A Comparison of Managing COVID-19 Health Services in and outside Bangkok: Effectiveness, Strategies and Problems

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Abstract

According to the GHS Index 2021, Thailand was ranked 5th out of 195 countries for health security and 1st in virus detection and rapid reporting. However, there are differences between Bangkok, the capital of Thailand, and places outside it. This study compared how the country managed COVID-19 in and outside Bangkok. This study was based on a mixed-method design. The results revealed that village health volunteers (VHVs) outside Bangkok score higher than health volunteers (HVs) in Bangkok in effectiveness of COVID-19 control; and strategies, measures, and practices to control the outbreak, while HVs score higher in problems with operational COVID-19 health service management in the community. This study suggests more experiments to clarify these contradictory results. Management in Bangkok should further focus on the effectiveness of COVID-19 control and strategies, measures, and practices to control the outbreak; management outside Bangkok should further focus on problems with operational COVID-19 health service management in the community. The lessons from Thailand provide a trajectory for other developing countries for the subsequent outbreaks.

Keywords: COVID-19-19, health service management, different locations, insights, implications
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1. INTRODUCTION

Compared to developing contexts, developed contexts have superior and more advanced health systems and health crisis management. The COVID-19 virus has exacerbated health disparities and burdens. Even the WHO's most basic COVID-19 prevention guidelines were almost impossible for migrant workers in urban slums and people living in informal settlements to follow (Rotheram et al., 2021).

However, not all contexts of development are in crisis. According to the GHS Index 2021, Thailand was the only developing nation to be ranked among the top ten for the past two years, ranking fifth out of 195 nations for health security and first in virus detection and rapid reporting (GHS Index, 2021). It is therefore intriguing why developing nations such as

Thailand were able to accomplish this, and the findings of the investigation will have implications for other developing nations around the globe. Examining the specifics reveals that it is more intriguing because COVID-19 records in and outside Bangkok, the capital of Thailand, contain contradictions. Evidently, the outbreak continued in Bangkok for nearly a year, and from Bangkok, clusters spread across the nation. In contrast, the outbreak outside Bangkok was not catastrophic despite a lack of medical facilities and personnel. This was the result of the health management of over 1,040,000 village health volunteers (VHVs) in every city except Bangkok. The argument for why health inequality is a burden in Bangkok but not elsewhere remains unconvincing. Therefore, it is intriguing to investigate how COVID-19 was managed in Bangkok and beyond. This study aimed to compare how Thailand managed COVID-19 in and outside Bangkok in order to draw conclusions and recommendations for Thailand. The lessons that can be learned from Thailand could also help other developing countries plan for future outbreaks.

This article's contents were organized as follows: This section (Introduction) presents the study's rationale, a research gap, and research objectives. The literature review, prior research on COVID-19 responses and management, a conceptual framework for the study, and research questions comprise the second section (Literature Review). The third (Research Method) describes the methodological approach to research. The fourth section (Results of the Study) illustrates the findings of the research. The fifth section (Conclusion) concludes the study. In the last section, (Discussion), the results of this study are compared to the results of other studies. Inconclusive results are explained, as are the limitations of this study. It is also talked about how the results of this study can add to the results of other studies, how more research needs to be done, and what policymakers should do as a result.

2. LITERATURE REVIEW

The literature review is divided into two sections to explain how Thailand managed COVID-19 within and outside of Bangkok. The former provides prior research on how developing countries managed COVID-19 in two main areas (namely ecological issues and paradigm shift) is covered in the first section. The latter provides prior research on Thailand's COVID-19 management challenges.

2.1 Administration of COVID-19

Several factors contribute to two of the most important factors are ecological issues and paradigm shift management.

2.1.1 Environmental concerns

Locations, size, physical geography, sociocultural differences, diversity, and distribution of organisms within an ecosystem determine disease management and control. Consequently, approaches and measures for epidemic control vary by region. To illustrate this, controlling international borders is the first and most effective measure for limiting the local spread of other countries (O'Connor, 2021). Because hilly regions are 10% less infected than other regions, epidemic control approaches and measures in hilly regions should be less stringent (Agnoletti et al., 2020). Therefore, scholars (e.g., Malatzky et al., 2020; Nath et al., 2021; Righi et al., 2021) advocated a location-based strategy to increase rural communities' understanding and awareness of the virus outbreak. For instance, Nath et al. (2021) found that anthropological and geographic approaches as well as integrated countermeasures are effective in coastal areas. On the other hand, Righi et al. (2021) indicated that cross-sector partnerships, grassroots sectors, and innovations based on local knowledge and experience can help rural and disabled communities reduce disaster risk in a comprehensive way.

Since COVID-19 is a new disease that has affected all parts of life, many new ways of thinking and actions have been taken to stop the epidemic.

2.1.2 Dealing with paradigm shifts

Almost all of the epidemic control measures implemented in response to COVID-19 have resulted in fundamental shifts in approaches and measures that have had a profound impact on the lives and well-being of people in all regions. These paradigm shifts include modifications to movement and transportation policies (da Silva, 2021; Gaskin et al., 2021), travel movement and transport restrictions (Mishra & Rath, 2020; Glaser & Krizek, 2021); responsible transport (Budd & Ison, 2020), and lockdown (Kumar & Choudhury, 2021; Sardar et al., 2020; Glover et al., 2020).

Several researchers (Thombre and Agarwal, 2021; Marsden & Docherty, 2021; Mogaji, 2020; Koch et al., 2021; Gupta et al., 2021; Maqableh & Alia, 2021; Chirisa et al., 2021; Fatmi et al., 2021; Chirisa et al., 2021; Mogaji, 2020) noted that public and private policy implementation requires clear practical guidelines. Practical guidelines for effective management must address travel behavior and travel patterns (Thombre & Agarwal, 2021), work from home styles (Koch et al., 2021), education and learning (Maqableh & Alia, 2021), lives and livelihoods around the world (Gupta et al., 2021), life and well-being (Chirisa et al., 2021), and human and social relationships (Chirisa et al., 2021 (Fatmi et al., 2021). Some researchers also revealed that technology, such as mobile apps for containment (O'Connor et al., 2021), Geographic Information Systems (GIS), and Big Data technologies (Zhou et al., 2020), can help make management more effective.

In a response to COVID-19, all nations must implement paradigm shifts. As the focus of this study is crisis management in Thailand, the following section describes how Thailand handles the crisis.

2.2 Managing the public health crisis in Thailand in response to COVID-19

To understand how Thailand handled health care during COVID-19, below are Thailand's challenges in managing COVID-19.

2.2.1 Difficulties Thailand faces in managing COVID-19

Multiple factors contribute to Thailand's effective administration. There are a lot of big problems, but here are three: inadequacy of vaccines and self-protective measures, concerns regarding the risks of infection and personal health issues, and ineffective systemic communication.

2.2.1.1 Inadequacy of vaccines and self-protective measures

Thailand has experienced a lack of self-protective measures, just as other developing nations have (Sagaon-Teyssier et al., 2020; Raju et al., 2021; Rotheram et al., 2021; Sagaon-Teyssier et al., 2020; Raju et al., 2021; Rotheram et al., 2021). During COVID-19, rural Thais lacked self-protective measures (such as wearing masks, frequently washing hands with soap, and alcohol gel) (Kaweenuttayanon et al., 2021; Chinnapha, 2020). A potential challenge for Thailand was to manage the slow services of detection, screening, treatment, and patient follow-up due to the deficiency of substantial health facilities. Due to the challenges, some scholars found that vulnerable groups, such as marginalized migrant workers (Georgios & Barra, 2021), age-related risk groups (Naughton et al., 2021), asylum seekers, indigenous communities, and children (Spagnolo et al., 2020), should be given extra care when dealing with the virus.

2.2.1.2 Concerns regarding the dangers of infection and personal health issues

Due to insufficient vaccines and self-protective measures, a lack of substantial health facilities, and slow services of detection, screening, treatment, and patient follow-up, health workers (both professionals and volunteers) throughout Thailand, particularly in remote areas, are concerned about the risks of infection and personal health issues (Jamjumrus, 2021). During the period of rising death and infection rates, the excessive workload led to fatigue at work, physical and mental exhaustion, boredom, and despondency among the workers. Also, as they got older and had health problems, their fears of getting sick and personal problems made them much more stressed and tense (Jiratchayaporn et al., 2022).

2.2.1.3 Ineffective systemic communication

To achieve effective management of COVID-19, Thailand developed websites and mobile applications such as Thai Chana and Aor Sor Mor for communication between health workers and patients and all parties involved in providing healthcare services promptly and managing the outbreak effectively to provide the best practices for prevention and containment of COVID-19 appropriately for the crisis in the region. Due to poor infrastructure, computer and technology illiteracy, lack of funds, and insufficient provision of self-protective measures and resources, it is difficult or impossible for people in rural and remote areas to access websites and mobile applications. Tejativaddhana et al. (2020) found that lack of communication and sharing of information between rural and urban areas makes it hard for health workers to provide timely services for COVID-19 prevention and local containment. Kaweenuttayanon et al. (2021) suggested that one of the biggest problems was that people did not want to report positive test results, and it was hard to get and share reliable information.

2.2.2 Managing the public health crisis in Thailand in response to COVID-19

Under the Universal Health-care Coverage Scheme, Thailand has provided healthcare services (UCS). Village health volunteers (VHVs) are essential to this system. In each community, a primary care clinic was established. Each VHV plays a crucial role as a health service provider and intermediary in facilitating the delivery of health services. Some of their respective responsibilities are listed below.

2.2.2.1 As a health-care professional

Due to shortages of health professionals in the Thai health service system, VHVs assist health professionals in providing healthcare services. It would be impossible to track local cases across Thailand without VHVs (Bezbaruah et al., 2021). To accomplish this, they conduct a proactive "door-to-door" service campaign to raise awareness of COVID-19 (Viwattanakulvanid, 2021). As data collectors and reporters, VHVs assisted health professionals during the campaign by collecting daily health data and keeping them informed with daily reports and vital health statistics. Each VHV keeps track of local cases in 10-15 households every day (Krassanairawiwong et al., 2021; Tantrakarnapa et al., 2020), identifies high-risk cases, sets up a quarantine, regularly checks on individuals and home-returnees, follows quarantine checkup, and visits patients to write down their symptoms (Tangkitvanich, 2021).

In carrying out the "door-to-door" service campaign, VHVs also provide protective equipment and supplies (such as handmade masks, alcohol gel, health flyers, and stickers for screened households), as well as local quarantine and 14-day self-isolation facilities (Bezbaruah et al., 2021; Vongsayan & Nethipo, 2021; Chinnapha, 2020; Malathum & Malathum, 2020; Marddent & Arporn, 2021). They are responsible for COVID-19 prevention and containment in their communities (Chinnapha, 2020). They work from a few hours a week to long shifts over several days in the event of an emergency (Vongsayan & Nethipo, 2021) and are available 24 hours a day in the event of an outbreak. They are invaluable health assets in the COVID-19 crisis (Nittayasoot et al., 2021) because they can work faster and more efficiently than government officials (Laochankham et al., 2021).

VHVs are key players in health surveillance activities during the COVID-19 pandemic, in addition to playing a vital role in managing local transmission (Vongsayan & Nethipo, 2021; Krassanairairawiwong et al., 2021; Langkulsen & Rwodzi, 2021; Shadmi et al., 2020). They collect daily health data, improve infection statistics on a regular basis, and periodically report the statistics to professionals (Viwattanakulvanid, 2021). In the event of an emergency or the discovery of a new case, they also report it to local authorities, such as the heads (Kaweenuttayanon et al., 2021; Tejativaddhana et al., 2020; Viwattanakulvanid, 2021). This information is needed to figure out

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how the disease spreads, prepare and buy medical equipment for prevention and treatment, and make decisions about budgets, emergency management, and policy (Marome & Shaw, 2021).

2.2.2.2 As a go-between

During the pandemic, VHVs connect public health professionals with their community (Naprathansuk et al., 2021; Aung et al., 2021), so they serve as intermediaries between their community and health professionals, the local authorities, and all parties and networks within and outside their community (Jiaviriyaboonya, 2022; Kitchanapaibul et al., 2021). In order to effectively manage the crisis and provide timely medical care to those in need, VHVs require assistance from wider social networking (Pongpirul, 2020). They can do their jobs well by using communication technologies like smartphones, apps for smartphones, and websites and apps made just for them (Raymond, 2022; Vongsayan and Nethipo, 2021; Bandaranayake et al., 2021).

As intermediaries, VHVs are also friends and family, get close to community members, and comprehend their concerns, thereby gaining the members' trust (Marddent & Arporn, 2021). They can provide emotional support through counseling and informal conversations (Kertesz et al., 2020) and guide community members to health solutions (Osewe, 2021). Conversations can aid in alleviating members' fears of infection, stress, and tension (Tejativaddhana et al., 2020). These trust-based relationships are crucial to the success of COVID-19 surveillance in the context of limited resources (Bezbaruah et al., 2021; Triukose et al., 2021). Despite Thailand's overall success in managing COVID-19-19, as evidenced by the prior study, the outbreak is ongoing in Bangkok. It is unclear how COVID-19 management in Bangkok differed from management outside Bangkok, given that management in Bangkok is done by volunteers and not trained health volunteers as in other cities. It is necessary to compare the management of COVID-19 health services in Bangkok and elsewhere. The findings will provide theoretical insights into health service management as well as practical implications for Thailand's policy formulation and implementation of more effective outbreak management. The lessons that can be learned from Thailand could also help other developing countries deal with future outbreaks.

To fill the gap and meet the goals of the study, a conceptual framework and research questions were made, as shown in the next section.

2.3 Conceptual framework of the study and research questions

2.3.1 Conceptual framework of the study

The conceptual framework of the study can be photographically as shown in Figure 1.

Figure 1 Conceptual framework of the study

Figure 1 illustrates the conceptual framework of this study. Based on the theoretical framework of this study, comparisons were made between COVID-19 management in Bangkok and outside of Bangkok in two areas: (1) the effectiveness of COVID-19 health service management in your area (2) strategies, measures, and practices to control the outbreak.

2.3.2 Research questions

In response to the study's objective, the following research question (RQ) was posed: What insights could be drawn upon the differences between COVID-19's health service management in and outside Bangkok in two areas (namely the effectiveness of COVID-19 control in VHVs and HVs and strategies, measures and practices to control the outbreak)? To address the aforementioned RQ, the following research methodology was developed.

3. METHODS

The method for this study includes designing the study and the sample, collecting data, using tools to collect data, analyzing the data, and testing its reliability. Below are details of each component.

3.1. Research design

This study's design was based on a mixed-methods approach. The population were health volunteers (HVs) outside Bangkok and health volunteers (HVs) in Bangkok. The selection of the sample was based on stratified probability sampling. The sample size was determined using the Taro Yamane formula. The survey's sample size was a total of 416, comprised of 356 VHVs and 60 HVs. The number of samples collected in each region of Thailand was as follows: Northern (83), Northeastern (68), Eastern (37), Western (33), Southern (61), Central (74), and Bangkok (83). (60). The 40 key informants for the focus groups were selected from each region, as well as Bangkok. Due to a dearth of prior information on how to manage this pandemic, the knowledge and experience of the key informants were required. The key informants' voices and points of view were kept alive with the help of the focus group. This gave the researchers flexibility in case new issues, ideas, or patterns came up. Figure 2 below illustrates the proportion of respondents in this study.

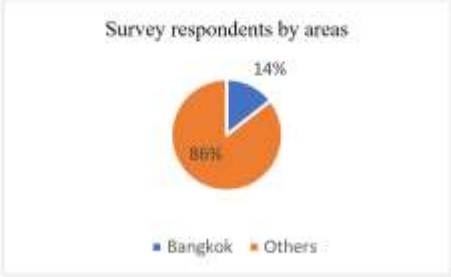

Figure 2 Proportion of samples

Figure 2 shows the percentage of respondents to this study. 86% (n. = 356 VHVs) of respondents were VHVs, while 14% (n. = 60 HVs) were HVs, for a total of 416 respondents.

3.2 Data collection

For July and August of 2021, the data collection began with two focus groups, each composed of 20 key informants, for a total of 40. The questionnaire was then administered to the samples between October and December of 2021. Then, 416 respondents were assigned a questionnaire survey. Lastly, 100 were interviewed for insights of problems in their areas.

3.3 Instruments

Below are the specifics of instruments for data elicitation in this study.

3.3.1 Focus groups

The purpose of these two focus groups was to compare their management of COVID-19 control based on the discussions of forty samples as key informants. As facilitators, the researchers conducted the discussions based on the principles of adaptability, sincerity, courtesy, and regard for the key informants. The discussion focused on the following topics: (namely, the effectiveness of COVID-19 health service management in your area, problems with the operation of COVID-19 control in your area, and strategies, measures, and practices to

control the outbreak). The insights from these focus groups were used to develop the questionnaire for the survey.

3.3.2 A questionnaire

The background content of the five-scale rating questionnaire based on agreeing and disagreeing was derived from the focus group discussions. The questionnaire has 2 main topics and 25 specific questions.

3.4 Data analysis and reliability and validity checks

3.4.1 Data analysis

There was both qualitative and quantitative data. The focus group analysis followed the triangulation principle. All three researchers recorded, transcribed, and decoded the verbal discussions. Then, the transcript's key concepts were meticulously identified. The identified concepts were then classified and interpreted in relation to one of the three major areas. The results interpreted by three researchers were compared and discussed in an effort to reach a consensus. The scoring criteria for the analysis of the questionnaire were based on a 5-point scale, ranging from 1 to 5 for strongly disagreeing, disagreeing, neutral, agreeing, and strongly agreeing, respectively. Statistical analysis utilized the mean and standard deviation. The levels of agreement were then interpreted based on the following criteria, from lowest to highest: lowest (average 1.51-2.50), low (average 1.51-2.50), moderate (average 2.51-3.50), high (average 3.51-4.50), and highest (average 4.51-5.00).

3.4.2 Reliability and validity checks

The questionnaire was developed in response to the study's objectives. This study was a collaboration between the United Kingdom and Thailand, so this survey questionnaire was sent to ten reviewers, five in the United Kingdom and five in Thailand, for content and construct validity checks. The researchers then made adjustments based on the reviewers' recommendations. The questionnaire was then tested by 30 respondents to determine its reliability. The results were evaluated using Alpha Cronbach's Coefficient. The value was 0.92, indicating a significant value. The study's findings are presented in the following section.

4. RESULT OF THE STUDY

The results of the study are presented in accordance with the RQ: What insights could be drawn upon the differences between COVID-19's health service management in and outside Bangkok in two areas (namely the effectiveness of COVID-19 control in VHVs and HVs and strategies, measures and practices to control the outbreak)?. Below are the results of the study.

Table 1 The effectiveness of COVID-19 control in VHVs and HVs

Effectiveness of COVID-19 control	VHVs		HVs	
	Mean (S.D.)	Level of satisfaction	Mean (S.D.)	Level of satisfaction
1. You know the principles and guidelines for practice in controlling the spread of COVID-19.	4.2331 (0.6316)	High	4.1333 (0.5665)	High
2. You are ready to work at all times.	4.2724 (0.6156)	High	4.1000 (0.6298)	High
3. The daily workload is appropriate.	3.8230 (0.9347)	High	3.4500 (0.7686)	Moderate
4. The service point is crowded.	2.6742 (0.7574)	Moderate	2.9000 (0.9334)	Moderate
5. The service point is safe.	4.1433	High	3.6833	High

	(0.6717)		(0.6763)	
6. The code of practice is clear.	4.3258 (0.6329)	High	3.8833 (0.6911)	High
7. The practice is systematic.	4.2584 (0.6733)	High	3.9833 (0.7247)	High
8. The practice is sufficient.	3.9916 (0.6733)	High	3.5500 (0.8522)	High
9. The practice is difficult.	2.5225 (0.9682)	Moderate	2.3500 (1.0055)	Low
10. There are weaknesses in the practice.	2.5393 (0.9411)	Moderate	2.5333 (1.0328)	Moderate
11. The current practice this year is the same as last year.	3.8062 (0.8747)	High	3.3833 (0.8253)	Moderate
12. There is a need for applied principles or practices.	3.9129 (0.7877)	High	3.7833 (0.6911)	High
13.You have difficulty in performing your tasks.	2.7303 (1.0456)	Moderate	3.3500 (1.0708)	Moderate
Total	3.6281 (1.0501)	High	3.4679 (1.0288)	Moderate

Table 1 shows a comparison of mean scores (and standard deviation) of the effectiveness of COVID-19 control between VHVs and HVs. The overall mean scores of VHVs ($\overline{X}$= 3.6281, S.D.= 1.0501) are higher than those of HVs ($\overline{X}$= 3.4679, S.D.= 1.0288). VHVs strongly agree with the effectiveness, while HVs moderately agree. In detail, VHVs strongly agree with these issues: "the code of practice is clear" ($\overline{X}$= 4.3258, S.D.= 0.6329), "you are ready to work at all times" ($\overline{X}$= 4.2724, S.D.= 0.6156), "the practice is systematic" ($\overline{X}$= 4.2584, S.D.= 0.6733), "you know the principles and guidelines for practice in controlling the spread of COVID-19" ($\overline{X}$= 4.2331, S.D.= 0.6316), "the service point is safe" ($\overline{X}$= 4.1433, S.D.= 0.6717), "the practice is sufficient" ($\overline{X}$= 3.9916, S.D.= 0.6733), "there is a need for applied principles or practices" ($\overline{X}$= 3.9129, S.D.= 0.7877), "the daily workload is appropriate" ($\overline{X}$= 3.8230, S.D.= 0.9347), and "the current practice this year is the same as last year" ($\overline{X}$= 3.8062, S.D.= 0.8747) respectively.

On the other hand, HVs strongly agree with these issues: "you know the principles and guidelines for practice in controlling the spread of COVID-19" ($\overline{X}$= 4.1333, S.D.= 0.5665), "you are ready to work at all times" ($\overline{X}$= 4.1000, S.D.= 0.6298), "the practice is systematic" ($\overline{X}$= 3.9833, S.D.= 0.7247), "the code of practice is clear" ($\overline{X}$= 3.8833, S.D.= 0.6911), "there is a need for applied principles or practices" ($\overline{X}$= 3.7833, S.D.= 0.6911), "the service point is safe" ($\overline{X}$= 3.6833, S.D.= 0.6763), and "the practice is sufficient" ($\overline{X}$= 3.5500, S.D.= 0.8522) respectively.

This means that both VHVs and HVs agree, on average, that COVID-19 control works. However, there are differences between VHVs and HVs regarding issues requiring further development in preparation for a future outbreak. All of the following are issues on which VHVs moderately agree: difficulty in performing tasks; crowding at the service point; practice weaknesses; and difficulty in practice. On the other hand, HVs are either moderately in agreement or disagree with the following: too much work to do every day; practice that is boring; difficulty in doing tasks, too many people at the service point; practice weaknesses; and practice difficulty.

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Table 2 Strategies, measures and practices to control the outbreak

Strategies, measures and practices to control the outbreak	VHV outside Bangkok		HV in Bangkok	
	Mean (S.D.)	Level of satisfaction	Mean (S.D.)	Level of satisfaction
1. Outbreak control principles are well-practiced.	3.9635 (0.7287)	High	3.8167 (0.7009)	High
2. The community healthcare system does not fit the current situation in your community.	3.9101 (0.7337)	High	3.8000 (0.6840)	High
3. The daily workload is appropriate.	3.8258 (0.8643)	High	3.3000 (0.6457)	Moderate
4. There is a multi-standard risk assessment.	2.7584 (1.0115)	Moderate	2.6667 (0.8570)	Moderate
5. The result of testing is slow.	2.6067 (1.0627)	Moderate	2.6833 (0.9112)	Moderate
6. There is difficulty in patient management.	2.4326 (1.1572)	Low	3.0333 (0.9561)	Moderate
7. More patients need special care than expected.	3.9663 (1.0064)	High	3.5000 (0.8733)	Moderate
8. As many patients as possible should be brought into the healthcare system.	3.4831 (1.1854)	Moderate	3.9167 (0.8496)	High
9. Home isolation for a patient with mild symptoms is needed.	2.3652 (1.0407)	Low	2.7167 (1.1213)	Moderate
10. COVID-19 management during the outbreak has failed.	3.6798 (0.9836)	High	3.2833 (0.9405)	Moderate
11. This current management plan is good.	3.9860 (0.8671)	High	3.6333 (0.9200)	High
12. A management plan needs to be revised in response to new situations.	4.0674 (0.8125)	High	3.7833 (1.0266)	High
Total	3.4204 (1.1603)	Moderate	3.3444 (1.0304)	Moderate

Table 2 shows a comparison of mean scores (and standard deviation) of strategies, measures and practices to control the outbreak between VHVs and HVs. The overall mean scores of VHVs ($\overline{X}$ = 3.4204, S.D.= 1.1603) are higher than those of HVs ($\overline{X}$ = 3.3444, S.D.= 1.0304). Both VHVs and HVs moderately agree. In detail, VHVs agree with these issues: "a management plan needs to be revised in response to new situations" ($\overline{X}$ =4.0674, S.D.= 0.8125), "this current management plan is good" ($\overline{X}$ =3.9860, S.D.= 0.8671), "more patients need special care than expected" ($\overline{X}$ =3.9663, S.D.= 1.0064), "outbreak control principles are well-practiced" ($\overline{X}$ =3.9635, S.D.= 0.7287), "the community

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healthcare system does not fit the current situation in your community" ($\overline{X}$=3.9101, S.D.= 0.7337), "the daily workload is appropriate" ($\overline{X}$=3.8258, S.D.= 0.8643), "COVID-19 management during the outbreak has failed" ($\overline{X}$=3.6798, S.D.= 0.9836) respectively.

On the other hand, HVs strongly agree with these issues: "as many patients as possible should be brought into the healthcare system" ($\overline{X}$=3.9167, S.D.= 0.8496), "outbreak control principles are well-practiced" ($\overline{X}$=3.8167, S.D.= 0.7009), "the community healthcare system does not fit the current situation in your community" ($\overline{X}$=3.8000, S.D.= 0.6840), "a management plan needs to be revised in response to new situations" ($\overline{X}$=3.7833, S.D.= 1.0266), "this current management plan is good" ($\overline{X}$=3.6333, S.D.= 0.9200) respectively.

This indicates that both VHVs and HVs are, on average, moderately in agreement with the strategies, measures, and practices employed to control the outbreak. However, there are differences between VHVs and HVs regarding issues requiring further development in preparation for a future outbreak. Minor areas of development are required for VHVs, including the ability to admit as many patients as possible into the healthcare system; multi-standard risk assessment; delayed test results; difficulty in patient management; and the need for home isolation for patients with mild symptoms. In contrast, HVs moderately agree or disagree with the following statements: special care for patients; appropriateness of daily workload; failure in COVID-19 management during the outbreak; difficulty in patient management; the need for home isolation for a patient with mild symptoms; and multi-standard risk assessment.

5. Conclusion of the study

Two conclusions could be drawn from the study.

On the effectiveness of COVID-19 control in VHVs and HVs, there are differences between VHVs and HVs regarding issues requiring further development in preparation for a future outbreak. The issues that VHVs moderately agreed and indicated further development included difficulty in performing tasks, crowding at the service point; practice weaknesses, and difficulty in practice. On the other hand, the issues that HVs moderately agreed and indicated further development comprised overload, boring practice, practice difficulty, congestions at the service point; practice weaknesses.

On the strategies, measures, and practices employed to control the outbreak, there are differences between VHVs and HVs regarding issues requiring further development in preparation for a future outbreak. Minor areas of development are required for VHVs, including the ability to admit as many patients as possible into the healthcare system; multi-standard risk assessment; delayed test results; difficulty in patient management; and the need for home isolation for patients with mild symptoms. In contrast, HVs moderately agree or disagree with the following statements: special care for patients; appropriateness of daily workload; failure in COVID-19 management during the outbreak; difficulty in patient management; the need for home isolation for a patient with mild symptoms; and multi-standard risk assessment.

6. DISCUSSION

The results of this study show that health inequality is a burden for developing countries and that inefficiency in health facilities is not always a problem in rural areas if the health service management is effective. This was determined by comparing the effectiveness of COVID-19 management in Bangkok by volunteers and outside Bangkok by trained village health volunteers. The results show that management outside Bangkok scored lower than its counterpart. This contradicts previous research (e.g., Sagaon-Teyssier et al., 2020; Raju et al., 2021; Rotheram et al., 2021). This study found that COVID-19 health service management in and outside Bangkok was multifaceted. Management in and outside Bangkok has different views on all six areas, but they face similar challenges. So, it is not clear if

health equality is a burden for places with inefficient health facilities, where good management is key to providing health care.

This study confirms previous research (Thombre and Agarwal, 2021; Marsden & Docherty, 2021; Mogaji, 2020; Koch et al., 2021; Gupta et al., 2021; Maqableh & Alia, 2021; Chirisa et al., 2021; Fatmi et al., 2021; O'Connor et al., 2021; Zhou et al., 2021). Effective management of epidemics requires inflexible approaches and measures (Marsden & Docherty, 2021; Thombre and Agarwal, 2021). This study supports other studies that effective communication fosters effective management, such as mobile apps for containment (O'Connor et al., 2021) and GIS and Big Data technologies (Zhou et al., 2020). This study found that both VHVs and HVs provide daily healthcare as assistants to health professionals in tracking local cases, identifying high-risk cases, conducting a quarantine, regularly monitoring individuals and home-returnees, following quarantine checkups, and visiting patients to record symptoms (2020). They also collect daily health data, improve infection statistics regularly, and report the statistics to professionals periodically (2021). In emergencies or new cases, they report to local authorities (Kaweenuttayanon et al., 2021; Tejativaddhana et al., 2020; Viwattanakulvanid, 2021).

This study, on the other hand, adds to the information from previous studies by showing that VHVs outside of Bangkok have trouble with tasks that are hard to do, service points that are too busy, weaknesses in practice, difficulty in practice, fear of being affected by work, time and psychological limitations in detection and follow-up, a large number of COVID-19 suspects, infected people, and patients in the area, and trouble referring COVID-19 patients.

In Bangkok, HVs face an inappropriate daily workload, repetitive practice, difficulty performing tasks, a crowded service point, practice weaknesses, and practice difficulty. Large numbers of COVID-19 suspects, infected, and patients in your area; inability to test all infected people; time and psychological constraints in detection and follow up; coordination and communication issues between VHV and new community members or visitors; and difficulty referring COVID-19 suspects, infected, and patients.

This study found that VHVs and HVs connect between public health professionals and their community like Naprathansuk et al. (2021) and Aung et al. (2021) and include all involving parties and networks like Jiaviriyaboonya (2022), Kitchanapaibul et al. (2021), and Pongpirul (2020) through the use of technology for communication such as smartphones, and smartphone apps (Marddent & Arporn, 2021).

Insufficiency of vaccines and self-protective measures is a priority challenge for developing countries (Sagaon-Teyssier et al., 2020; Raju et al., 2021; Rotheram et al., 2021). This study found Thailand's self-protection measures insufficient. Rural Thais lacked self-protection during COVID-19 (e.g., wearing masks, washing hands often with soap, and alcohol gel). Kaweenuttayanon et al. (2021) and Chinnapha (2020). This study found that Thailand's lack of health facilities could slow detection, screening, treatment, and patient follow-up. This study suggests Thailand set short-term goals to provide solutions to these challenges of strategies, measures, and practices to control the outbreak (special care for patients; appropriateness of daily workload; failure in COVID-19 management during the outbreak; difficulty in patient management; need for home isolation for a patient with mild symptoms; and multi-standard risk assessment). Also, short-term solutions must be found for COVID-19's biggest problems, such as the lack of confidence in the future code of conduct and its effectiveness, the lack of safety equipment, the fear of getting sick from work, the high number of COVID-19 suspects, infected people, and patients in your area, the inability to test everyone who is infected, the lack of time and mental space for detection and follow-up, and coordination problems.

Previous studies (e.g., Sagaon-Teyssier et al., 2020; Raju et al., 2021; Rotheram et al., 2021) found that health facilities and professionals in

developed countries are key to COVID-19 success. In developing countries, inadequate health facilities and professionals make managing health inequality difficult. In this study, the overall mean scores of VHVs outside Bangkok are higher than those of HVs in Bangkok, indicating that insufficient vaccines and self-protective measures are not the biggest challenges for rural locations.

The results are incongruous. VHVs score higher than HVs in effectiveness of COVID-19 control; strategies, measures, and practices to control the outbreak; but HVs score higher in problems with operational COVID-19 health service management in the community. This study, therefore, suggests more experiments to clarify these contradictory results.

This study's limitations may explain the contradictions. This study compares COVID-19 in two areas (namely in and outside Bangkok). This study ignored differences. Differences include ecology (location, size, geography) and local spread severity. Differences may affect disease control and management. As a result, some Thai cities or regions may have different management.

Due to this limitation, the study's results aren't clear because they were conducted in different parts of Thailand. Other studies, however, are based on a specific area in a specific physical setting. O'Connor (2021), Agnoletti et al. (2020), Malatzky et al. (2020), Nath et al. (2020), and Righi et al. (2021) all suggest a location-based approach to understanding COVID-19-19 transmission.

As an interdisciplinary study, the results contribute to management, health services, outbreak control, and public administration. The study's results will primarily benefit risk and crisis management researchers. As the study's specific area of management is health service, the results will help researchers in fields related to outbreak control, such as health service, social welfare, geography, ecology, communication, information technology, human and social relationships, anthropological approach, local knowledge, alternative medicine, and assessment (such as approaches and measures for epidemic control, outbreak transmission, and preparing and buying medical equipment for prevention).

The study's findings have practical implications for the public in all investigated areas. They can make the best use of the findings from the three areas: effectiveness of COVID-19 health service management, problems with COVID-19 control, and strategies, measures, and practices to control the outbreak. They can also apply each area's insights appropriately.

The findings suggest better outbreak management in Thailand. This study proposed goals for policymakers in developing best practices for COVID-19 management, including short-term goals (to focus on strategies, measures, and practices to control the outbreak and problems with COVID-19 control in VHVs' area). This study extends previous ones. This study investigated all types of areas at once, including hilly, plain, coastal, urban, and rural. This study's insights on COVID-19 health service management in and outside Bangkok provide policymakers with a broader empirical perspective than previous studies. This study suggests more experiments are needed to clarify the contradictory results between in-and outside Bangkok management. This study suggests more experiments to clarify these contradictory results. For example, management in Bangkok should further focus on effectiveness of COVID-19 control; and strategies, measures, and practices to control the outbreak; management outside Bangkok should further focus on problems with operational COVID-19 health service management in the community.

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