FACTORS INFLUENCING ELDERLY INDIVIDUALS WITH CHRONIC DISEASE INFECTED WITH COVID-19 IN NORTHEAST THAILAND

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ABSTRACT

Little is known about the factors influencing elderly individuals' decisions regarding the COVID-19 booster vaccine, especially given the ongoing evolution of the virus. This study aimed to determine the factors affecting decision-making about receiving the booster doses. A total of 597 participants were recruited through stratified random sampling for this analytical cross-sectional study conducted from August 2023. Research instruments included a questionnaires based on Protection Motivation Theory and intensions to receive the COVID-19 vaccine. Data were analyzed using descriptive statistics and multiple logistic regression. The results showed that the majority of participants were female (67.00%), aged over 66 years (64.32%), and single (72.22%). Notably, 72.22% hesitated to receive the third booster dose, and and 73.87% reported not receiving the booster due to fear of adverse events following immunization. Participants who were retired government officials or in other occupations (Adjusted OR = 3.142, 95% CI:1.938-8.294) had two co-morbidities (Adjusted OR = 4.637, 95% CI: 2.113-9.004), had high perceived severity (adjusted OR = 3.321, 95% CI: 1.943-9.625), had high self-efficacy (adjusted OR = 7.392, 95% CI: 1.042-12.634), and had high protection motivation (Adjusted OR = 6.832, 95% CI: 2.347-14.628) were significantly more likely to decide to receive the COVID-19 booster dose. Nurses should focus on promoting awareness and prevention of adverse effects related to the booster vaccine.

Keywords: *Booster; COVID-19; decision-making; dose hesitancy; elderly*

BACKGROUND

Since the World Health Organization (WHO) declared the novel coronavirus (COVID-19) a global pandemic, its spread has continued worldwide, (Cucinotta & Vanelli, 2020). Vaccination has been a crucial tool in controlling severe acute respiratory syndrome and has been administered globally since late 2020 with the aim of achieving herd immunity against the pandemic (Jain et al., 2021). In the early stages, COVID-19 vaccines were designed based on the ancestral (wild-type) strain and were typically administered in two shots to achieve full priming vaccination. However, breakthrough commonly occur even after a full priming (Graña et al.,2022; Chia et al., 2022). The main reasons for this were include waning immunity (Castro et al., 2022) and booster vaccinations are crucial (Regan et al.,2023). Additionally, concerns about vaccine efficacy and emergence of variant strains complicate efforts to eradicate COVID-19 with vaccines alone (Arashio et al., 2023; Ferdinands et al., 2023). Therefore, booster vaccinations remained crucial (Regan et al., 2023). Elderly with chronic illnesses who have received no more than two doses of the COVID-19 vaccine constitute represent particularly vulnerable population. Their susceptibility arises not only from age-related physiological decline but also from diminished immune function and the presence of comorbidities, which collectively heighten the risk of COVID-19 infection. Evidence from a literature review indicates that vaccination coverage in this group remains below 50%, and their mortality rate is substantially higher than that of other populations. Furthermore, preventive health motivation has been shown to be positively associated with COVID-19 vaccination uptake (Regan et al., 2023).

Thailand has strived against multiple waves of the COVID-19 pandemic, with approximately 4 million total confirmed cases and nearly 30,000 deaths have been reported (Pratumwan et al., 2022). In response, the Thai Ministry of Health continues to recommend that the population receive up-to-date vaccines as a booster vaccinations, especially elderly individuals with chronic diseases, who are considered a vulnerable group at greater risk of life-threatening infection or mortality due to an insufficient immune response compared to healthy individuals. However, vaccine hesitancy —defined as delay in acceptance or refusal of vaccines, vaccines despite availability—remains a major challenge, partly due to concerns about side effects and access to vaccination (MacDonald, 2015; Salmon et.al., 2015).

Vaccine hesitancy is complex and context-specific, varying over time, across regions, and depending on the type of vaccine. It is influenced by factors such as complacency, convenience, and confidence (Mittring-Junghans et al.,2021). Several studies have reported significant increases in vaccine hesitancy (Roy et al., 2022a; Alimohamadi et al., 2022; Roy et al., 2022b), attributed to altered perceptions of disease risk, concerns about safety and efficacy, uncertainty regarding available vaccines, and fear of side effects, misinformation, and fake news (Paul et al., 2022; Roy et al., 2022c; Yanto et al., 2022).

Due to multiple waves of the COVID-19 pandemic, booster doses necessary to protect against life-threatening infections and reduce the likelihood of long COVID-19. Although vaccination has been a key public health practice that greatly reduce disease, disability, and death, vaccine hesitancy remains a major obstacle worldwide in controlling the COVID-19 pandemic (Sallam, 2021; Fisher et al., 2020).

A review of literature revealed limited information on the factors affecting COVID-19 booster vaccine hesitancy among fully vaccinated individuals (Folcarelli et al., 2022; Rzymski et al., 2021; Yadete et al., 2021; Klugar et al., 2021; Pal et al., 2021). Immunity in older decline with age, both due to the aging process and presence chronic conditions. It is recommended that elderly patients aged 60 and above with chronic disease receive booster vaccinations to protect themselves from common infectious diseases and their serious complications. In this study, we conducted a cross-sectional analysis study by distributing questionnaires in June to August 2023 in Northeast Thailand, aiming to determine factors influencing decision to receive booster doses among elderly patients with chronic disease who have been infected with COVID-19.

METHOD
Study design
This study employed a cross-sectional design, and the sample size was calculated using Cochran's sample size formula by using Z-score1.96,p 0.5, and e.05, resulting in an initial estimate of 385 participants, resulting in an initial estimate of 387 participants. After incorporating an additional allowance of more than 20% to account for potential dropouts, the final required sample size was **597** respondents. A stratified multistage random sampling technique was used. Since the elderly individuals with chronic disease sampled reside in Northeast Thailand, this region was divided into three sub-regions. Samples from these sub-regions; Bueng Khong Long District Bueng Kan Province, Mueang District Ubon Ratchathani Province, Yang Talat District Kalasin Province were then proportionally selected using multistage random sampling. The stratification factors included sub-region, age, sex, and disease type. The inclusion criteria comprised elderly individuals with chronic diseases who had previously infected with COVID-19.

Instruments
A self-report questionnaire was developed based on a literature review and expert opinions (Finney et al., 2021; Xiong et al., 2019; Fang, 2021). The research instrument consisted of three parts: the first collected basic information about the participants; the second included items on COVID-19 vaccine hesitancy, which were self-designed based on the literature review, interviews with elderly individuals who had been infected with COVID-19, and expert consultation. The closed-ended question measured participants' responses to the question, "To what extent do you want to take the COVID-19 booster vaccine?," responses were by as "definitely yes," "unsure but tend to be willing," "unsure but tend to be unwilling," "definitely no." The responses to COVID-19 vaccine intention were classified into two categories: willing group ("definitely yes", and "unsure but tend to be willing") and unwilling group ("unsure but tend to be unwilling", and "definitely no"). Participants were further asked about the reasons "Why don't you want a booster shot?" which included efficacy efficacy, vaccine accessibility, side effects, product safety, and history of COVID-19 infection. The final section included items based on the domain of the Protective Motivation Theory, to which participants responded using a 5-point Likert scale, ranging, from strongly disagree (1 point) to strongly agree (5 point). A higher score indicated a more negative attitude toward COVID-19 vaccination. A pilot study was conducted to assess the validity and reliability of the scale. The Item Objective Congruence (IOC) IOC. ranged from 0.67 to 1.00, and the total scale demonstrated good internal consistency, with a Cronbach's alpha reliability coefficient of 0.86.

Data analysis
The Statistical Package for the Social Sciences (SPSS) software was used for data analysis. Descriptive statistics were employed to explore the characteristics of the study population. Multiple regression analysis was conducted to address the study objectives. The enter method of regression was applied to obtain odds ratios (OR) and 95% confidence intervals (95% CI). Statistical significance was set at $p < 0.05$.

Ethical considerations
The Health Research Ethics Committee of Mahasarakham University granted ethical approval to conduct this study under approval number 227-194/2023.

RESULT
Table 1 shows that the majority of participants had not received a booster dose after completing the standard two-dose vaccination course. The proportions of participants hesitant to receive further COVID-19 booster doses and regular vaccines were 73.87% and 36.13%, respectively. All 441 participants responded to questions regarding factors influencing their willing to receive booster vaccines in the near future. In the order of prevalence, the factors were: side effects (78.68%), product safety (49.43%), history of COVID-19 infection (48.75%), vaccine efficacy (43.99%), and vaccine accessibility (20.63%). This study was conducted during the fifth wave of the pandemic period in Thailand, from June 2023 to August 2023. During this period, the number of elderly individuals with chronic diseases affected by COVID-19 increased, and the Thai Ministry of Public Health actively encouraged them to receive booster doses.

Table 1. Hesitancy of participants' decision whether to have booster vaccines

Variable	Answer	f	%
Booster hesitancy	yes	441	73.87
	no	156	26.13
Vaccine efficacy	yes	194	43.99
	no	247	56.01
Vaccine accessibility	yes	91	20.63
	no	350	79.37
Side effect	yes	347	78.68
	no	94	21.32
Product safety	yes	218	49.43
	no	223	50.57
COVID-19 infection history	yes	215	48.75
	no	226	51.25

Table 2 presents data from a total of 597 valid questionnaires collected for this study, comprising 400 women (67.00%) and 197 men (33.00%). Most respondents,384 respondents (64.32%), were over 66 years old. The most common occupation was farmer/gardener/general contract worker, accounting for 59.29% of the sample. Additionally, of respondents reported having a single chronic disease out of 608 chronic illness recorded. A high level of perceived severity was reported by 57.78%, while 58.29% perceived their self-efficacy as low to moderate. Furthermore, 64.82% demonstrated a high level of protection motivation (See Table 2). We also found that 73.87% of respondents exhibited hesitancy toward receiving the third dose booster of the COVID-19 vaccine. The important reason for not yet receiving the third dose booster was fear of adverse events following immunization.

Table 2. Difference in COVID-19 vaccine booster doses hesitation to variable (n = 597)

Variable	Investigators (n=597)	Hesitate (n=441)		Non- hesitate (n=156)		p value
		f	%	f	%	
Age (y)						.034
≤ 65	213	153	34.69	60	38.46	
≥ 66	384	288	65.31	96	61.54	
Sex						.019
Male	197	144	32.65	53	33.97	
Female	400	297	67.35	103	66.03	
Occupation						.009
Farmer/gardener/general contract occupation	354	271	61.45	83	53.21	
Retired government official and other	243	170	38.55	73	46.79	
Number of chronic disease						<.001
Single disease	461	341	77.32	120	76.92	
More than 2 diseases	136	100	22.68	36	23.08	
Perceived severity						<.001
Low to moderate	252	188	42.63	64	41.03	
High	345	253	57.37	92	58.97	
Perceived self-efficacy						<.001
Low to moderate	348	249	56.46	99	63.46	
High	252	192	43.54	57	36.54	
Protection motivation						<.001
Low to moderate	210	156	35.37	54	34.62	
High	387	285	64.63	102	65.38	

Table 3 illustrates the factors affecting the decision making to receive COVID-19 booster doses. Participants who were retired government official or belonged to other occupational categories (adjusted OR = 3.142, 95% CI:1.938-8.294), those with two comorbidities (adjusted OR = 4.637, 95% CI: 2.113-9.004), individuals with had high perceived severity (adjusted OR = 3.321, 95% CI: 1.943-9.625), those with had high self-efficacy (adjusted OR= 7.392, 95% CI: 1.042-12.634), and those with high protection motivation (adjusted OR = 6.832, 95% CI: 2.347-14.628) were significantly more likely to decide to receive the COVID-19 booster dose.

Table 3. Factors affecting decision making for receiving the booster doses in elderly with chronic disease (n = 597)

Variable	Crude OR	95% CI		Adjusted OR	95% CI		p - value
		lower	Upper		lower	Upper	
Occupation							<.001
Farmer/gardener/general contract occupation		Ref			Ref		
Retired government official	6.794	2.063	8.991	3.142	1.938	8.294	
Number of chronic disease							<.001
Single disease		Ref			Ref		
More than 2 diseases	5.025	3.663	10.152	4.637	2.113	9.004	
Perceived severity							<.001
Low to moderate		Ref			Ref		
High	4.067	2.732	11.544	3.321	1.943	9.652	
Perceived self-efficacy							<.001
Low to moderate		Ref			Ref		
High	9.744	2.519	14.082	7.392	1.042	12.634	
Protection motivation							<.001
Low to moderate		Ref			Ref		
High	7.031	4.705	16.511	6.832	2.347	14.628	

DISCUSSION

This research was performed approximately six months after the fifth wave of the COVID-19 pandemic in Thailand, to investigate the decision-making factors influencing for COVID-19 booster doses uptake among 597 elderly patients with chronic diseases in Northeast Thailand. The findings revealed a high prevalence of vaccine hesitancy (73.87%) roughly six months after following 5th pandemic wave. This hesitancy rate is relatively high compared to global averages reported in systematic reviews, where acceptance rates typically range from 31.3% to 84.6% depending on the region. For instance, a study in China by Lin et al. (2020) reported a significantly lower hesitancy rate of 44.9%. The disparity between our findings and prior studies may be attributed to "pandemic fatigue" and the timing of data collection; as the immediate threat of new waves perceived by the public decreased, the urgency to boost immunity might have waned compared to the early stages of the vaccine rollout. Conversely, these results align with findings from Roy et al. (2022a) and Alimohamadi et al. (2022), which suggest that vaccine hesitancy is dynamic and can increase over time due to altered perceptions of risk and uncertainty about vaccine efficacy against new variants.

The primary barrier identified in this study was the fear of adverse events following immunization (AEFI), with 78.68% of participants citing side effects as a major concern. This finding aligns with a global survey by Lazarus et al. (2021) and research by Paul et al. (2022), both of which highlighted safety concerns and fear of side effects as universal determinants of vaccine hesitancy. Similarly, Dhanda et al. (2022) emphasized that public trust in safety monitoring (post-marketing surveillance) is crucial for vaccine acceptance. However, these findings contradict the high acceptance rates observed in studies where trust in the healthcare system was greater, suggesting that for the Thai elderly with chronic illness group, personal safety concerns currently outweigh the perceived societal benefits of herd immunity.

Regarding Protection Motivation Theory (PMT), this study confirmed that high perceived severity (adjusted OR = 3.321), high self-efficacy (Adjusted OR = 7.392), and high protection motivation (adjusted OR = 6.832) were significant predictors of booster acceptance. These results are consistent with those of Griffin et al. (2022) and Wang & Liu (2021), who found that individuals who perceiving COVID-19 as a severe threat are more motivated to seek protection. Furthermore, these findings on self-efficacy support the work of Thinzar (2022) and Min et al. (2023), who demonstrated that confidence in one's ability to obtain and tolerate the vaccine is a strong predictor of vaccination intention. In contrast, Wong et al. (2020) utilized the Health Belief Model and found that, while severity was important, the benefits of vaccination (susceptibility reduction) were the strongest driver, whereas our study highlights self-efficacy as the most potent predictor (highest Odds Ratio).

Demographically, we found that retired government officials and individuals with multiple comorbidities (more than two diseases) were more likely to accept the booster. This finding aligns with Pratumwan et al. (2022), who observed that health literacy and access to information—often higher among government officials—correlate with better preventive behaviors. Interestingly, while some literature suggests that frail individuals might hesitate due to fear concerns their bodies cannot tolerate the vaccine, this study indicates the opposite: patients with multiple chronic conditions perceived a higher threat to their lives, thereby increasing their willingness to vaccinate. This supports the notion that perceived vulnerability drives compliance in high-risk groups, as noted by Yadete et al. (2021) in the United States.

CONCLUSION

In this study, we found that 27.78% of participants were fully vaccinated and had received at least one additional booster dose. A rapid increase in the booster dose uptake is needed to effectively manage the pandemic. Specific strategies should be implemented for elderly individuals with chronic illness, who are more likely to hesitate in receiving the third vaccine dose. These measures will help reduce vaccine hesitancy within the chronic disease population and facilitate smooth progress of large-scale COVID-19 booster vaccination campaigns in the future. Further research on factors associated with booster dose hesitancy is also needed, with an emphasis on enhancing self-efficacy and perceived severity to inform interventions tailored to different settings and time periods.

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