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RESEARCH ARTICLE

UTILIZATION, DEMAND, AND WILLINGNESS TO PAY FOR TELEHEALTH SERVICES: A STUDY OF PATIENTS IN SELECTED VIETNAMESE PROVINCES

Hung Dang Ta[1], Hoan Van Vu[1], Thu Xuan Mai[1], Hieu Thi Minh Nguyen[1], Toan Thanh Thi Do[2], Hoat Ngoc Luu[3]*

1. Health Strategy and Policy Institute, Ministry of Health, Hanoi 100000, Vietnam
2. School of Preventive Medicine and Public Health, Hanoi Medical University, Hanoi 100000, Vietnam.
3. Phenikaa University, Hanoi 100000, Vietnam

Correspondence: tadanghung1884@gmail.com

ABSTRACT

OBJECTIVE:

Telehealth has become essential in healthcare delivery, particularly during the COVID-19 pandemic. It provides solutions to access disruptions and enhances healthcare accessibility and efficiency. This study aimed to describe the utilization, demand, and willingness to pay for Telehealth services in selected provinces in Vietnam.

METHODS:

A cross-sectional survey involving 438 participants from three Vietnamese provinces was conducted between late 2021 and early 2022. The study assessed telehealth utilization, user preferences, and willingness to pay for different telehealth services.

RESULTS:

The study revealed that 58.7% of participants had utilized telehealth services. For lower-cost services (100,000 VND to 500,000 VND), low-income households were 2.7 times more likely to pay (OR: 2.7, 95% CI: 1.41-5.00, p<0.01); familiarity with telehealth services increased the likelihood of spending by 1.6 times (OR: 1.6, 95% CI: 1.10-2.54, p<0.05); and those with less convenient access to healthcare were 1.79 times more likely to pay (OR: 1.79, 95% CI: 1.00-3.13, p<0.05). For higher-cost services (500,000 VND to 1,500,000 VND), wealthier households were 16.67 times more likely to invest (OR: 16.67, 95% CI: 2.04-100.00, p<0.01); insured individuals were 5.88 times more likely to pay (OR: 5.88, 95% CI: 1.92-16.67, p<0.01); and familiarity with telehealth increased the likelihood of payment by 2.3 times (OR: 2.3, 95% CI: 1.20-4.46, p<0.05).

CONCLUSION:

Telehealth is a crucial component of healthcare in Vietnam, with substantial engagement and willingness to pay. The findings underscore the need for investment in telehealth infrastructure and supportive policies to integrate telehealth into the national healthcare system, particularly in underserved regions.

KEYWORDS

telehealth, telemedicine, utilization, willingness to pay, Vietnam

INTRODUCTION

Telehealth, broadly encompassing health services such as virtual consultations, remote monitoring, and health education, has gained prominence globally, especially during the COVID-19 pandemic [1]. While telemedicine focuses on direct clinical interactions, telehealth includes health maintenance, prevention, and administrative services [2, 3]. These modalities, particularly synchronous (real-time) and asynchronous (store-and-forward) communication, have proven essential in maintaining healthcare delivery amidst physical access disruptions [3, 4].

In Vietnam, the rapid adoption of telehealth during the COVID-19 pandemic highlighted its potential to bridge healthcare gaps, particularly in rural areas with limited access to medical facilities [5]. The Vietnamese Ministry of Health's initiative 2628/QD-BYT, launched in 2020, underscores the national commitment to integrating telehealth into the healthcare system [6]. However, challenges such as inconsistent internet access, varying levels of digital literacy, and infrastructural disparities between urban and rural regions present significant barriers to widespread adoption [5].

This study hypothesizes that socioeconomic status, familiarity with digital technologies, and geographical location are significant determinants of telehealth adoption in Vietnam. Specifically, we expect wealthier households with higher digital literacy and those in urban areas will demonstrate higher telehealth utilization and willingness to pay for such services. By addressing these factors, this research aims to provide insights that will support the sustainable expansion of telehealth within Vietnam's healthcare landscape, particularly in underserved regions.

METHODS

STUDY DESIGN AND SETTING

This cross-sectional study was conducted from September 2021 to September 2022 across three provinces in Vietnam, including Son La, Quang Ninh, and Ha Tinh. These provinces were chosen to provide a representative sample of rural and urban populations, reflecting diverse healthcare access scenarios.

PARTICIPANTS

The study included 438 patients currently using telemedicine services. Participants were recruited from ten provincial and district hospitals equipped with telemedicine capabilities, ensuring a diverse participant pool that reflects varied healthcare settings.

Eligible participants were those who had utilized telemedicine services within the year before the study and were able to provide informed consent. Exclusions were made for patients unable to communicate effectively due to severe health conditions or those unwilling to participate.

SAMPLE SIZE CALCULATION

The sample size was determined based on the following formula:

$$n = z^2_{\left(1-\frac{\alpha}{2}\right)} \times \frac{p \times q}{d^2}$$

The sample size for this study was initially determined based on a previous feasibility study conducted in 2016 by Tran Minh Khanh, which reported that 72.6% of the population was willing to pay for telemedicine services [7]. Accordingly, the estimated sample size needed to achieve a 90% confidence level with a margin of error of 5% was 430. To accommodate the actual recruitment process, this number was adjusted to 438.

DATA COLLECTION

The study was conducted in 10 hospitals located in Son La, Quang Ninh, and Ha Tinh provinces, in which five hospitals belong to provincial and 5 belong to district level hospitals. These locations were specifically chosen because they had recently initiated telemedicine services and were deemed successful by state health management bodies. For each hospital, approximately 44 patients were randomly selected from eligible participants.

Data were collected using a structured questionnaire developed based on the Telemedicine Satisfaction and Usefulness Questionnaire, which has been validated in prior research [8]. Interviews were conducted face-to-face by trained healthcare professionals who were briefed on the ethical considerations of the patient interaction [9].

In this study, participants were asked about their willingness to pay for telemedicine consultations and remote medical services, with a maximum fee set at 1,500,000 VND. This classification follows Circular No. 02/2017/TT-BYT, which outlines the maximum allowable fees for telemedicine services in Vietnam. According to Circular No. 39/2018/TT-BYT, issued by the Ministry of Health on November 30, 2018, the standardized cost of medical services across hospitals is specified. For example, the consultation fee at special-grade hospitals and first-grade hospitals is set at 37,000 VND (applicable to higher-level hospitals providing telemedicine consultations). In comparison, the consultation fee at second-grade hospitals is 33,000 VND (applicable to lower-level hospitals in the telemedicine consultation hierarchy). Given that provincial general hospitals are larger and serve more patients, the study estimated a lower system management and transmission cost for these facilities compared to regional general hospitals and district hospitals. To estimate the minimum fee for telemedicine consultations, the research team aggregated the two cost components (consultation fee and additional costs) and further included an estimated 25% additional cost for system management and transmission for provincial hospitals and 30% for regional general hospitals and district hospitals. Based on these calculations, the study determined that the lowest estimated fee for remote consultations would be approximately 100,000 VND.

STATISTICAL ANALYSIS

Statistical analysis was performed using SPSS version 25. Descriptive statistics summarized demographics and usage patterns. Inferential statistics, including chi-square and logistic regression, were used to explore associations between demographic factors and telemedicine usage, with significance set at $p<0.05$ [10].

ETHICAL CONSIDERATIONS

The study received ethical approval from the Scientific Board of the Health Strategy and Policy Institute under decision number 192/QĐ-CLCSYT dated September 24, 2021. Consent forms were obtained from all participants before conducting the survey. All collected information regarding the research subjects was kept confidential, with the primary aim to improve community health and contribute to policy development, not for other purposes.

RESULTS

GENERAL INFORMATION OF STUDY PARTICIPANTS

Table 1 provides the demographic breakdown of the 438 participants enrolled in the study, detailing their age, gender, ethnicity, economic status, and health insurance coverage. The participants had an average age of 45.9 years, with a standard deviation of 17.1. Females were more represented at 62.6%, and the majority ethnic group was Kinh at 74.7%. Economic data show that the vast majority (88.1%) are not considered poor or near-poor. Social health insurance coverage was notably high, with 91.3% of participants having some form of health insurance (Table 1).

TABLE 1: GENERAL INFORMATION OF STUDY PARTICIPANTS

Characteristics	Number (%)
Age (Mean, SD)	45.9 (17.1)
Gender	
Male	167 (37.4%)
Female	274 (62.6%)
Ethnicity	
Kinh	327 (74.7%)
Others	111 (25.3%)

Characteristics	Number (%)
Economic status	
Poor/Near Poor	52 (11.9%)
Not Poor/Near Poor	386 (88.1%)
Health insurance coverage	
Social Health Insurance	400 (91.3%)
Commercial Insurance	5 (1.1%)
None (out-of-pocket payment)	33 (7.5%)

UTILIZATION OF TELEHEALTH SERVICES

This section reports on the types of telehealth services utilized by the study participants. Data collected from 438 patients indicate varying preferences for telehealth modalities, as summarized in Table 2.

TABLE 2: TYPES OF TELEHEALTH SERVICES USED BY PATIENTS IN THREE PROVINCES (N=438)

No.	Type of service used	Number of users	Percentage (%)	Telehealth modality
1	Phone calls to healthcare providers to inquire about health conditions	196	44.8	Synchronous
2	Receiving phone calls from healthcare providers about health status and medication post-visit	161	36.8	Synchronous
3	Calls to a health hotline for advice on health issues and medication	96	21.9	Synchronous
4	Sending images, test results, medical records for consultation	77	17.6	Asynchronous (store and forward)
5	Remote consultations with live interaction via apps like Zalo, Viber, Messenger	72	16.4	Synchronous
6	Using smartphone apps to connect with healthcare providers for consultation	64	14.6	Mobile Health (mHealth)
7	Local doctors discussing cases with hospital specialists via phone or TV during medical examinations or surgeries	53	12.1	Synchronous

A total of 257 patients (58.7%) reported using at least one form of telehealth. The most utilized service was making phone calls to healthcare providers to inquire about health conditions, engaged by 44.8% of participants. This service is categorized under synchronous telehealth modalities, which involve real-time communication. Conversely, the least commonly used service was consultations involving local doctors and hospital specialists during procedures, used by only 12.1% of participants. This underscores a significant preference for direct and immediate telehealth communication, while more complex interactions involving specialist coordination were less frequent.

DEMAND FOR TELEHEALTH SERVICES

This section explores the preferences and potential future demand for telehealth services among 438 participants, revealing a strong inclination towards synchronous telehealth services for immediate health concerns. Phone consultations are the most popular method, with 253 patients (57.8%) choosing this synchronous mode for real-time consultations. Meanwhile, 99 patients (22.6%) have utilized modern interactive synchronous services such as video calls via platforms like Zalo, Viber, and Messenger. Health advice hotlines, another form of synchronous service, and health consultations via smartphone apps, classified under mobile health due to their use of mobile technologies, were embraced by 90 (20.6%) and 77 (17.6%) patients, respectively. This diversity in service utilization underscores the broad

spectrum of patient needs and preferences for telehealth services, particularly under the constraints of the COVID-19 pandemic (Table 3).

TABLE 3: DEMAND FOR TELEHEALTH SERVICES WHEN FACING HEALTH ISSUES (N=438)

No.	Service Demand	Number	(%)	Telehealth modality
1	Phone calls to healthcare providers for consultations	253	57.8	Synchronous
2	Remote consultations with live image and direct interaction (via Zalo, Viber, Messenger)	99	22.6	Synchronous
3	Calls to health advice hotlines	90	20.6	Synchronous
4	Health consultations through smartphone apps with direct interaction	77	17.6	Mobile Health (mHealth)

In the domain of post-discharge services, a diverse range of telehealth modalities are actively employed by the study participants to manage their health effectively from home. Phone consultations, classified as synchronous telehealth, remain the most utilized service, with 248 patients (56.6%) engaging in this form for treatment consultations. Meanwhile, synchronous exchanges involving live images and direct interaction, used by 130 patients (29.7%), highlight the preference for more interactive and detailed medical communications. Monitoring health parameters through devices, part of remote patient monitoring, was reported by 90 patients (20.6%), and mHealth services guiding rehabilitation and health reminders were utilized by 62 and 40 patients, respectively. These services underscore the significant integration of telehealth into post-discharge care, emphasizing its role in continuous patient management and recovery (Table 4).

TABLE 4: DEMAND FOR SERVICES RELATED TO MEDICATION MANAGEMENT, TREATMENT, AND RECOVERY AT HOME (N=438)

Service Demand	Number	(%)	Telehealth modality
Phone calls to healthcare providers for treatment consultation	248	56.6	Synchronous
Exchanges with healthcare providers involving images and direct interaction (via Zalo, Viber, Messenger)	130	29.7	Synchronous
Monitoring health parameters through smart devices	90	20.6	Remote Patient Monitoring
Guidance on rehabilitation exercises or health improvement via phone or smart devices	62	14.2	Mobile Health (mHealth)
Reminders for medication timing via text messages or synthetic voice	40	9.1	Mobile Health (mHealth)

WILLINGNESS TO PAY FOR TELEHEALTH SERVICES

FIGURE 2. WILLINGNESS TO PAY FOR SINGLE USE OF TELEHEALTH SERVICES WITH CENTRAL-LEVEL PHYSICIANS AT LOWER-LEVEL HEALTH FACILITIES (N=438)

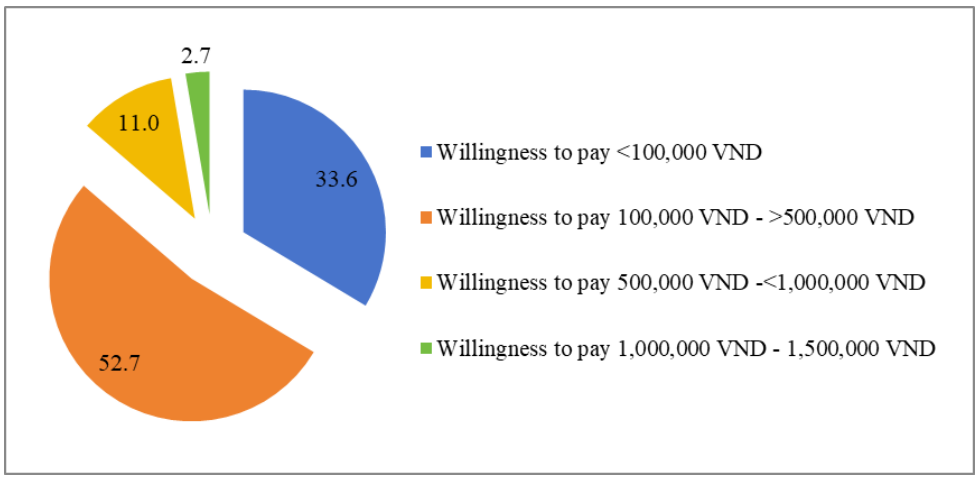

Figure 2 visually represents patient willingness to pay for telehealth services, demonstrating that a significant majority, 52.7% (231 patients), are willing to pay between 100,000 VND and 500,000 VND. Notably, 33.6% are willing to pay less than 100,000 VND, and a smaller segment, 11%, can afford 500,000 VND to 1,000,000 VND. The highest payment range, 1,000,000 VND to 1,500,000 VND, is the least preferred, with only 2.7% willing to pay this amount.

TABLE 5. MULTIVARIABLE REGRESSION ANALYSIS OF WILLINGNESS TO PAY FOR TELEHEALTH SERVICES AND DEMOGRAPHIC CHARACTERISTICS

Characteristic	OR	95%CI	P
Willingness to pay between 100.000 and 500.000 VND			
Economic situation (Ref: Not poor/Near poor)	2.70	1.41-5.00	0,002
Health insurance (Ref: Without health insurance)	2.38	0.91-6.25	>0,05
Knowledge of telehealth (Ref: Never heard of it)	1,6	1.10-2.54	0,021
Accessibility (Ref: Travel convenience)	1.79	1.00-3.13	0,047
Willingness to pay between 500.000 and 1.500.000 VND			
Economic situation (Ref: Not poor/Near poor)	16.67	2.04-100	0,008
Health insurance (Ref: Without health insurance)	5.88	1.92-16.67	0,002
Knowledge of telehealth (Ref: Never heard of it)	2,3	1,20-4,46	0,012
Accessibility (Ref: Travel convenience)	1.52	0.61-3.85	0,372

Pseudo R2 = 0,0549

The results from Table 5 indicate three factors—economic status, knowledge of telehealth, and accessibility—that have statistically significant impacts on the willingness to pay for telehealth services ranging from 100,000 VND to 500,000 VND. Households not classified as poor/near-poor are 2.7 times more likely to pay for telehealth services compared to poorer households (95% CI: 1.41-5.00, p<0.01). Patients aware of telehealth are 1.6 times more inclined to spend on these services compared to those unaware (95% CI: 1.10-2.54, p<0.05). Those facing accessibility challenges are 1.79 times more likely to pay compared to those with easier access to medical facilities (95% CI: 1.00-3.13, p<0.05).

Further analysis of Table 5 also shows that economic status, the use of health insurance, and knowledge of telehealth significantly influence the willingness to pay for services ranging from 500,000 VND to 1,500,000 VND. Households not classified as poor are 16.67 times more likely to pay for higher-priced telehealth services compared to poorer households (95% CI: 2.04-100.00, p<0.01). Those who used health insurance for a medical visit are 5.88 times more likely to spend on these services compared to those without insurance (95% CI: 1.92-16.67, p<0.01). Patients familiar with telehealth are 2.3 times more likely to pay higher amounts compared to those not familiar (95% CI: 1.20-4.46, p<0.05).

DISCUSSION

During the resurgence of the COVID-19 pandemic in late 2021 and early 2022, telemedicine adoption underwent significant global shifts. Public healthcare providers in Vietnam utilized platforms like Zalo to manage COVID-19 patients, demonstrating innovative solutions to accessibility challenges. Consequently, 58.7% of our study's participants engaged in telemedicine services, a usage rate closely mirroring the 57% reported in Canada [11] yet lower than the rate observed in China. A comprehensive survey in China across 57 hospitals in 16 provinces found that 94.6% of physicians adopted telemedicine during the pandemic, with 34.1% being first-time users and only 9.3% using it weekly [12]. Additionally, there was a high willingness among Chinese physicians to continue using telemedicine, with 91.5% expressing readiness during the pandemic and 88.4% afterward. However, major concerns included the inability to conduct physical examinations (78.3%) and other implementation challenges (58.0%) [13].

In contrast, Africa has seen limited success in sustaining telemedicine initiatives despite its potential to address critical health challenges. Barriers such as a shortage of doctors, heavy disease burdens, poverty, inadequate infrastructure, and unreliable power supplies have hindered adoption [14]. Furthermore, the lack of insurance reimbursement, alongside

medico-legal and ethical concerns, has made telemedicine less appealing [13]. Similarly, in Vietnam, telehealth faces significant barriers, especially in underserved areas. Economic status remains a key determinant, with wealthier individuals more likely to utilize and benefit from telehealth services. Nevertheless, infrastructural inadequacies and a general lack of awareness about telehealth's benefits continue to impede broader adoption, underscoring the need for enhanced public education and investment in infrastructure to effectively integrate telehealth into Vietnam's healthcare system.

Our analysis identified familiarity with telehealth services as a significant determinant of healthcare spending across different economic thresholds. At the lower financial threshold (100,000 VND to 500,000 VND, approximately $4.26 to $21.32), participants familiar with telehealth were 1.6 times more likely to invest in these services. This association remained strong at higher expenditure levels (500,000 VND to 1,500,000 VND, approximately $21.32 to $63.97), where familiarity increased the likelihood of spending by 2.3 times. These results are consistent with findings from a U.S. study, where positive experiences with telemedicine significantly influenced future usage intentions, and perceived risks associated with in-person visits promoted a shift towards telemedicine [15].

Additionally, our study revealed that, at the lower financial bracket, accessibility issues significantly influenced willingness to pay for telehealth services, with those facing less convenient access being 1.79 times more likely to spend. At higher financial thresholds, health insurance coverage played a pivotal role, with insured individuals being 5.88 times more likely to pay higher rates. This trend exceeds that observed in U.S. studies, where insurance coverage was also a significant factor [15]. Notably, at the highest financial threshold (500,000 VND to 1,500,000 VND, approximately $21.32 to $63.97), wealthier households were 16.67 times more likely to pay than their less affluent counterparts. This finding aligns with American research, where convenience was a key motivator for telemedicine adoption [15]. However, similar to the U.S. context, barriers such as poverty, physical access to hospitals, lack of insurance, and unfamiliarity with telehealth persist in Vietnam, limiting broader adoption. Also, participants who have higher economic status are more likely to have a higher willingness to pay for telehealth services [16, 17].

The limitations of our study highlight the complexities of researching telehealth usage in Vietnam, a country with a unique healthcare system facing rapid technological changes. The absence of qualitative methods in our study prevented a deeper exploration of telehealth users' subjective experiences [15]. Additionally, the study did not comprehensively analyse demographic characteristics or include diverse geographical locations, which could have enriched the findings. The COVID-19 pandemic context may also have influenced healthcare utilization patterns. The ongoing development of artificial intelligence presents opportunities to enhance telehealth services and public adoption, warranting further investigation in future research.

Understanding the structure of Vietnam's healthcare system, which is divided into four main levels—national, provincial, district, and commune—is crucial. This decentralized structure, while addressing the diverse needs of urban and rural populations, has resulted in underinvestment in public hospital infrastructure. Consequently, the private healthcare sector has begun to play a critical role, particularly in major cities, although its impact remains limited [18].
Future research should include private hospitals to provide a more comprehensive understanding of telehealth's impact across different healthcare settings in Vietnam. This approach will help clarify how healthcare structure influences the adoption and effectiveness of telehealth solutions, offering valuable insights for integrating these technologies into Vietnam's healthcare landscape [19].

CONCLUSION

This study highlights the significant role of telehealth in advancing healthcare delivery in Vietnam, particularly during the COVID-19 pandemic. The findings reveal a substantial adoption rate of 58.7%, with most patients preferring regular teleconsultations with their usual healthcare providers. Despite the promising engagement, the majority of patients are only willing to pay up to 500,000 VND for telehealth services. Key determinants of willingness to pay include economic status, health insurance coverage, and familiarity with telehealth technologies.

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