreaks in densely populated communities with close-proximity housing increase the risk of transmission. Communication barriers, particularly language limitations within ethnic minority groups, further complicate COVID-19 prevention and control efforts in these communities. This necessitates a deeper understanding of these factors to develop effective and culturally sensitive interventions.

Kek Noi subdistrict in Kaeng Kho district, Phetchabun province, houses two primary ethnic minority groups: the Hmong and Lisu (Department of Health Service Support, 2023). Characterized by high population density and significant population mobility due to occupational patterns, communication within these communities relies heavily on their native languages. This study employs the educational diagnosis phase of the PRECEDE framework (Green et al., 1980; Green & Kreuter, 2005) to investigate factors influencing COVID-19 prevention behaviors among the Hmong, Lisu, Mien, and Lahu ethnic groups in Kek Noi. The Hmong constitute the largest group (96.20%), while the Lahu represent the smallest (0.13%). Each group maintains unique cultural and belief systems,

encompassing distinct housing styles, clothing, agricultural practices, and beliefs surrounding ancestral spirits and the supernatural. Furthermore, these communities demonstrate limited understanding of COVID-19, a lack of awareness regarding the pandemic's severity, and inadequate COVID-19 prevention practices.

Consequently, this research aims to identify factors influencing health-protective behaviors within these ethnic minority groups. The study integrates the Social Support theory (Cobb, 1976; Plisuk, 1982) and the multifactorial approach of the PRECEDE model to analyze key internal and external influences on behavior. The ultimate goal is to develop effective and culturally sensitive strategies for behavior change (Rungnoy, 2022).

Objective

1. To investigate COVID-19 prevention behaviors among ethnic minority groups in Kek Noi subdistrict, Kaeng Kho district, Phetchabun province.

2. To identify predictors of COVID-19 prevention behaviors among ethnic minority groups in Kek Noi subdistrict, Kaeng Kho district, Phetchabun province.

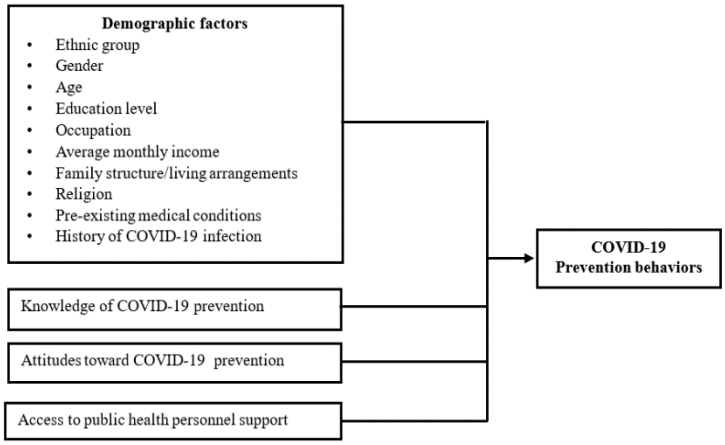

Figure 1 Conceptual frame work

MATERIALS AND METHODS

A cross-sectional analytical study was conducted among the 12,529 ethnic minority individuals residing in Kek Noi subdistrict, Kaeng Kho district, Phetchabun province (Department of Health Service Support, 2023). A sample size of 373 participants was determined using the n4 studies 20 software (Danial & Cross, 2019; Ngamjarus & Pattanittum, 2023), employing a finite population mean estimation method with a 95% confidence level and a 5% margin of error.

Inclusion Criteria (1) Ethnic minority individuals residing in Kek Noi subdistrict for one year or more (2) Able to communicate effectively without speech or hearing impairments. (3) Possessing full mental capacity (4) Providing voluntary informed consent to participate in the research.

Exclusion Criteria (1) Participants who provided informed consent but were unable to complete the questionnaire (2) Participants who did not complete the questionnaire fully.

Research Instrument

The research instrument was a self-administered questionnaire developed by the researcher based on a review of relevant literature. It comprised five sections:

Section 1: Demographics (7 items): Collected data on ethnic group, gender, age, education level, occupation, monthly income, family structure, religion/beliefs, pre-existing medical conditions, and history of COVID-19 infection using checklists and open-ended questions.

Section 2: COVID-19 Knowledge (10 items): Utilized a 3-point rating scale (correct/incorrect/unsure), with scores ranging from 0-10. Results were categorized into three levels (low, moderate, high) based on Best's (1997) criteria.

Section 3: Attitudes toward COVID-19 Prevention (10 items): Employed a 5-point Likert scale (strongly disagree to strongly agree), with scores ranging from 10-50. Results were categorized into three levels (low, moderate, high) based on Best's (1997) criteria.

Section 4: Access to Resources, Information, and Services (10 items): Used a 3-point rating scale (received/unsure/not received), with scores ranging from 0-20. Results were categorized into three levels (low, moderate, high) based on Best's (1997) criteria.

Section 5: COVID-19 Prevention Behaviors (10 items): Utilized a 4-point rating scale (always, often, sometimes, never), with scores ranging from 10-40. Results were categorized into three levels (low, moderate, high) based on Best's (1997) criteria.

Instrument validation involved: (1) Content validity, assessed by three experts using the Index of Content Validity (IOC). Items showed IOC values ranging from 0.67 to 1.00; items with lower IOC values were revised based on expert and advisor feedback. (2) Reliability: Kuder-Richardson (KR-20) for the COVID-19 knowledge section (0.752); Cronbach's alpha for the COVID-19 prevention attitude (0.765), resource access (0.817), and prevention behavior (0.953) sections

Data collected

Following ethical approval from the Sirindhorn College of Public Health, Phitsanulok Human Research Ethics Committee (SCPHPL 2/2567.3.4, February 1, 2024), permission was obtained from Sirindhorn College of Public Health, Phitsanulok, and community leaders in Kek Noi subdistrict, Kaeng Kho district, Phetchabun province. Collaboration with community leaders and village volunteers facilitated participant recruitment, informed consent procedures, and data collection (self-administered questionnaires) between April and June 2024.

Data Analysis

Descriptive statistics (frequency, percentages, means, and standard deviations) were used to analyze demographic data, COVID-19 knowledge, attitudes toward COVID-19 prevention, access to resources and information, public health services related to COVID-19 prevention, and COVID-19 prevention behaviors. Multiple linear regression analysis ($p<0.05$) was used to identify predictors of COVID-19 prevention behaviors.

RESULT

The participants in Kek Noi subdistrict were predominantly Mien (68.90%), with most participants aged 41-60 years (60.59%), and a mean age of 51.57 years (S.D. = 13.281). The age range was 25-85 years. The highest educational attainment was primary school (52.00%), and the most common occupation was farmer (44.50%). Mean monthly income was 15,571.05 baht (S.D. = 13,343.82), ranging from 1,000 to 59,000 baht. Most participants lived in nuclear families (76.90%), and 39.40% identified as Christian. Prevalence of diabetes was 49.00%, and 75.30% reported a history of COVID-19 infection.

Table 1. Demographics characteristics of participants (n = 373)

Demographics	Frequency	%
Ethnicity		
Mien (Hmong)	257	68.90
Lisu	116	31.10

Gender		
Male	154	41.30
Female	219	58.70
Age (Years) $\bar{x}$ = 51.57, S.D. = 13.281		
< 40	69	18.50
41 – 60	226	60.59
≥ 61	78	20.91
Education Level		
No formal education	68	18.20
Primary School	194	52.00
Lower Secondary School	36	9.70
Upper Secondary School/Equivalent	25	6.70
Associate Degree/Equivalent	7	1.90
Bachelor Degree and above	43	11.60
Occupation		
Unemployed	43	11.50
Farmer	166	44.50
Laborer	96	25.70
Merchant	32	8.60
Civil servant	36	9.70
Average Monthly Income (TBA) $\bar{x}$= 15,571.05 , S.D. = 13,343.82		
< 10,000	139	37.30
10,000 – 30,000	175	46.90
≥ 30,001	59	15.80
Family Structure or Household Type		
Nuclear family	287	76.90
Extended family	86	23.10
Religion		
Christian	147	39.40
Buddhist	100	26.80
Animism (or Ancestor Worship)	126	33.80
Co-morbidity		
Yes	256	69.60
No	117	31.40
COVID-19 History		
No history of COVID-19 infection	92	24.70
History of COVID-19 infection	281	75.30

Participants demonstrated high levels of COVID-19 prevention knowledge (68.60%), Attitudes toward COVID-19 prevention (63.80%), Access to public health personnel support (96.70%), and COVID-19 Prevention behaviors (53.60%).

Table 2. Level of knowledge, Attitude, Access to public health personnel support, and COVID-19 Prevention behaviors among the participants (n = 373)

Variable	High n(%)	Moderate n(%)	Low n(%)
Knowledge of COVID-19 prevention	256 (68.60)	105 (28.20)	12 (3.20)
Attitudes toward COVID-19 prevention	238 (63.80)	88 (23.60)	47 (12.60)

Access to public health personnel support	260 (96.70)	108 (29.00)	5 (1.30)
COVID-19 Prevention behaviors	200 (53.60)	160 (42.90)	13 (3.50)

Access to public health personnel support (β = 0.539, p < 0.001), attitudes toward COVID-19 prevention (β = -0.155, p < 0.001), and lack of education (β = -0.100, p = 0.022) were significant predictors of COVID-19 prevention behaviors among ethnic groups in Khek Noi subdistrict, explaining 34.00% of the variance.

Table 3. Predictive Factors of COVID-19 Prevention Behaviors among the participants.

Variable	**b**	**SE**	β	**t**	**p-value**
personnel support Access to public health	0.74	0.05	0.54	12.70	<0.001
Attitudes toward COVID-19 prevention	-0.09	0.02	-0.16	-3.65	<0.001
No formal education	-1.40	0.59	-0.10	-2.37	0.018
$R = 0.584$, $R^2 = 0.341$, R^2 Adj = 0.336, Constant = 22.8, $F = 5.621$					

DISCUSSION

The study found that overall COVID-19 prevention behaviors among the sample population were high (53.60%). This can be attributed to the high levels of COVID-19 knowledge and positive attitudes toward prevention observed in the sample. In Kek Noi subdistrict, Kaeng Kho district, Phetchabun province, health education initiatives focusing on COVID-19 prevention practices were implemented to ensure accurate understanding and awareness among the ethnic minority population regarding the severity of the disease. Furthermore, the sample group received strong support regarding resources for COVID-19 prevention, along with disease surveillance from public health officials. Public health messaging was disseminated through various channels using the local dialect to enhance comprehension. This approach yielded positive results, effectively addressing challenges faced by the sample population, a significant portion of whom had only a primary school education (52.00%) and were elderly. The researchers observed that a considerable number were unable to read or write Thai, necessitating the use of interpreters or public health officials from the same ethnic group to facilitate communication in the local dialect. These findings align with previous research by Grasung & Thappha (2022), Rungnoy (2022), and Inthacharoen et al. (2021), which demonstrated that COVID-19 knowledge, attitudes toward prevention, access to information, and higher education levels positively influence prevention behaviors.

Predictive factors for COVID-19 prevention behaviors among the ethnic minority group in Kek Noi subdistrict accounted for 34.00% of the variance and included three key factors:

1. Access to Resources, Information, and Public Health Services: This factor significantly predicted COVID-19 prevention behaviors (Beta = 0.747, p<0.001). This aligns with Grasung & Thappha (2022), who found that access to information predicted preventive behaviors in Phra Nakhon Si Ayutthaya. It also supports Boonsaner (2022), who found social support influenced COVID-19 prevention behaviors in Non Sang subdistrict, and Hanjaroenpipat et al. (2022), who found a similar relationship among the Kuy ethnic group in Tum subdistrict. In this study, 69.70% of participants reported high levels of access to resources, information, and services. The most frequently accessed services were community-based disease control and prevention monitoring by public health officials, followed by information from public health officials or village health volunteers. This high level of access can be explained by the provision of comprehensive support, including information dissemination through various channels, provision of preventive materials, guidance, screening, and follow-up by local public health officials. This interaction fostered trust and a strong relationship between public health officials and the ethnic minority community, leading to compliance with recommendations. This

aligns with Pilisuk's (1982) social support theory, which emphasizes the role of mutual support in fostering emotional security, trust, and positive relationships.

2. Attitudes toward COVID-19 Prevention: This factor showed a negative, statistically significant relationship with prevention behaviors (Beta = -0.092, $p<0.001$). This suggests that improved attitudes did not directly translate to increased preventive behaviors. Conversely, it may have led to decreased behaviors in some groups, potentially due to underlying beliefs about disease and treatment, influencing prevention behaviors. This highlights the importance of considering social context and specific characteristics of the population. In this study, 63.80% of participants demonstrated positive attitudes towards COVID-19 prevention, believing that science-based health promotion and prevention could reduce illness. However, these positive attitudes did not directly translate into preventive behaviors, possibly because attitudes are internal and influence perception more than the direct expression of behavior.

3. Education Level: Education level showed a negative, statistically significant relationship with COVID-19 prevention behaviors (Beta = -1.406, $p=0.018$). Higher education levels did not necessarily correlate with increased prevention behaviors, potentially due to the complexity of prevention information not aligning with the understanding and context of the ethnic minority group's lives. Different education levels do not directly translate to better prevention; the influence may vary across populations and contexts. The majority of participants (52.00%) had a primary school education, and some (18.20%) had no formal education, due to geographical location, cultural language barriers, and historical limitations in access to education. The inability to understand Thai, the primary language of instruction, and cultural emphasis on early marriage and family formation contributed to early school leaving. However, current COVID-19 prevention communication strategies have adapted to the context of the ethnic minority group, with public health officials using the local dialect, improving access to information and potentially contributing to improved prevention behaviors in the future.

AUTHORS' CONTRIBUTIONS

Conceptualization: Chayanun Junkham , Thawatchai Sattayasomboon; methodology: Chayanun Junkham , Thawatchai Sattayasomboon; Software: Chayanun Junkham , Thawatchai Sattayasomboon; validation: Chayanun Junkham , Thawatchai Sattayasomboon; formal analysis: Chayanun Junkham; resources: Chayanun Junkham , Thawatchai Sattayasomboon; data curation: Chayanun Junkham, Kongprai tunsuchart, Thawatchai Sattayasomboon; writing—original draft preparation: Chayanun Junkham, Kongprai tunsuchart, Thawatchai Sattayasomboon; writing—review and editing: Kongprai tunsuchart, Thawatchai Sattayasomboon; visualization: Chayanun Junkham, Thawatchai Sattayasomboon; supervision: Thawatchai Sattayasomboon; project administration: Chayanun Junkham, Thawatchai Sattayasomboon; All authors have read and agreed to the published version of the manuscript.

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