

ORIGINAL ARTICLE

Knowledge, Perception and Readiness to Utilize Telepharmacy Among Malaysian Public

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ABSTRACT

Introduction: Telepharmacy has emerged as a crucial strategy to mitigate the risk of Covid-19 transmission while ensuring access to pharmaceutical care during the pandemic. The assessment of public knowledge and perception is paramount in gauging their readiness to telepharmacy services. Regrettably, there remains a dearth of study concerning the Malaysian public's knowledge, perception, and readiness (KPR) regarding telepharmacy. This study aims to evaluate the KPR of the public in the utilization of telepharmacy and to determine the association between the demographic profile with the KPR of Malaysian public. **Materials and methods:** A cross-sectional study was conducted using the self-administered questionnaire. Descriptive statistics was used to analyse the result by SPSS version 28. The associations between the demographic profile and KPR were analysed by the Kruskal-Wallis's test. **Results:** A total of 391 respondents participated and 43.2% were familiar with telepharmacy. The public showed a positive perception and ready to utilize telepharmacy. A significant association was identified between sex and occupation with the knowledge regarding telepharmacy services, meanwhile there are no associations reported between the demographic profile with the perception and readiness. **Conclusion:** Public in Malaysia has high knowledge, positive perception and high readiness to utilize telepharmacy. Sex and occupation affected the knowledge of the Malaysian public towards telepharmacy. However, there is no significant association between public's demographic profiles to the perception and readiness towards the utilization of telepharmacy.

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INTRODUCTION

The National Association of Boards of Pharmacy defines telepharmacy as “the provision of pharmaceutical care through the use of telecommunications and information technologies to patients at a distance” [1]. Telepharmacy services encompass reviewing medication orders, refill authorization, therapeutic drug monitoring, medication management, drug information service, and patient counselling [1]. The advancement of technologies has ushered in an era of unprecedented transformation in the healthcare sectors, with telepharmacy emerging as a promising innovation. Telepharmacy leverages telecommunications technology to connect pharmacists with patients, providing remote pharmaceutical services, consultations, and medication management [1]. In recent years, its potential to enhance healthcare accessibility and improve medication adherence has garnered significant attention in Malaysia. The healthcare landscape is evolving rapidly to meet the needs of a diverse

and growing population. In Malaysia, to overcome the mobility limitation due to the strict movement control order (MCO), the Malaysia government issued reinforcement towards the utilization of telepharmacy [2]. Most hospitals implemented telepharmacy to commit to the social distancing practice as advised by the Ministry of Health of Malaysia. The Malaysia healthcare system, like many others worldwide, faces numerous challenges, including rising healthcare costs, the burden of chronic diseases, and the need to serve underserved populations in remote areas. Telepharmacy has the potential to address some of these challenges by offering convenient access to pharmaceutical care, reducing healthcare costs, and promoting better health outcomes [2]. However, the successful implementation of telepharmacy relies heavily on the knowledge, perception, and readiness of the Malaysian public to embrace this innovative approach.

Despite the advantages and benefits of telepharmacy, Malaysian's knowledge, perception and readiness (KPR) are not well identified. A study conducted in Manila, Philippines showed a low-than-average level of knowledge and neutral perception towards the utilization telepharmacy [3]. This study depicted that

gender, educational background and age affect their knowledge and perception [3]. Another study from Indonesia reported that over half of their population was familiar with telepharmacy and showed a positive perception. The same study also reported that a good knowledge and positive perceptions to telepharmacy make the public more ready to use telepharmacy [4]. Findings from the previous study showed that age, educational level and gender played a crucial role in determining KPR [5]. However, the evidence that focuses on the Malaysian publics' KPR in response to the utilization of telepharmacy is still under-observed.

This study aims to examine the level of KPR to utilize telepharmacy and to determine the association between the demographic profile with the KPR among the Malaysian public. Understanding these factors is paramount for healthcare policymakers, practitioners, and stakeholders to design effective strategies and policies that facilitate the integration of telepharmacy into the Malaysian healthcare system.

MATERIALS AND METHODS

A cross sectional method using a set of self-administered questionnaires was conducted in this study. The quantitative method was implemented to aid in the investigation regarding the level of Malaysian publics' KPR towards telepharmacy services. This study also investigates if there is an association between the demographic profile of the Malaysian public and the KPR towards telepharmacy.

A convenience sampling method was used to recruit the respondents. The respondents in this study include Malaysians who aged 18 years old and above, currently living in Malaysia and those who can understand either English or Malay.

The online questionnaire, comprising four domains and a total of 29 items, was adapted from validated measures utilized in prior studies [1, 3-5]. The questionnaire validation processes involved the participation of four pharmacy academicians with expertise in telepharmacy. Their experience in the telepharmacy area ranged from clinical practice to research and teaching. Each academician meticulously reviewed the questionnaire items, assessing their relevance, clarity, and appropriateness for the study's objectives. They provided feedback and suggestions for refinement to ensure the questionnaire's validity and reliability.

Additionally, a pilot study of the questionnaire was conducted to assess its feasibility and identify any potential issues with comprehension or formatting. During this pilot phase, 30 participants completed the questionnaire, and their feedback was gathered to further refine the instrument before its full implementation in the main study. Section 1 documented the demographic

profile of the respondents with a total of eight items. The items included the respondents' sex, marital status, age, geographical living area, ethnicity, educational level, occupation and income group. Section 2 had six items that collected the respondents' knowledge and their experience of telepharmacy. Section 3 consisted of nine items aimed to investigate the public's perception of the utilization of telepharmacy. The fourth section with six items investigated their readiness towards the utilization of telepharmacy in Malaysia. A multiple-choice question was implemented in the first section to collect the respondents' demographic criteria. For the second sections, three options as "yes", "not sure" and "no" were given to the respondents. The five-point Likert scale was used to assess the publics' perception and readiness in the third and fourth section, respectively. The Likert scale ranges from 1 to 5, where 1= Strongly disagree, 2 = Disagree, 3 = Neutral, 4 = Agree and 5 = Strongly agree. A pilot test involving 30 respondents was done prior to the data gathering to confirm the feasibility of the questionnaire survey.

To remark the KPR's score as high, moderate or low, it was first calculated by the following equation

$$\text{Percentage value (\%)} = \frac{\text{Mean value}}{\text{Mean value}} \times 100$$

Based on expert opinion from researchers and previous studies, the total score of each section was used to categorize responses into three groups: low ($\leq 40\%$), medium (41%-74%), and high ($\geq 75\%$) [5].

This study was conducted via an online platform. The questionnaire and link were created via a Google Form. The link to the questionnaire was distributed via electronic mail (e-mail), social media platforms (including but not limited to Facebook, Twitter, Instagram, and LinkedIn) and online chat apps like WhatsApp and iMessage. A consent forms were collected prior to answering the questionnaire.

The data obtained in this study were analysed with Statistical Package for Social Sciences (SPSS) software, version 28. The descriptive statistic was analysed using frequencies and percentages to represent the respondents' demographic profile, and KPR for the telepharmacy utilization in Malaysia. Then, the Kruskal-Wallis's test was utilized to investigate the relationship between the demographic profile with the KPR.

This study has received the ethics approval from the UiTM Research Ethic Committee (REC)(PH)/UG/049/2023.

RESULTS

A total of 391 respondents have participated in this study. Table I shows the respondents who participated

in this study. Most of them were female (n= 217, 55.5%), Malay (n= 377, 96.4%), aged between 18 to 29 years old (n=280, 71.6%) and single (n=283, 72.4%). Most of them live in the urban area (n= 178, 45.5%) and only a few amounts from the rural area responded in this survey (n=29, 7.4%). 69.6% of the respondents (n=272) were undergraduate students and only 11.5% (n= 45) were postgraduate students. Most of the questionnaire reached the private sector workers (n= 133, 34%) and are from the B40 income group (n= 198, 50.6%).

Table I: Frequency and percentage on the demographic profile of the respondents

Variable	Frequency (N)	Percentage (%)
Sex		
Female	217	55.5
Male	174	44.5
Marital Status		
Single	283	72.4
Married	105	26.9
Widow/ Widower	3	0.8
Age (years old)		
18-29	280	71.6
30-39	87	22.3
40-49	12	3.1
50-59	12	3.1
Geographical living area		
Urban	184	47.1
Sub-urban	178	45.5
Rural	29	7.4
Ethnicity		
Malay	377	96.4
India	1	0.3
Orang Asli	2	0.6
Bumiputera Sarawak	7	1.8
Bumiputera Sabah	4	1.0
Educational level		
Pre-university	22	5.6
Diploma	52	13.3
Bachelor degree	272	69.6
Master	37	9.5
PHD	8	2.0
Occupation		
Student	171	43.7
Government sector	58	14.8
Private sector	122	34.0
Retired	1	0.3
Self-employed	12	3.1
Unemployed	16	4.1
Income		
B40 [$\leq$ RM6,338]	198	50.6
M40 [RM6,339 – 10,959]	175	44.8
T20 [$\geq$ RM10,960]	18	4.6

The findings of this study reveal that the mean score for the knowledge of the Malaysian public regarding telepharmacy is 13.51 out of 18.00 marks, with a standard deviation (SD) of 1.73 (Table II). This suggests that the public's knowledge about telepharmacy services in Malaysia is high, with a corresponding percentage value of 75%. Additionally, the public displayed a

positive perception (78% percentage value) towards the implementation of telepharmacy, as evidenced by the mean score of 35.06 out of 45.00 marks, with a standard deviation (SD) of 4.9. Moreover, the mean score for readiness indicates a high readiness level, with a score of 23.47 out of 30.00 marks (78% percentage value), and a standard deviation (SD) of 3.73.

Table II: Mean score and standard deviation for knowledge, perception and readiness.

Variable	Minimum	Maximum	Mean	SD	Description
Knowledge	8.00	18.00	13.51	1.73	High knowledge
Perception	16.00	45.00	35.06	4.99	Positive perception
Readiness	12.00	30.00	23.47	3.73	High readiness

Notably, more than half of the public (51.9%) are still unclear about the presence of telepharmacy services that had already been implemented in Malaysia's healthcare system (Table III). Only 5.6% of respondents have experience with telepharmacy. Most of the participants are uncertain about the procedures and process of telepharmacy.

Table III: The knowledge of the public regarding telepharmacy

Items	N (%)		
	Yes	Not sure	No
Telepharmacy services is available in Malaysia.	169(43.2)	203(51.9)	19(4.9)
I have experienced the telepharmacy services.	22(5.6)	71(18.2)	298(76.2)
Telepharmacy needs a strong internet connection or a high-performance technology.	263(67.3)	98(25.1)	30(7.7)
In general hospitals, telepharmacy services is conducted by the pharmacists during office hours.	167(42.7)	215(55.5)	9(2.3)
In general hospitals, telepharmacy services is conducted by the emergency departments after office hours	71(18.2)	291(74.4)	29(7.4)
Telepharmacy played a big role during the pandemic of Covid-19.	287(73.4)	101(25.8)	3(0.8)

Based on the result (Table IV), the public expressed their concern about the risk of medication error and data security while conducting telepharmacy as these items have the lowest agreement level. Regardless of this issue, they agreed that telepharmacy is better than the conventional one in terms of accessibility and medication adherence. Noteworthy, most of the respondents are ready to utilize telepharmacy in the future. The respondents put their trust in the pharmacist and were willing to share their personal data in utilizing telepharmacy (Table V). Most of them stated that they have sufficient skills and facilities to utilize telepharmacy. Despite most respondents being willing to pay for the telepharmacy services, nevertheless, a minority of them disagree.

Table IV: The publics' perception towards telepharmacy.

Items	N (%)				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
Telepharmacy will improve your adherence to the medication.	2(0.5)	11 (2.8)	110 (28.1)	158 (40.4)	110 (28.1)
Telepharmacy can enhance rural communities' access to medication.	5(1.3)	22 (5.6)	62 (15.9)	145 (37.1)	157 (40.2)
Telepharmacy will provide a complete privacy setting during the consultation period.	3(0.8)	18 (4.6)	94 (24.0)	156 (39.9)	120 (30.7)
Telepharmacy provides better duration of each session.	0(0)	18 (4.6)	109 (27.9)	152 (38.9)	112 (28.6)
Telepharmacy services can save money.	6(1.5)	10 (2.6)	80 (20.5)	148 (37.9)	147 (37.6)
Telepharmacy can solve the waiting time issue in most general hospitals.	2(0.5)	14 (3.6)	47 (12.0)	119 (30.4)	209 (53.5)
The consultation via telepharmacy will be effective.	3(0.8)	31 (7.9)	142 (36.3)	139 (35.5)	76 (19.4)
There will be high medication error in conventional telepharmacy	15(3.8)	49 (12.5)	199 (50.9)	94 (24.0)	34 (8.7)
Data security is a great concern in telepharmacy.	8(2.0)	20 (5.1)	100 (25.6)	134 (34.3)	129 (33.0)

Table V: Publics' readiness towards the utilisation of telepharmacy

Items	N (%)				
	Strongly disagree	Disagree	Neutral	Agree	Strongly agree
You are interested in utilizing telepharmacy.	1 (0.3)	12 (3.1)	74 (18.9)	174 (44.5)	130 (33.2)
You will give the fullest trust to your pharmacist to conduct telepharmacy service.	4 (1.0)	14 (3.6)	88 (22.5)	173 (44.2)	112 (28.6)
You are willing to pay for telepharmacy service.	16 (4.1)	41 (10.5)	134 (34.3)	142 (36.3)	58 (14.8)
You are willing to share your personal information while using telepharmacy services.	14 (3.6)	36 (9.2)	122 (31.2)	158 (40.4)	61 (15.6)
You have sufficient skill in using smartphone and mobile applications.	9 (2.3)	4 (1.0)	38 (9.7)	132 (33.8)	208 (53.2)
The internet support in my area at the best satisfactory level.	5 (1.3)	15 (3.8)	72 (18.4)	157 (40.2)	142 (36.3)

Additionally, the findings of this study indicate a significant association between sex (p -value = 0.014) and occupation (p -value = 0.043) with knowledge as illustrated in Table VI. However, none of the other demographic factors examined showed a significant impact on the public's perception and readiness in utilizing telepharmacy.

Table VI: Association between the demographic profile with knowledge, perception and readiness towards telepharmacy.

Variable	p -value
Knowledge	
Sex	0.014
Marital status	0.954
Age	0.344
Geographical living area	0.991
Ethnicity	0.146
Educational level	0.257
Occupation	0.043
Income	0.455
Perception	
Sex	0.471
Marital status	0.571
Age	0.369
Geographical living area	0.592
Ethnicity	0.445
Educational level	0.520
Occupation	0.915
Income	0.362
Readiness	
Sex	0.389
Marital status	0.662
Age	0.100
Geographical living area	0.790
Ethnicity	0.519
Educational level	0.303
Occupation	0.859
Income	0.923

DISCUSSION

This study aims to evaluate KPR in the utilization of telepharmacy and to determine the association between the demographic profile with KPR among the Malaysian public. The finding from this study showed that Malaysian publics have high knowledge, positive perception and high readiness towards telepharmacy. Additionally, sex and occupation have an association with the knowledge on telepharmacy, meanwhile, there are no associations reported between the demographic profiles with perception and readiness. In a study conducted by Smith et al. (2015), which investigated public knowledge and readiness to use telepharmacy services in the United States, some intriguing parallels and distinctions emerge. The findings from our study consistently demonstrated a high level of knowledge among the Malaysian public, aligning with Smith et al.'s

findings that a substantial proportion of the American public was knowledgeable about telepharmacy [6]. These similarities may indicate a global trend towards increased awareness and understanding of telepharmacy, driven by the growing ubiquity of digital technologies and the expansion of telehealth services worldwide [6]. Nevertheless, it is important to address certain significant differences observed between the two studies. Firstly, while our study reported a significantly high knowledge based on sex and occupation, however, Smith et al. (2015) found significant disparities in knowledge based on age and education level. Study conducted by Smith et al., (2015) found that younger participants and those with higher levels of education were more likely to be knowledgeable about telepharmacy in the American context [6]. This discrepancy among the present study and other previous study may be attributed to the variations of the study populations as most of the participants in the previous study were conducted among the university students [6]. However, another study conducted among the public in Saudi Arabia did not identify the significant demographic disparities in knowledge, except for a notable influence of sex which is similar in this study's findings [5]. This contrast highlights the importance of considering the unique sociodemographic factors and healthcare infrastructures that can influence public knowledge in specific regions. It also underscores the need for tailored educational interventions to address disparities and ensure equitable access to telepharmacy services. Trenfield et al., (2022) also indicate that sex and occupation influence the knowledge score [7]. The same study is in contrast with the previous study conducted among Indonesian public, where age and education have an association with the knowledge of telepharmacy [5]. Meanwhile, previous study conducted in Saudi Arabia discovered that education and sex are the factors associated with the knowledge of telepharmacy [8]. The observed disparity in telepharmacy among different genders may stem from various factors including societal norms and career expectations. A previous study reported that women traditionally have more involvement in healthcare-related activities or roles, leading to potentially higher levels of knowledge in telepharmacy compared to men [9]. Certain occupations such as healthcare providers may inherently involve more exposure to healthcare practices or technologies, influencing the level of understanding of telepharmacy services [9]. Access to resources and educational opportunities could contribute to the disparity. Individuals in certain occupations or specific backgrounds may have had more exposures to telepharmacy through their workplace environments, thus resulting in higher knowledge scores [10]. Conversely, those with limited access to education or healthcare facilities may have less exposure to telepharmacy information, leading to lower knowledge scores [11]. Addressing these disparities requires targeted efforts in health promotion campaigns and educational initiatives. By understanding the underlying

factors contributing to differences in telepharmacy the tailored interventions can be developed to ensure equitable access to information and promote awareness among all segments of the population [12].

Our study findings showed a positive perception of utilizing telepharmacy. Nevertheless, it is worth to note that the main respondents in our study primarily consisted of young people aged less than 29 years old. A previous study reported that younger individuals tend to exhibit higher levels of digital literacy and comfort with technology compared to older generations [13]. Thus, this demographic characteristic likely influenced the positive perception observed towards telepharmacy services. This result also in parallel with the research conducted by Tjiptoatmadja and Alfian (2022) among the younger generation of public in Indonesia [4]. Both research finding found a generally positive perception among younger generation. Participants in both studies acknowledged the convenience and accessibilities that telepharmacy offers, particularly in remote or underserved areas. This parallel suggests that the perceived benefits of telepharmacy transcend national boundaries and are recognized as valuable by younger populations. Nevertheless, it is essential to consider the unique aspects of each country's healthcare system and cultural contexts when interpreting these findings. In Malaysia, the positive perception of telepharmacy could be influenced by the nation's growing reliance on digital technologies for various aspects of daily life, including healthcare [14].

Additionally, our study findings showed a high readiness of the Malaysian public in utilizing telepharmacy. This is similar to the research conducted by Garcia et al. (2022) in the United States, which examined the readiness and willingness of the American public to adopt telepharmacy services [15]. This commonality suggests that the readiness to embrace telepharmacy services is global phenomenon driven by factors such as technological advancement and increased awareness of telehealth solutions [16]. Firstly, advancements in technology have made telepharmacy more accessible and convenient for individuals, eliminating barriers such as geographical distance and travel constraints [17]. With the widespread availability of smartphones and internet connectivity, users can easily access telepharmacy services from the comfort of their homes [18]. The Covid-19 pandemic has accelerated the adoption of telehealth solutions, including telepharmacy, as healthcare systems worldwide faced unprecedented challenges in providing in-person care. This crisis underscored the importance of remote healthcare delivery and highlighted the potential of telepharmacy to enhance accessibility and continuity of care, particularly during times of crisis or when physical distancing measures are necessary [19]. Additionally, increasing awareness of telehealth among both healthcare providers and the public have contributed to

the growing readiness to embrace telepharmacy services [20]. As more individuals become familiar with telehealth options, they are more likely to express readiness to utilize telepharmacy as part of their healthcare routine [21]. Overall, the similarities in readiness observed between our study in Malaysia and previous research suggest that the readiness of telepharmacy services is not limited by geographical boundaries. Instead, it reflects a broader trend driven by technological advancements, changing healthcare needs, and increasing readiness of remote healthcare solutions worldwide [16].

This is the first nationwide study conducted that assessed the KPR among the Malaysian public towards telepharmacy services as well as the demographic factor associated with them. Previous research has primarily concentrated on pharmacists while findings related to Malaysian public are limited [21-23]. However, this study also has certain limitations. Many respondents were university graduates and reside in Klang Valley without any information regarding their disease or chronic illnesses, and hence our findings are probably not representative of the general population in Malaysia. Further study could involve conducting a survey with stratified sampling. This method would ensure that respondents are more representative of the real population, thereby bolstering the validity and generalizability of the findings.

CONCLUSION

In conclusion, this study has shed light on the KPR of the Malaysian public regarding telepharmacy. The findings reveal an encouraging trend, indicating that the public possesses a high level of knowledge, holds a positive perception, and demonstrates a high readiness to embrace telepharmacy services in Malaysia. This underscores the potential for telepharmacy to play a pivotal role in the healthcare landscape of the country, promoting accessibility and convenience for healthcare services. However, it is noteworthy that certain demographic factors, such as sex and occupation, exerted an influence on the public's knowledge regarding telepharmacy. These disparities highlight the importance of targeted educational initiatives and outreach programs to ensure that all segments of the population are adequately informed about the benefits and safety of telepharmacy.

Overall, the results of this study provide valuable insights into the current state of telepharmacy in Malaysia. As the healthcare landscape continues to evolve, policymakers and healthcare providers should take these findings into account to develop strategies that maximize the potential of telepharmacy while addressing any disparities in knowledge and access. By doing so, Malaysia can harness the full potentials of telepharmacy to enhance healthcare services for all its citizens.

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