

An evaluation of Thais' attitude toward Telepharmacy in community pharmacies: A cross-sectional survey study

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Abstract: To determine the Thais' attitudes toward telepharmacy in community pharmacies service and explore the factor effected their attitudes. This cross-sectional survey study conducted in Thailand. The population was Thai citizens over the age of 18 years. Data was gathering via online questionnaire. Descriptive statistics were examined. Subgroup analysis was evaluated by t-test or one way ANOVA as appropriate. The factors affecting Thais' attitudes regarding telepharmacy were tested with multiple regression analysis. Total of 391 respondents were analyzed. Overall mean score of attitudes on telepharmacy was 4.15 ± 0.45 . The highest rating was given to telepharmacy procedures (4.49 ± 0.49). Females had higher opinion mean scores than males (4.18 ± 0.44 vs. 4.08 ± 0.48 ; $p = 0.017$) and healthcare people performed poorly opinions mean scores than the general population (4.09 ± 0.44 vs. 4.19 ± 0.47 , $p = 0.026$). The factors that influenced the opinion score were gender ($p = 0.017$), income ($p = 0.036$), and working or studying in the medical field ($p = 0.011$). Telepharmacy is a crucial service offered by community pharmacies. It facilitated clients' access to medications and pharmacists. Gender, income, and working or studies in the medical area influenced the Thais' opinion.

Keywords: Drugstores, Pharmacy, Telemedicine, Telepharmacy, Thailand.

1. Introduction

Telepharmacy is a part of telehealth, which is the application of technology to the provision of health services. In general, telepharmacy is defined as the pharmaceutical care practices and related services to patients through telecommunications at a distance [1]. Telepharmacy services have been implemented in many countries and are available in both hospitals and community pharmacies. Numerous research studies demonstrated the benefit of telepharmacy to the healthcare system [2-12]. It enables patients to obtain their medications with more accessibility [7-10], convenience [7,9,11], and safety [2,4,12].

During the COVID-19 outbreak, the social distancing is needed. Thai authorities have enacted new legislation governing telepharmacy in 2020 [13]. This marked the commencement of telepharmacy service in Thailand. Telepharmacy is a new approach that Thai pharmacists are using to deliver pharmaceutical care, but it can assist alleviate on the healthcare system and enhance the drug dispensing safety. Consequently, telepharmacy has become more widespread in pharmaceutical care practices such as medication management, dispensing, patient counseling, and drug information [14-16].

In accordance with the Standards and Procedures for Telepharmacy of the Pharmacy Council of Thailand [13], telepharmacy is classified into three categories: (i) in-hospital services, (ii) in-community pharmacies with the physician's prescription, and (iii) in-community pharmacies without physician's prescription. According to the types of service, telepharmacy activities can be different; however, there are particular activities that are fundamental practices such as: medication reconciliations, exploring drug-related problems, evaluating of the physician's orders or prescriptions, drug dispensing, and delivery of medications to the patient's residence.

In terms of patient satisfaction, telepharmacy helps alleviate patients' problems in obtaining their medications. Many people are uncomfortable to leaving their house in order to receive regular medication. However, due to technological advancements, pharmacists may also supervise patients without having to travel. [17] Especially in Thailand, the Thai Drugs Act permits community pharmacists to provide non-dangerous drugs without a prescription, therefore accessing drugs is much easier. Implementation of telepharmacy into community pharmacies has improved customer satisfaction due to its convenience [18].

Since the Pharmacy Council of Thailand announced the telepharmacy standard, the study about the opinions toward telepharmacy in Thailand has been sparse. To our knowledge, three studies have been conducted: two of which were performed on the pharmacist population [19,20] and one of which was conducted on the public population [18]. All of them have two limitations that seem to be similar. First, all studies were carried out prior to the telepharmacy standard announcement. This indicates that there was no telepharmacy service available at the time of the studies. It may be possible that people's perceptions regarding telepharmacy will be shifted. Second, the qualitative research method was applied in all three studies. In-depth interviews were conducted in limited participants. Generalizability should be considered. Nowadays, telepharmacy services are now available in retail pharmacies as well as hospitals. Therefore, this current study has applied the concept of quantitative research to be able to gather data from a larger number of people. This study aimed to determine the Thais' opinions toward telepharmacy in community pharmacies and explore the factor effected to the opinions. This enables community pharmacists to gain a better understanding of their clients' opinions toward telepharmacy and to apply the findings to improve telepharmacy services.

2. Materials and Methods

2.1. Study Design and Participants

This study was a cross-sectional survey study conducted in Thailand. The population was Thai citizens over the age of 18 years old who accessed the questionnaire through social media platforms. A convenience sampling technique was employed. Sample size was calculated under Cochran's formula [21]. According to maximum variability, the estimated proportion of the population (p) was assumed of 0.5. The 95% confidence level gives us a Z value of 1.96. The calculated sample size (n) was 385.

2.2. Research Instrument

The research instrument was a Google Form-based online questionnaire. The questionnaire's content validity was evaluated by three experts: two community pharmacists with ten years of experience in community pharmacy and one lecturer at the Faculty of Pharmacy. The questions with a content validity index of greater than 0.8 were chosen [22]. Comments were used to develop wording improvements to provide a clearer and more intelligible final questionnaire. Reliability test was undertaken among thirty Thais. Cronbach's alpha coefficient was used to determine the reliability. Acceptance alpha value was more than 0.7 [23]. The questionnaire took approximately 20 minutes to complete. It consisted of two parts: (i) demographic data (e.g., gender, education, residency, income per month, telepharmacy experience, etc.) and (ii) opinions toward telepharmacy services in community pharmacies. The second part was a five-Likert scale questionnaire with 37 items. Rating scales ranged from 1 (strongly disagree) to 5 (strongly agree). Cronbach's alpha coefficient for the final draft questionnaire was 0.905.

2.3. Data Collection and Analysis

Data was gathered using an online survey, which allowed the participants to complete the questionnaire independently. The questionnaire was posted on social media, including Facebook, Twitter, and Line. Data were collected between 25 February to 5 March 2022. The authors explored the questionnaire one by one for completeness and then extracted data from Google Forms into Microsoft Excel. The formal analysis was performed by statistical software. Descriptive statistics were examined. The results were presented as frequency, percentage, mean, and standard deviations (SD). Subgroup analysis was evaluated by t-test or one way ANOVA as appropriate. The factors affecting Thais'

opinions regarding telepharmacy in community pharmacies were tested with multiple regression analysis using stepwise backward elimination method. The significant level was set at $p < 0.05$.

2.4. Ethics Approval of Research

The study protocol was approved by the University of Phayao human ethics committee (No. UP-HEC 1.2/003/65). The informed consent was not obtained by the participants. The completion of the questionnaire by the participants was an indication of consent to participate.

3. Results

There was a total of 406 people that responded to the survey. Fifteen were excluded: 10 respondents were under the age of 18; and 5 respondents were not completely submitted. Finally, a total of 391 questionnaires were analyzed in the study. Demographic characteristics of respondents were shown in Table 1. The mean age was 26.19 years ($SD=9.24$). Most were women (77.8%) and had bachelor's degree and higher education (84.7%) and resided in the north of Thailand (44.8%). Half of them (55.8%) were healthcare providers or health profession students. A small percentage of respondents reported experiencing telepharmacy in community pharmacies (16.4%) and hospitals (17.6%).

Table 1.
Demographic characteristics of respondents ($n = 391$).

Characteristics	Groups	<i>n</i>	%
1. Gender	Female	304	77.8
	Male	87	22.2
2. Age; years	Mean 26.19 ± 9.24		
3. Education	Under Bachelor	60	15.3
	Bachelor's degree and higher	331	84.7
4. Residency	North	175	44.8
	Central	125	31.9
	North – east	48	12.3
	East	23	5.9
	South	15	3.8
	West	5	1.3
5. Occupations	Students	235	60.1
	Government officers	98	25.1
	Private officers	14	3.6
	Others	44	11.2
6. Income (Bath/month)	< 5,000	134	34.3
	5000 – 10,000	99	25.3
	10,001 – 20,000	79	20.2
	20,001 – 30,000	35	9.0
	> 30,000	44	11.2
7. Telepharmacy experiences	Drugstores	64	16.4
	Hospitals	69	17.6
8. Underlying diseases	Yes	41	10.5
	No	350	89.5
9. Working /Studying in the medical field	Yes	173	44.2
	No	218	55.8

3.1. Thais' Attitude Toward Telepharmacy Services

Overall mean score of Thais' opinion on telepharmacy in community pharmacies was 4.15 ± 0.45 . The highest rating was given to opinions on telepharmacy procedures (4.49 ± 0.49), perceived benefits

(4.32 ± 0.58), telepharmacy platforms (3.97 ± 0.67), and perceived impacts (3.52 ± 0.84), respectively. According to telepharmacy procedure section, the respondents strongly agreed with providing the drug allergies or adverse drug reaction (ADRs) history to the pharmacy personnel (4.67 ± 0.62); ensuring the confidentiality of medical history (4.63 ± 0.72); and community pharmacies should be monitored for ADRs after serving through telepharmacy (4.63 ± 0.69). In perceived benefits section, most respondents mentioned that the telepharmacy services would: minimize the risk of contracting of communicable diseases (4.59 ± 0.70); enhance the accessibility to medications and pharmaceutical services (4.57 ± 0.69); and enable them to save time by avoiding trips to the pharmacy (4.49 ± 0.74). In Perceived impacts section, the respondents express concern about the escalating medicine pricing (3.98 ± 1.01); legitimacy of medicine obtained (3.73 ± 1.07); and the quality of medicine during the delivery process (3.60 ± 1.08). In telepharmacy platforms section, the respondents realized that community pharmacies should have a dedicated platform for their telepharmacy services (4.50 ± 0.77). They indicated that telepharmacy should be delivered through video chat (4.33 ± 0.85) or through a chat box (4.32 ± 0.88). The results of the opinions on telepharmacy among each item were shown in Table 2.

Table 2.
Thais' opinions toward Telepharmacy in community pharmacies ($n = 391$).

Statement	n (%)					Mean (SD)
	5	4	3	2	1	
Telepharmacy procedure						4.49 (0.49)
1. Telepharmacy should be available at community pharmacies.	244 (62.4)	113 (28.9)	28 (7.1)	3 (0.8)	3 (0.8)	4.51 (0.73)
2. The client's medical profile should be recorded during the session of service.	224 (57.3)	129 (33.0)	30 (7.7)	6 (1.5)	2 (0.5)	4.45 (0.75)
3. It is also essential to record audio or video during the session of service.	144 (36.8)	107 (27.4)	89 (22.8)	31 (7.9)	20 (5.1)	3.83 (1.16)
4. It is necessary to preserve the confidentiality of the client's information.	291 (74.4)	62 (15.9)	32 (8.2)	4 (1.0)	2 (0.5)	4.63 (0.72)
5. You are comfortable providing your information about current illness, as well as your medical and medication histories.	264 (67.5)	95 (24.3)	26 (6.7)	4 (1.0)	2 (0.5)	4.57 (0.78)
6. You are comfortable providing your information about drug allergy or adverse drug reactions.	292 (74.6)	73 (18.7)	23 (5.9)	3 (0.8)	0 (0.0)	4.67 (0.62)
7. You are comfortable providing your information about dietary supplement, vitamins, and herbs.	265 (67.8)	90 (23.0)	32 (8.2)	4 (1.0)	0 (0.0)	4.58 (0.69)
8. After the telepharmacy is completed, pharmacists should be monitored for adverse drug reactions.	285 (72.9)	73 (18.7)	28 (7.2)	4 (1.0)	1 (0.2)	4.63 (0.69)
9. After the telepharmacy is completed, pharmacists should be monitored for drug compliances.	232 (59.3)	99 (25.3)	53 (13.6)	5 (1.3)	2 (0.5)	4.42 (0.81)
10. After the telepharmacy is completed, pharmacists should be monitored for the efficacy of treatments.	250 (63.9)	96 (24.6)	42 (10.7)	3 (0.8)	0 (0.0)	4.52 (0.72)
11. Telepharmacy should be used to provide medication counseling.	274 (70.1)	90 (23.0)	25 (6.4)	2 (0.5)	0 (0.0)	4.62 (0.63)
Perceived benefits						4.32

						(0.58)
12. Telepharmacy helps you to have much more convenient access to drugs and pharmacists.	262 (67.0)	64 (24.0)	32 (8.2)	2 (0.5)	1 (0.3)	4.57 (0.69)
13. Telepharmacy helps you to get medicines on promptly.	182 (46.6)	108 (27.6)	83 (21.2)	15 (3.8)	3 (0.8)	4.15 (0.94)
14. Telepharmacy helps you attempt to use medicines and medical products in the most appropriate and safest terms possible.	198 (50.6)	117 (30.0)	68 (17.4)	6 (1.5)	2 (0.5)	4.29 (0.84)
15. Telepharmacy helps you save money on travel costs to the pharmacy.	234 (59.8)	100 (25.6)	39 (10.0)	13 (3.3)	5 (1.3)	4.39 (0.89)
16. Telepharmacy helps you save time by eliminating the need to visit the pharmacy.	242 (61.9)	105 (26.9)	39 (10.0)	4 (1.0)	1 (0.2)	4.49 (0.74)
17. Telepharmacy helps you consult a pharmacist more conveniently or easily when you have drug-related problems.	230 (58.8)	114 (29.2)	36 (9.2)	11 (2.8)	0 (0.0)	4.44 (0.78)
18. Telepharmacy helps you avoid the risk of communicable diseases such as COVID-19.	272 (69.6)	87 (22.2)	27 (6.9)	3 (0.8)	2 (0.5)	4.59 (0.70)
19. Telepharmacy helps you receive more effective treatment.	144 (36.8)	127 (32.5)	102 (26.1)	14 (3.6)	4 (1.0)	4.01 (0.93)
20. Telepharmacy helps you to obtain essential information related to medication use.	173 (44.2)	147 (37.6)	64 (16.4)	4 (1.0)	3 (0.8)	4.24 (0.81)
21. Telepharmacy encourages you to have more compliance with your medication regimen.	147 (37.6)	146 (37.3)	75 (19.2)	18 (4.6)	5 (1.3)	4.05 (0.93)
Perceived impacts						3.52 (0.84)
22. You have concerns about the medication's stability or quality during transportation.	92 (23.5)	124 (31.7)	117 (29.9)	43 (11.0)	15 (3.8)	3.60 (1.08)
23. You have concerns about the possibility of a price increase for medications.	149 (38.1)	126 (32.2)	84 (21.5)	24 (6.1)	8 (2.0)	3.98 (1.01)
24. You have concerns about the medication you received, such as incorrect or insufficient medication.	107 (27.4)	136 (34.8)	97 (24.8)	37 (9.5)	14 (3.6)	3.73 (1.07)
25. Once you do not select the product yourself, you suffer from receiving low-quality items.	82 (21.0)	106 (27.1)	125 (32.0)	43 (11.0)	35 (9.0)	3.40 (1.19)
26. You have limitations on using communication technology for dealing with pharmacies.	66 (16.9)	83 (21.2)	84 (21.5)	60 (15.4)	98 (26.1)	2.90 (1.43)
Telepharmacy platforms						3.97 (0.67)
27. Telepharmacy should be given via telephone.	198 (50.6)	134 (34.3)	50 (12.8)	5 (1.3)	4 (1.0)	4.32 (0.82)
28. Telepharmacy should be given via e-mail.	102 (26.1)	107 (27.4)	96 (24.5)	55 (14.1)	31 (7.9)	3.50 (1.24)
29. Telepharmacy should be given via chats.	209 (53.4)	123 (31.5)	41 (10.5)	13 (3.3)	5 (1.3)	4.32 (0.88)
30. Telepharmacy should be given via VDO chats.	205 (52.4)	123 (31.5)	50 (12.8)	10 (2.5)	3 (0.8)	4.33 (0.85)
31. Telepharmacy should be given via	168	123	67	17	16	4.05

Facebook.	(42.9)	(31.5)	(17.1)	(4.4)	(4.1)	(1.07)
32. Telepharmacy should be given via Line.	211 (54.0)	117 (29.9)	47 (12.0)	9 (2.3)	7 (1.8)	4.32 (0.90)
33. Telepharmacy should be given via WeChat.	95 (24.3)	73 (18.7)	104 (26.6)	62 (15.8)	57 (14.6)	3.22 (1.36)
34. Telepharmacy should be given via WhatsApp.	89 (22.8)	74 (18.9)	109 (27.9)	58 (14.8)	61 (15.6)	3.18 (1.36)
35. Telepharmacy should be given via Zoom Meeting.	146 (37.3)	116 (29.7)	71 (18.2)	25 (6.4)	33 (8.4)	3.81 (1.24)
36. Telepharmacy should be given via Google Meet.	132 (33.8)	117 (29.9)	85 (21.7)	23 (5.9)	34 (8.7)	3.74 (1.22)
37. Telepharmacy should be given via specific application.	254 (64.9)	85 (21.7)	46 (11.8)	5 (1.3)	1 (0.3)	4.50 (0.77)
Overall						4.15 (0.45)

Note: 5 = strongly agree; 4 = agree; 3 = neutral; 2 = disagree; 1 = strongly disagree; SD = Standard deviations.

3.2. Subgroup Analysis of Thais' Opinion Toward Telepharmacy

Subgroup analyses of several categorical variables, such as education ($p = 0.786$), residency ($p = 0.622$), occupations ($p = 0.960$), income per month ($p = 0.183$), underlying disease history ($p = 0.845$), and telepharmacy experiences in community pharmacies ($p = 0.541$) and hospitals ($p = 0.922$), did not reveal statistically significant differences (Table 3). On the other hand, the results of the study indicated that females had higher opinion mean scores than males, statistically significantly (females, 4.18 ± 0.44 vs. males, 4.08 ± 0.48 ; $p = 0.017$). A statistically significant difference was found in the subgroup analysis of those working or studying in the medical field. Healthcare-related people performed poorly opinions mean scores than the general population (4.09 ± 0.44 vs. 4.19 ± 0.47 , $p = 0.026$).

Table 3.

Subgroup analysis of Thais' opinion toward telepharmacy in community pharmacies.

Characteristics	Mean	SD	T ^a , F ^b	p-value
1. Gender ^a				
Male	4.08	0.48	-2.3981	0.017*
Female	4.18	0.44		
2. Education ^a				
Under Bachelor	4.14	0.49	-0.2720	0.786
Bachelor's degree and higher	4.15	0.44		
3. Residency ^b				
North	4.12	0.43	0.70	0.622
Central	4.16	0.45		
North – east	4.18	0.46		
East	4.24	0.54		
South	3.96	0.38		
West	4.22	0.42		
4. Occupations ^b				
Students	4.13	0.45	0.83	0.960
Government officers	4.18	0.45		
Private officers	4.31	0.48		
Others	4.12	0.47		
5. Income ^b (Bath/month)				
< 5,000	4.09	0.47	1.56	0.183
5000 – 10,000	4.15	0.42		

10,001 – 20,000	4.21	0.50		
20,001 – 30,000	4.26	0.44		
> 30,000	4.15	0.35		
6. Underlying diseases ^a				
Yes	4.14	0.44	-0.1957	0.845
No	4.15	0.45		
7. Working /studying in the medical field ^a				
Yes	4.09	0.44	-2.2383	0.026*
No	4.19	0.47		
8. Telepharmacy Experiences in Drugstores ^a				
Yes	4.12	0.50	-0.6115	0.541
No	4.16	0.44		
9. Telepharmacy Experiences in Hospitals ^a				
Yes	4.15	0.47	-0.0979	0.922
No	4.15	0.45		

Note: ^at-test; ^bone way ANOVA, *p < 0.05, SD = Standard deviations.

3.3 Factors Affecting Thais' Opinions Toward Telepharmacy

The factors that influenced the Thais' opinion score were analyzed and shown in Table 4. The opinion scores toward telepharmacy were unlikely to be affected by general characteristics such as education, residency, occupation, telepharmacy experience, and age. The results of regression analysis demonstrated that the positive factors were gender ($p = 0.017$), income ($p = 0.036$), and working or studying in the medical field ($p = 0.011$).

Table 4.

Factors affecting Thais' opinions regarding telepharmacy in community pharmacies^a

Factors	Coef.	SE	t	Sig.
1. Coefficients	3.7633	0.1374	27.37	0.000*
2. Age	-0.0051	0.0029	-1.75	0.080
3. Gender	0.1302	0.0543	2.4	0.017*
4. Income per month	0.0347	0.1648	2.10	0.036*
5. Working or studying in the medical field	0.1165	0.0459	2.54	0.011*

Note: ^aMultiple regression analysis using Stepwise backward elimination method; Adjust R² = 0.0324, R-squared = 0.424, F=4.27, *p < 0.05.

4. Discussion

The purpose of this study was to determine the general public's opinions on telepharmacy services of drugstores. The results of this study will help to understand people's opinions better and can be used as a guideline for the development of telepharmacy services for drugstores in Thailand.

Most respondents (91.3%) agreed that community pharmacies should offer the telepharmacy services (62.4% strongly agree and 28.9 % agree). This is consistent to previous study of Welch et.al [24], the results demonstrated that most people were willing to use telemedicine with their health care provider since the convenience of using the service. As in prior study in Thailand, the participants consented to utilize telepharmacy services owing to the convenience from not needing to commute to the pharmacy [18]. On the other hand, if they had to choose in-person or telepharmacy visits, most of the participants preferred in-person visits [25].

The availability of complementary pharmaceutical care was one factor that increased customers' willingness to use telepharmacy [26]. Pharmacists should provide more counseling roles instead of only dispensing medications.^[27] In this current study, most of the respondents agreed that pharmacies should offer pharmaceutical care via telepharmacy, such as: adverse drug reactions monitoring (91.6%),

treatment efficacy follow-up (88.5%), medication adherence follow-up (84.6%), and drug counseling (83.1%).

According to the Standard of Telepharmacy, community pharmacies also needed to accommodate audio or video throughout the timeframe of services and document the medical history in the pharmacy's system at the end of the services. Results of current study indicated that respondents agreed to have audio or video recording during the service (64.2%). Nearly 22.8% were neither agree nor disagree. The Enopex project reported a mean rate of confidentiality issues of 1.6%, and 98.4% of respondents pointed out that they experienced no issues regarding confidentiality [26]. Several studies have raised concerns regarding patient privacy [29–30]. Therefore, maximum protection of patient data must be ensured.

The study on the outpatients' opinion regarding to telepharmacy during the COVID-19 pandemic revealed that the patients considered that telepharmacy had positively impacted their communication with pharmacists. The most appreciated aspect of telepharmacy was the ability to avoid having to travel to the hospital while the state of emergency was in effect, thereby avoiding the risk of infection with the Sars-CoV-2 virus [26]. Consistent with the results of this study, respondents agreed that telepharmacy services decreased the chance of exposure to communicable diseases (88.0%), improved ease of access to medications and pharmacists (91.0%), and decreased travel time to the drugstore (88.8%). It should also be noted that the most well-liked feature of telepharmacy is that it has minimized necessity physical visits to community pharmacies.^[91]

The respondents in this survey were concerned about the possibility of increasing drug prices (70.3%), obtaining wrong or inadequate medicine (62.3%), and drug's quality or stability while in transit (55.2%). The price of medications is an indisputably crucial aspect that patients evaluate when deciding whether or not to acquire services. In Thailand, Traditional pharmacy cost is mostly determined by the price of the medications since no additional fee for pharmacist consultation is obligatory. A previous study of Thais' opinions found that several participants would utilize telepharmacy even though there would be payments for services, since they believed it was acceptable to be charged for professional consultation or delivery services [15]. According to Predmore et al.[25] and Alsayed et al.[27] studies, respondents in the United States, Jordan, and Iraq were willing to pay for telepharmacy similar to Thai people. Telepharmacy is the practice of connecting pharmacists to their patients across greater distances using communications technology. Telepharmacy may be delivered by computer, video, telephone, or instant messaging. Previous studies employed telepharmacy communication techniques that differed by context and area [32–34].

The current study's findings indicated that respondents desire a specialized platform for telepharmacy services. The most convenient platforms were VDO consulting, chatting, and telephone calls. Telepharmacy technologies must be simple to use for both patients and practitioners. The best solutions are as straightforward to deploy and use in medical offices as they are for patients. Furthermore, our findings suggest that gender, income and working or studying in the medical field were associated with customers' opinion on telepharmacy. Inconsistency to the prior study, Orrange et al.[35] demonstrated that age was the only significant factor associated with patients' satisfaction on telemedicine. Several studies have demonstrated that health professionals have a favorable opinion toward telemedicine [36–38].

The strength of the current study is that it represents a huge number of replies on telepharmacy. However, we also address few limitations. First, more than 80% of respondents were under the age of 30. Our findings showed less representation from the elderly population. Second, the study gathered responses from people who completed the survey online, those who had access to the internet, and those who were technologically savvy; hence, the results may not be representative of all sorts of patients.

5. Conclusions

Thais expressed great willingness to accept telepharmacy services in community pharmacies. The findings suggested that telepharmacy is a crucial service offered by community pharmacies. It facilitated clients' access to medications and pharmacists. The respondents were willing to provide information about treatment via telepharmacy and agreed that pharmacies should ensure the confidentiality of their

clients' information. They were not constrained by technological constraints and agreed that pharmacies should have dedicated platforms for providing telepharmacy. Females greatly outperformed males in terms of mean opinion scores about telepharmacy. Healthcare professionals scored lower on average than the general population. And gender, income, as well as working or studies in the medical area, influenced the Thais' opinion. Continuous development in community pharmacy telepharmacy was required.

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Author's Contribution:

The authors confirm contribution to the paper as follows: conceptualization–OM, PJ, PW, SP; methodology–OM, SP, PJ, PW; data collection: PJ, PW; formal analysis–OM, SP; validation–OM; writing original draft–OM; review and editing manuscript–OM, SP, PJ, PW; supervision–OM. All authors read and approved of the final manuscript.

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References

- [1] Alexander E, Butler CD, Darr A, Jenkins MT, Long RD, Shipman CJ, Stratton TP. ASHP Statement on telepharmacy. *Am J Health Syst Pharm* 2017;74(9):e236–41.
- [2] Kosmisky DE, Everhart SS, Griffiths CL. Implementation, evolution and impact of ICU telepharmacy services across a health care system. *Hosp Pharm* 2019;54(4):232–40.
- [3] Newman P, Dhaliwall S, Polyakova O, McDonald K. Pharmacy distribution, clinical, and management services: a survey of small hospitals in Canada supported by telepharmacy services. *Can J Hosp Pharm* 2021;74(3):256–68.
- [4] Amkreutz J, Lenssen R, Marx G, Deisz R, Eisert A. Medication safety in a German telemedicine centre: Implementation of a telepharmaceutical expert consultation in addition to existing tele-intensive care unit services. *J Telemed Telecare* 2020;26:105–12.
- [5] Ibrahim OM, Ibrahim RM, Z Al Meslamani A, Al Mazrouei N. Role of telepharmacy in pharmacist counselling to coronavirus disease 2019 patients and medication dispensing errors. *J Telemed Telecare* 2020:1357633X20964347.
- [6] Scott DM, Friesner DL, Udem T, Anderson G, Sem K, Peterson CD. Perceived sustainability of community telepharmacy in North Dakota. *J Am Pharm Assoc* (2003) 2017;57(3):362–8.
- [7] Velázquez Fuentes MN, Shah P, Hale GM. Improving medication adherence in patients with hypertension through pharmacist-led telehealth services. *J Telemed Telecare* 2022: 1357633X221076719.
- [8] Pathak S, Haynes M, Qato DM, Urlick BY. Telepharmacy and quality of medication use in rural areas, 2013–2019. *Prev Chronic Dis* 2020;17:E101.
- [9] Baldoni S, Amenta F, Ricci G. Telepharmacy services: present status and future perspectives: a review. *Medicina (Kaunas)* 2019;55(7):327.
- [10] Poudel A, Nissen LM. Telepharmacy: a pharmacist's perspective on the clinical benefits and challenges. *Integr Pharm Res Pract* 2016;5:75–82.
- [11] Hefti E, Wei B, Engelen K. Access to telepharmacy services may reduce hospital admissions in outpatient populations during the COVID-19 pandemic. *Telemed J E Health* 2022.
- [12] Scott DM, Friesner DL, Rathke AM, Doherty-Johnsen S. Medication error reporting in rural critical access hospitals in the North Dakota Telepharmacy Project. *Am J Health Syst Pharm* 2014;71(1):58–67.
- [13] The Pharmacy Council of Thailand. Notification of The Pharmacy Council of Thailand No. 56/2563 for Standards and Procedures for Telepharmacy [Internet]. 2020. [cited 2022 April 1]. Available from: https://www.pharmacycouncil.org/index.php?option=content_detail&menuid=68&itemid=1846&catid=0.
- [14] Racha P, Kongros J, Sodchien T. The development of nursing service system for chronic non-communicable (NCDs) patients in the COVID-19 outbreak situation. *Region4-5 Medical Journal*. 2020;39(3):414–26.
- [15] Rattanapan P, Phetcharun P, Suriya S. Development of mail-pharmacy system for hypertensive patients in er os coronavirus disease 2019 pandemic. *Chaingrai Medical Journal*. 2020;12(2):48–99.
- [16] Chaillak P, Sunongbua A. The outcome of patients care during the prevention of COVID-19 pandemic situation at Mueang Chaiyaphum Primacy Care Unit, 2020. *Chaiyaphum Medical Journal*. 2021;41(1): 111–21.
- [17] Traynor K. Telepharmacy services bring new patient care opportunities. *Am J Health Syst Pharm*. 2013;70(7):565–6.
- [18] Limwilairatana K. A study of Thais' attitudes toward telepharmacy [Independent Study of Master of Sciences Program in Marketing]. Pathum Thani: Thammasat University; 2020.

- [19] Na Lampang W. Development of telepharmacy effected to new normal pharmaceutical care services in Thailand. [Independent Study of Master of Management Program]. Bangkok: Mahidol University; 2021.
- [20] Jindasook C. Exploring drivers and barriers towards utilizing telepharmacy among pharmacists in Bangkok. [Independent Study of Master of Management Program]. Bangkok: Mahidol University; 2020.
- [21] Cochran WG. Sampling Techniques. 3rd ed. Newyork: John Wiley & Sons; 1977.
- [22] Yusoff MSB. ABC of Content validation and content validity index calculation. *Educ Med J* 2019;11(2):49–54.
- [23] Taber KS. The use of Cronbach's alpha when developing and reporting research instruments in science education. *Res Sci Educ* 2018;48(6):1273–96.
- [24] Welch BM, Harvey J, O'Connell NS, McElligott JT. Patient preferences for direct-to-consumer telemedicine services: a nationwide survey. *BMC Health Serv Res* 2017; 17(1):784.
- [25] Predmore ZS, Roth E, Breslau J, Fischer SH, Uscher-Pines L. Assessment of patient preferences for telehealth in post-COVID-19 pandemic health care. *JAMA Netw Open* 2021;4(12):e2136405.
- [26] Margusino-Framiñán L, Fernández-Llamazares CM, Negro-Vega E, Tortajada-Goitia B, Lizeaga G, Mercadal-Orfila G, Almeida-González C, Morillo-Verdugo R. Outpatients' opinion and experience regarding telepharmacy during the COVID-19 pandemic: the Enopex project. *J Multidiscip Healthc* 2021;14:3621–32.
- [27] Alsayed AR, Halloush S, Hasoun L, Alnatour D, Al-Dulaimi A, Alnajjar MS, et al. Perspectives of the community in the developing countries toward telemedicine and pharmaceutical care during the COVID-19 pandemic. *Pharmacy Practice* 2022;20(1):2618.
- [28] Botrugno C. Telemedicine in daily practice: addressing legal challenges while waiting for an EU regulatory framework. *Health Policy Technol* 2018;7:131–6.
- [29] Comer JS, Furr JM, Cooper-Vince C, Madigan RJ, Chow C, Chan P, Idrobo F, Chase RM, McNeil CB, Eyberg SM. Rationale and considerations for the internet-based delivery of parent-child interaction therapy. *Cogn Behav Pract* 2015;22(3):302–16.
- [30] Crico C, Renzi C, Graf N, Buyx A, Kondylakis H, Koumakis L, Pravettoni G. mHealth and telemedicine apps: in search of a common regulation. *Ecancermedicalscience* 2018;12:853.
- [31] Dorsey ER, Okun MS, Bloem BR. Care, convenience, comfort, confidentiality, and contagion: the 5C's that will shape the future of telemedicine. *J Parkinsons Dis* 2020; 10:893–7.
- [32] Maxwell LG, McFarland MS, Baker JW, Cassidy RF. Evaluation of the impact of a pharmacist-led telehealth clinic on diabetes-related goals of therapy in a veteran population. *Pharmacotherapy* 2016;36(3):348–56.
- [33] Donaghy E, Atherton H, Hammersley V, McNeilly H, Bikker A, Robbins L, Campbell J, McKinstry B. Acceptability, benefits, and challenges of video consulting: a qualitative study in primary care. *Br J Gen Pract* 2019;69(686):e586–94.
- [34] Singh LG, Accursi M, Korch Black K. Implementation and outcomes of a pharmacist-managed clinical video telehealth anticoagulation clinic. *Am J Health Syst Pharm* 2015;72(1):70–3.
- [35] Orrange S, Patel A, Mack WJ, Cassetta J. Patient satisfaction and trust in telemedicine during the COVID-19 pandemic: retrospective observational study. *JMIR Hum Factors* 2021;8(2):e28589. doi:10.2196/28589.
- [36] Zayapragassarzan Z, Kumar S. Awareness, knowledge, attitude and skills of telemedicine among health professional faculty working in teaching hospitals. *J Clin Diagn Res* 2016;10(3):JC01–JC04.
- [37] Biruk K, Abetu E. Knowledge and attitude of health professional toward telemedicine in resource-limited setting: a cross-sectional study in north west Ethiopia. *J Healthc Eng* 2021;7345780. doi:10.1155/2021/7345780.
- [38] Elhadi M, Elhadi A, Bouhuwaish A, Bin Alshiteewi F, Elmabrouk A, et al. Telemedicine awareness, knowledge, attitude, and skills of health care workers in a low-resource country during the COVID-19 pandemic: cross-sectional study. *J Med Internet Res* 2021;23(2): e20812. doi: 10.2196/20812.