Original Article

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Behavior to Prevent Coronavirus Disease 2019 (COVID-19) among the Elderly with Non-Communicable Disease in Rural Northeastern Thailand

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Abstract:

Objective: This study aimed to investigate the preventive behaviors against coronavirus disease 2019 (COVID-19) and to identify factors influencing these behaviors.

Material and Methods: We conducted a cross-sectional study from September 2021 to January 2022 during the COVID-19 outbreak. The study population comprised 320 early-onset elderly individuals with non-communicable diseases residing in rural northeastern Thailand. A simple random sampling technique was utilized to select participants. Data collection was facilitated through a self-administered questionnaire.

Results: The analysis indicated that 69.1% of participants were female, with a mean age of 63.7 years. Diabetes mellitus represented 43.1% of the underlying conditions. A significant majority (54.4%) exhibited a high level of preventive behavior against COVID-19. Notably, 76.3% of the participants consistently engaged in hand hygiene with alcohol gel in public settings. Age and educational background were significant personal factors correlated with preventive behaviors (p-value<0.05). Participants with very high preventive behaviors were predominantly in the 60-65 age bracket (62.3% vs. 37.7%, p-value=0.027) and had completed late elementary education (46.0% vs. 30.1%, p-value=0.018).

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Conclusion: Elderly individuals with underlying diseases in rural areas of northeastern Thailand displayed commendable preventive behaviors against COVID-19. These findings suggest a heightened awareness and proactive engagement in mitigating the transmission of this infectious disease.

Keywords: coronavirus disease 2019, elderly, non-communicable diseases, preventive behavior, Thailand

Introduction

Coronavirus disease 2019 (COVID-19), caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2), emerged as a formidable global health challenge. The initial case was identified in China in December 2019, with the World Health Organization (WHO) subsequently declaring it a pandemic on March 11, 2020[1,2]. The disease, primarily transmitted through direct, indirect, and contact routes, is postulated to have a zoonotic origin[3-5]. As of May 6, 2020, there have been 3,732,046 confirmed cases and 261,517 deaths attributed to the COVID-19 outbreak[6].

The pandemic has significantly impeded global mobility and caused extensive mortality, especially due to its highly contagious nature[7]. Seniors experienced a disproportionately high rate of mortality, and the risk of contracting COVID-19 is higher among older people. Adults 65 and over account for 20% of reported fatalities in the United States[8]; in contrast, mortality in this age range was relatively higher in the Asian region[9] and more likely to develop severe illness[10].

Elderly individuals have experienced disproportionately high mortality rates, with those aged 65 and over representing 20% of reported fatalities in the United States and even higher mortality rates observed in the Asian region[11-14]. This demographic is particularly vulnerable, often having pre-existing non-communicable diseases such as hypertension and diabetes mellitus, which exacerbate the risk of severe illness and mortality[15].

Adherence to preventive measures has been less common among the elderly, despite their efficacy[16]. The WHO recommends fundamental protective behaviors, such as proper mask usage, maintaining physical distancing, and regular hand hygiene. Additional precautions include respiratory etiquette and self-isolation upon symptom onset or a positive COVID-19 test[17].

Preventive behaviors are particularly critical among the elderly, where perception of risk, gender, living conditions, understanding of COVID-19, and familial support play integral roles in prevention[18,19]. In Northeastern Thailand, the elderly population is often characterized by strong community and family networks, which can be pivotal in fostering and maintaining preventive practices. This region, known for its unique socio-cultural dynamics, presents specific challenges and opportunities in promoting health behaviors among its aging residents[7,20,21].

Thus, the objectives of this research are to assess the preventive behaviors against COVID-19 among the elderly with underlying diseases in Northeastern Thailand and to discern the factors influencing these behaviors. The outcomes of this study are intended to inform strategies that enhance preventive efforts and ultimately improve the health and well-being of this vulnerable segment of the population.

Material and Methods

Study design and setting

A cross-sectional study was conducted from September 2021 to January 2022. The target population of the study consisted of early elderly individuals aged 60-69 years with underlying diseases, specifically diabetes and hypertension. These conditions affected a total of 17,694

early elderly residents within the Det Udom District of Ubon Ratchathani province. The Health Promoting Hospital in Det Udom district, located in the northeastern region of Thailand, arranged the elderly service across its 25 sub-district health-promoting hospitals.

Sample size calculation

Simple random sampling was utilized to select a total of 320 elderly participants. The sample size was determined using the G*Power program, with an effect size w=0.3, an alpha error probability of 0.05, a power of 0.95 (1-β error probability), 12 degrees of freedom, test family as 'tests', and the statistical test as 'goodness of fit tests: contingency tables'. The calculated total sample size was 288 participants. To accommodate potential follow-up loss, the sample size was adjusted for by a 10% follow-up loss ratio, employing the formula $n_{adj}=\frac{n}{1\text{-}R}$ where n_{adj} is the adjusted sample size, n is the calculated sample size, and R is the proportion of missing data (10% or 0.10). Consequently, the final sample size was set at 320 participants.

Study sample

This study randomly selected a sample of 320 individuals from 5 (20%) of the 25 sub-district health-promoting hospitals in the Det Udom District of Ubon Ratchathani Province, located in northeastern Thailand. The inclusion criteria for participants were as follows: aged between 60 and 69 years old and diagnosed with either diabetes mellitus, hypertension, or both. The exclusion criteria included illiteracy in Thai and failure to participate in data collection after two follow-up attempts.

Study design

A cross-sectional study was conducted from; September 2021 to January 2022, during the COVID-19 outbreak. Elderly people living in the rural communities, Det Udom district in Ubon Ratchathani Province, Northeastern Thailand were recruited. These individuals had follow-up treatment at the Health Promoting Hospital within Det Udom district.

Research tools

Upon conducting a literature review, a research questionnaire was developed. The self-administration of this questionnaire by participants typically spanned between ten to fifteen minutes. The instrument comprised two sections. Part 1 solicited demographic information from participants, covering age, gender, marital status, education level, occupation, and monthly income. This section consisted of six demographic questions, allowing participants to fill in blanks and select from multiple choices to detail their demographic data for each category. Part 2 of the questionnaire focused on the participants' COVID-19 preventive behaviors, featuring 15 items. Participants rated the frequency of their preventive behaviors on a four-tiered scale: 'regular' (4 points), 'often' (3 points), 'sometimes' (2 points), and 'never' (1 point). Each participant could select only one response per item, resulting in a sum of points that fell into one of four distinct levels of preventive behavior. The scoring ranges, derived by dividing the maximum score by the minimum and categorizing the results, were defined as follows: 1.00-1.75 for 'low', 1.76-2.51 for 'moderate', 2.52-3.27 for 'high', and 3.28-4.00 for 'very high' levels of preventive behavior.

The questionnaire's content validity was verified by three experts, yielding an Index of Item Objective Congruence ranging from 0.75 to 1. Preliminary questionnaire testing was conducted to ascertain its reliability, which resulted in a Cronbach's alpha coefficient of 0.84.

Data collection

After obtaining approval from the director of the Health Promoting Hospital in the Det Udom district, our research team, staff members at the hospital, received

training. This training ensured they could communicate the research objectives and explain the questionnaire to potential participants. Amid the COVID-19 outbreak, the hospital implemented social distancing protocols to minimize the risk of infection among the elderly with underlying diseases. Consequently, these patients were not permitted to collect their medications for diabetes and hypertension in person at the hospital. Instead, designated caregivers were authorized to obtain the medication on their behalf.

The team collected the research data at the participants' residences. All eligible individuals were informed about their rights as research volunteers, including their right to informed consent. They were also assured of their freedom to participate in the study or to decline. Prior to data collection, participants chose a convenient date and completed the self-administered questionnaire in their homes.

Data analysis

Data were analyzed using descriptive statistics, encompassing numbers, percentages, means, and standard deviations. These measures were employed to describe the demographic characteristics of the participants and provide an overview of their preventive behaviors. Factors predicting preventive behavior against COVID-19 were also identified and examined using the chi-square test, with a p-value of less than 0.05, denoting statistical significance. An alpha level of p-value<0.05 was established as the threshold for statistical significance.

Results

Part 1 Demographic characteristics

The demographic characteristics of the 320 elderly individuals participating in our study were summarized as follows: Most participants were female (69.1%), with males constituting 30.9%. The average age of the participants was 63.7 years. Most participants were married (80.3%), and 44.1% had completed junior high school education. The predominant occupation among participants was farming (79.1%). On average, participants reported a monthly income of 3,076 Thai baht. Additionally, 43.1% of the participants were living with diabetes.

Part 2 Preventive behavior of COVID-19 among the elderly with underlying diseases

The data presented in Table 1 show that a majority of participants (76.3%) regularly engaged in preventive measures against COVID-19, which included handwashing with alcohol gel containing at least a 70% concentration when venturing into public spaces. Additionally, 66.6% of the participants were kept informed about the disease's status and updates on those infected with the virus through television or the internet. When feeling unwell, 64.1% of the participants practiced social distancing by staying at home, thus avoiding outings and visits to community gatherings or public areas. Most participants (54.4%) showed a high level of preventive behavior for COVID-19, and 45.6% reported a very high level of preventive behavior for COVID-19 (Table 2).

Part 3 The relationship between participants' personal characteristics and level of preventive behaviors for COVID-19

The analysis of factors associated with COVID-19 preventive behaviors indicated that age (p-value=0.027) and education level (p-value=0.018) significantly correlated with the adoption of such behaviors. Participants who exhibited a very high level of preventive behaviors were more likely to be in the 60-65 years (the younger) age group (50.0% vs. 37.7%, p-value=0.027) and to possess an education level equivalent to late elementary school (46.0% vs. 30.1%, p-value=0.018). Other personal characteristics including gender, marital status, occupation, monthly income, and presence of underlying diseases did not show a significant association with preventive behaviors for COVID-19 (Table 3).

Table 1 Descriptive statistics for frequency of preventive behaviors for COVID-19 among the elderly (n=320)

No.	Items	Frequency of behavior Number (%)			
		Regularly	Often	Sometimes	Never
1	When coughing or sneezing, use a tissue to cover your mouth and nose every time.	202 (63.1)	110 (34.4)	8 (2.5)	0 (0.0)
2	Wash your hands with soap after coughing, sneezing or blowing your nose every time.	199 (62.2)	108 (33.8)	13 (4.1)	0 (0.0)
3	Wash your hands with at least 70% alcohol-based hand sanitizer when going out in public.	244 (76.3)	67 (20.9)	8 (2.5)	1 (0.3)
4	Avoid going to crowded places such as markets.	181 (53.8)	124 (38.8)	14 (4.4)	3 (3.1)
5	Discard the surgical mask after use and place it in a sealed plastic bag before disposing of it in a closed bin.	172 (53.8)	97 (30.3)	38 (11.9)	13 (4.1)
6	Avoid close contact with people with flu-like symptoms or symptoms of a respiratory infection.	165 (51.6)	128 (40.0)	25 (7.8)	2 (0.6)
7	Use your hands to rub your eyes or touch your face.	32 (10.0)	53 (16.6)	119 (37.2)	116 (36.3)
8	Do not share things with others such as hand towels, glasses, and drinking straws, etc.	138 (43.1)	81 (25.3)	42 (13.1)	59 (18.4)
9	Travelling to an area or village where COVID-19 cases have been reported.	98 (30.6)	69 (21.6)	56 (17.5)	97 (30.3)
10	When having an illness such as coughing or runny nose, you wear a face mask when you are with the household.	183 (57.2)	102 (31.9)	28 (8.8)	7 (2.2)
11	When having an illness, you stay at home and don't go out. Do not travel to the community or public places.	205 (64.1)	97 (30.3)	15 (4.7)	3 (0.9)
12	When you are sick with a fever, cough, sneeze, runny nose, or sore throat, you buy medicine to take by yourself.	65 (20.3)	65 (20.3)	71 (22.2)	119 (37.2)
13	You follow the news of the disease situation of those infected with COVID-19 via television or the internet	213 (66.6)	82 (25.6)	17 (5.3)	8 (2.5)
14	Upon returning home after running errands outside, you immediately shower, wash your hair, and change into new clothes.	203 (63.4)	113 (35.3)	4 (1.3)	0 (0.0)
15	You wash your hands with soap after touching things such as railings, stairs, doorknobs, etc.	201 (62.8)	102 (31.9)	16 (5.0)	1 (0.3)

COVID-19=coronavirus disease 2019

Table 2 The level of preventive behavior for COVID-19 among the elderly (n=320)

Level of preventive behavior	Number	%
Low (score 1.00-1.75)	0	0.0
Moderate (score 1.76-2.51)	0	0.0
High (score 2.52-3.27)	174	54.4
Very high (score 3.28-4.00)	146	45.6

Discussion

Participants in this study were elderly people aged 60-69 years, with underlying non-communicable diseases, such as diabetes and hypertension or both. The participants attended the chronic disease follow-up clinic at their health-promoting hospital, a fundamental health care facility in Thailand. The definition of COVID-19 preventive practices in this study included washing hands, wearing face masks, maintaining social distancing, and following up about high-risk locations via the Internet and television. They self-reported how frequently they engaged in preventive behavior

over a week during an outbreak. The elderly participants in this study reported practicing high levels of preventive behavior against COVID-19 infections. The participants were particularly active in health-seeking behaviors and also more likely to engage in a high level of preventive behaviors for all items.

Table 3 The relationship between participants' personal characteristics and infection preventive behaviors of the elderly with COVID-19 (n=320)

Variable	Level of preventive behaviors Number (%)		df	X^2	p-value
	High	Very high			
Gender			1	0.081	0.777
Male	44 (30.1)	55 (31.6)			
Female	102 (69.9)	119 (68.4)			
Age (years)			1	4.889	0.027*
60-65	55 (37.7)	87 (50.0)			
66-69	91 (62.3)	87 (50.0)			
Marital status					
Single	19 (13.0)	19 (10.9)	3	4.542	0.209
Married	111 (76.0)	146 (83.9)			
Divorced/separated	13 (8.9)	8 (4.6)			
Widowed	3 (2.1)	1 (0.6)			
Education			2	8.054	0.018*
Early elementary school	78 (53.4)	63 (36.2)			
Late elementary school	44 (30.1)	80 (46.0)			
Primary high school	15 (10.3)	26 (14.9)			
Secondary high school/vocational certificate	5 (3.4)	3 (1.7)			
Vocational certificate or equivalent	3 (2.1)	1 (0.6)			
Bachelor's degree	1 (0.7)	0 (0.0)			
Postgraduate	0 (0.0)	1 (0.6)			
Occupation			4	6.169	0.187
Agriculture	111 (76.0)	142 (81.6)			
Trading goods	15 (10.3)	12 (6.9)			
Own business	3 (2.1)	0 (0.0)			
General employee (ie. retail store)	8 (5.5)	13 (7.5)			
Unemployed	9 (6.2)	7 (4.0)			
Monthly income (Thai Baht/month)			2	2.154	0.341
0-5,000	131 (89.7)	147 (84.5)			
5,001-10,000	10 (6.8)	20 (11.5)			
10,001-15,000	4 (2.7)	4 (2.3)			
15,001-20,000	1 (0.7)	2 (1.1)			
20,001-25,000	0 (0.0)	1 (0.6)			
Underlying diseases			2	0.909	0.635
Diabetes	66 (45.2)	72 (41.4)			
Hypertension	60 (41.1)	72 (41.4)			
Diabetes and hypertension	20 (13.7)	30 (17.2)			

*p-value<0.05

Vulnerable groups, such as the elderly and individuals with non-communicable diseases, face a heightened risk of COVID-19 infection and often experience more severe symptoms during outbreaks. Consequently, these populations have been prioritized by the government for vaccinations and additional healthcare measures. Regular engagement in health-preserving behaviors is evident; for instance, when venturing outdoors, the elderly in this study were diligent in using alcohol-based hand sanitizers with a minimum concentration of 70%.

Previous research corroborates these findings. A study by Upake et al. revealed that the elderly demonstrated high levels of COVID-19 preventive behaviors[23]. Likewise, Yodmai et al. reported good preventive behavior among the elderly[7]. Poonaklom et al.'s study in Kalasin Province, Thailand, found that the majority of elderly participants rated their COVID-19 preventive behavior as good, consistently wearing face masks outside and regularly washing their hands with soap or alcohol gel[24]. Additionally, in the research by Chen et al., it was observed that Chinese elderly adults frequently washed their hands and wore face masks in public spaces[25]. This body of evidence underscores that fundamental preventive practices against COVID-19 among the elderly are well-established within the community.

The preventive behaviors previously outlined have the potential to mitigate the risk of COVID-19 among the elderly, who are particularly vulnerable to infection in public spaces. A commendable practice observed in this study's elderly participants was their regular engagement with media sources to stay informed about the COVID-19 situation, which likely contributed to their high level of reported preventive behavior. Another prudent behavior was their inclination to remain at home and avoid community or public places while ill, thereby reducing the potential to spread the virus and safeguarding their own health. When the elderly are unwell, their immune systems are typically more compromised, making them more susceptible to additional infections. The presence of non-communicable diseases such as diabetes and hypertension further exacerbates the risk of severe respiratory complications from COVID-19.

However, some behaviors reported by the elderly in this study could increase their risk of COVID-19 infection. For instance, habits such as touching their faces or rubbing their eyes, and traveling to areas with reported COVID-19 cases, posed additional risks. These actions often stemmed from essential activities or strong desires, such as visiting family members or running necessary errands in affected areas.

Risk factors for COVID-19 infection in the elderly also include not maintaining social distancing, inadequate hand hygiene, and failing to self-monitor or isolate when symptomatic. Such behaviors could elevate the risk of viral transmission. Nevertheless, the severity and symptomatology of COVID-19 in the elderly may differ due to widespread vaccination. With most elderly individuals in Thailand having received the COVID-19 vaccine, the risk of severe illness and hospitalization is significantly reduced despite the possibility of infection.

This study revealed that there was an association between age groups and the level of preventive behavior against COVID-19 infection. Notably, participants in the early elderly category (60-65 years old) exhibited the highest level of preventive behavior, while those aged between 66 and 69 years demonstrated relatively lower levels of such behavior. Importantly, individuals in both age brackets were self-sufficient and did not require specialized care from family members for daily living, despite having underlying health conditions such as diabetes and hypertension. Their independence from family or grandchildren for care enabled these elderly individuals to adhere to effective preventive measures against COVID-19. The analysis highlighted that early seniors (60–65 years old) were more autonomous in self-care compared to other older age groups, including

those between 66 and 69 years old, thus affording them the highest potential for safeguarding themselves against COVID-19. In comparison, a previous study by Chen et al. found that a majority of older adults, specifically 54.1% of those aged 60 to 69, had a preventive behavior score of 13.81 (standard deviation=1.61) out of 15, reinforcing the significance of age in influencing preventive behaviors[25].

It was also discovered that the participant's education was significantly associated with their level of preventive practices for COVID-19. Most of the elderly who had graduated from late elementary school, had the highest level of COVID-19 prevention behavior. It was therefore inferred that the properly educated elderly were better able to track and read information regarding COVID-19. It is possible that better education enabled some participants to synthesize information on various social media or read press releases from many sources. As a result, the elderly had both high and highest levels of preventive behaviors against COVID-19. This is similar to previous research, which also showed that higher levels of education were associated with an increase in preventive behavior for COVID-19[26].

Conclusion

The findings of this study indicate that elderly individuals with underlying diseases in rural northeastern Thailand exhibit a high level of preventive behavior against COVID-19. It appears that such populations are becoming increasingly aware of the risks associated with infectious diseases and are willing to adopt effective measures to mitigate the spread of COVID-19. This proactive stance towards prevention is likely to curtail the transmission of various illnesses, including COVID-19, thereby yielding positive health outcomes. These results underscore the importance of continuing to promote preventive behaviors among the elderly, particularly those with non-communicable diseases in rural settings, alongside efforts to enhance their safety and overall health.

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Conflict of interest

We have no conflicts of interest.

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