Pharmacy Education (2024) 24(3) 251 - 255
https://doi.org/10.46542/pe.2024.243.251255

IGSCPS SPECIAL EDITION

RESEARCH ARTICLE

The readiness and acceptance of patients with tuberculosis to use telecare

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Keywords
Digital health
e-Health
Healthcare
Tuberculosis

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Abstract

Background: Tuberculosis (TB) has been a global health burden and a leading infectious killer. The evolving healthcare technology allows telecare services to improve treatment support for TB patients. However, patient readiness and acceptance to use the service still need to be discovered. **Objective:** To evaluate the readiness and acceptance of TB patients in using telecare services**. Methods:** A cross-sectional survey involving patients at a respiratory hospital in Surabaya, Indonesia, was conducted using an accidental sampling technique from April to June 2023. A validated questionnaire was developed from the technology readiness index (TRI) and technology acceptance model (TAM) framework. Data were analysed using partial least squares-structural equation modelling (PLS-SEM)**. Results:** A total of 188 respondents participated. Respondents had low to medium-range attitudes towards a readiness to use the telecare service. Nevertheless, the majority of the respondents accepted the idea of telecare service. Optimism and innovativeness were two significant factors influencing patient readiness to use telecare services. Respondents had a positive perception of the perceived ease of use and perceived usefulness of the service. **Conclusion:** Not all patients were ready to use telecare despite their high acceptance towards the service. However, the positive perception towards the benefits of the service can be the leveraging factor for gradually adopting the service.

Introduction

Tuberculosis (TB) is the second world's deadliest infectious disease, with Indonesia being ranked second as the largest contributor (Wijkman *et al.,* 2020; Mucheleng'anga *et al.,* 2022; WHO Global TB Report, 2022). The emergence and spread of TB in Indonesia was huge, covering most regions. The government's ambitious goal is to eradicate TB in 2030 by focusing on the broader implementation of directly observed therapy (DOT).

DOT has been the standard of care for TB in Indonesia since 1995. However, its implementation has not always been successful, given the country's archipelagic landscape and the possible shortage of health professionals and facilities (Ratchakit-Nedsuwan *et al.,* 2019; Mulyono *et al.,* 2022). Nevertheless, the recent Covid-19 pandemic has provided a deeper insight into the battle against TB.

Despite suffering from the pandemic, Indonesia has witnessed the increasing use of telemedicine. Broad access to telecommunication and pharmaceutical logistics has enabled the general population to sustain their health during the COVID-19 outbreak. Telecare has become an alternative to providing remote healthcare access across the country. This has provided an impetus to develop and increase telecare delivery for TB patients.

The use of telehealth intervention is not completely novel in treating TB. For instance, video DOT (VDOT) and video-observed therapy (VOT) can improve TB medication adherence and clinical outcomes. However, these methods are not common in Indonesia. In

addition, there is a paucity of research investigating the telecare approach to TB (Guo *et al.,* 2020; Heritage *et al.,* 2020).

Telecare can be a promising intervention for TB if the patient is ready and willing to use the service (Yeo *et al.,* 2019; Rouidi *et al.*, 2022). Therefore, the objective of this study was to evaluate the readiness and acceptance of patients with TB towards the use of the telecare service.

Method

An observational survey was conducted from April to June 2023 at Husada Prima Hospital, the largest respiratory and TB referral hospital in Surabaya, the second largest city in Indonesia (population of 3.4 million). The respondents were recruited using an accidental sampling technique. An estimated sample of 188 patients, aged over 18 years old and currently being treated for TB for at least two weeks, were recruited for this study. The respondents were asked to complete a self-administered questionnaire, which had passed the validity and reliability testing (Cronbach alpha = 0.937).

The questionnaire was developed using the theory of technology readiness index (TRI) and the technology acceptance model (TAM), reflecting the mental attitude of patients towards telecare service. TRI measured four technology belief dimensions differentiating between either motivators, which are optimism (OPT) and innovativeness (INN) or inhibitors, which are discomfort (DIS) and insecurity (INS). TAM supported the TRI construct, represented by perceived ease of use (PEOU) and perceived usefulness (PU), highlighting the individual's intention to use the technology.

Data was further analysed using a partial least square (PLS) – structural equation model (SEM).

Results

A slightly higher number of male respondents (54.78%) participated in the study. The age range of respondents is between 46 and 55 (56.38%). The majority had graduated from elementary school (47.88%) and were employers (66.48%), as shown in Table I.

Table I: Characteristics of respondents (n = 188)

Characteristics	Number (%)
Gender	
Male	103 (54.78)
Female	85 (45.21)
Age (years)	
17-25	16 (8.51)
26-35	16 (8.2)
36-45	31 (16.49)
46-55	106 (56.38)
>55	19 (10.11)
Education	
Never attended school	3 (1.59)
Primary Education	90 (47.88)
Secondary Education	88 (46.80)
Tertiary Education	7 (3. 72)
Job	
Unemployed	63 (33.51)
Employed	125 (66.48)

Table II showed that most respondents were low to medium ready for the service (37.78% and 35.1%, respectively). On the contrary, patient acceptance was dominated by high to medium levels, with 47.3% and 52.12%, respectively. These results may highlight the difficulty distinguishing mental attitudes towards telecare services, given that there are no majority views on readiness and acceptance. However, most respondents (67.54%) intended to use the service if available.

Table II: Readiness and acceptance of telecare services by TB patients (n = 188)

Category	High n (%)	Medium n (%)	Low n (%)
Readiness	51 (27.13%)	66 (35.1%)	71 (37.78%)
Acceptance	89 (47.3%)	98 (52.12%)	1 (0.53%)
Intention to use telecare services			
Yes	126 (67.54)		
No	62 (32.46)		

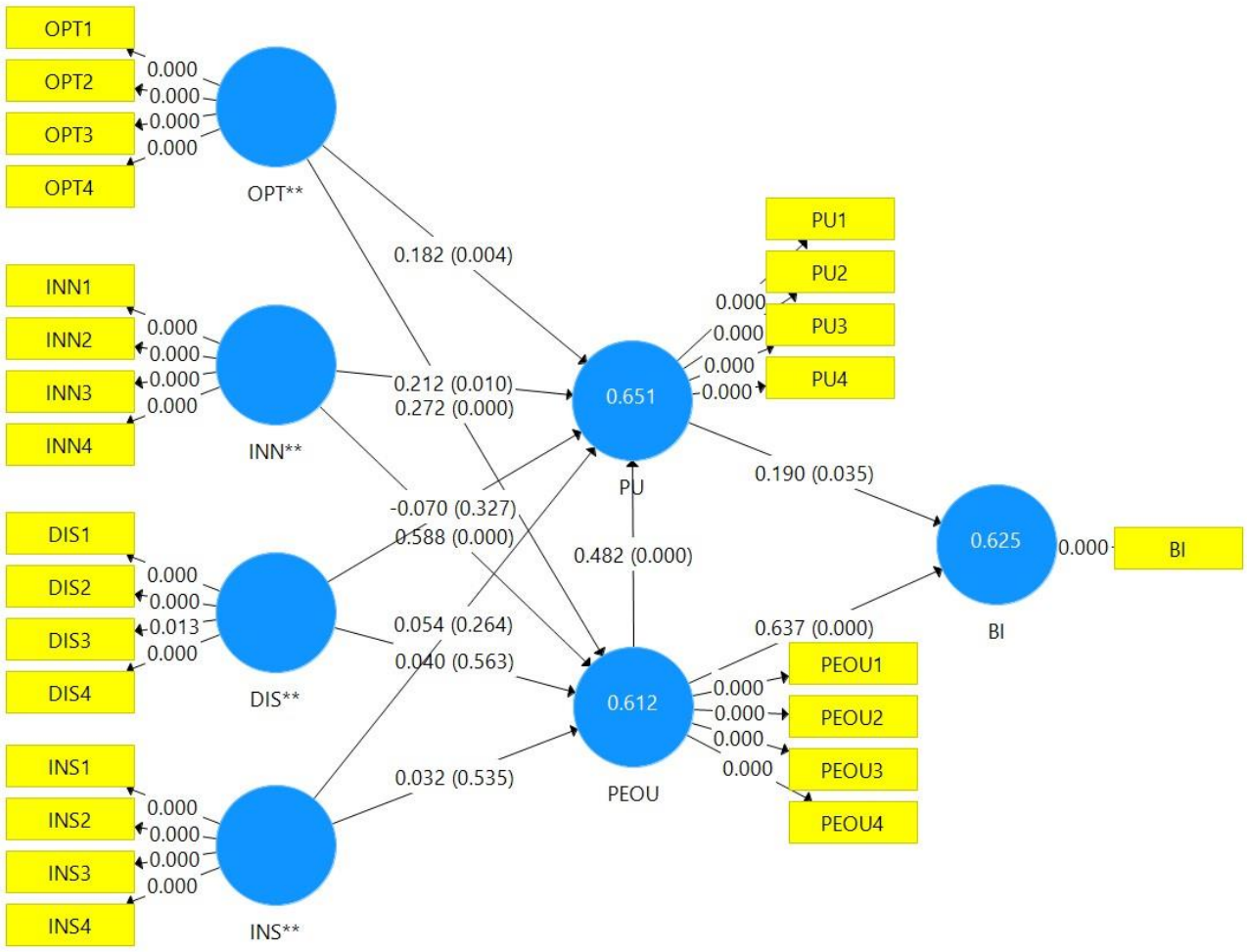
Table III confirms the aforementioned findings, with medium scores for readiness (2.958) and acceptance (65.21), respectively, based on the TRI and TAM score assessments.

The structural model using PLS-SEM analysis (Figure 1) revealed that INN and OPT had a significant influence on patient readiness ($p < 0.05$). Accordingly, DIS and INS did not affect patient belief towards readiness. The combined four dimensions contributed to 65.1% of the variance at the PU and 61.2% at the PEOU, respectively. Furthermore, the four dimensions also accounted for 62.5% of the variation in individual intention to accept telecare services. PU and PEOU have been found to affect this individual intention ($p < 0.05$) significantly.

Table III: TRI and TAM score assessment

Construct	Dimension	Score
TRI†	Optimism	0.8
	Innovativeness	0.783
	Discomfort	0.715
	Insecurity	0.655
Total TRI value		**2.958 (Medium)**
TAM‡	Perceived usefulness	67.44
	Perceived ease of use	62.77
Acceptance average value		**65.21 (Medium)**

†TRI ≤ 2.82 (low); 2.83 ≤ TRI ≤ 3.24 (Medium); TRI ≥ 3.25 (High)
‡TAM score of 100 ≥ X > 66.68 (High); 66.68 ≥ X > 33.34 (Medium); and 33,34 ≥ X > 0 (Low)



*Significance at $p < 0.05$

**OPT = optimism; INN = innovation; DIS = discomfort; INS = insecurity; PU = perceived usefulness; PEOU = perceived ease of use; BI = behavioral intention

Figure 1: Hypothesised application of the TRAM from SEMPLS

Discussion

Telecare has accelerated the delivery of healthcare (Chang *et al*., 2021). However, not all patients are ready to fully embrace telecare, so an initial examination of their readiness and acceptance is critical. (Nielsen *et al*. 2022). The measurement of readiness and acceptance is needed since an individual's attitude toward eHealth and intention to utilise a technology was affected by his/her opinion of the technology's utility and ease of use (AshaRani *et al*. 2021).

The patient readiness in this study was classified as low to medium category. This suggested that TB patients did not fully understand the importance of telecare services. Many factors affected this finding, ranging from the individual to a greater health system issue. Individual characteristics, including income, state of health and capability to adopt the service, along with the availability of the service within the country, were the factors most frequently associated with a lower degree of readiness to accept telecare (Yu-Tong *et al.,* 2022; AlSalloum *et al.,* 2023; Octavia *et al.,* 2023; vanKessel *et al.,* 2023).

Patient comprehension towards telecare service is critical as it may lead to poor readiness. The user of telecare must understand the advantages of the services. Widespread access to smartphones and internet connectivity and increasing demand for timely healthcare services are two leveraging factors for telecare which can be promoted to the potential user (Peixoto & Ferreira 2022). This is why it is important to introduce telecare in a way that people understand. Poor comprehension of these benefits may affect the service's sustainability in the long term.

The findings' medium to high acceptance score reflects the potential to adopt the service fully. However, adopting a service may not always imply a successful implementation. In addition, only two-thirds of the respondents intended to use the service, substantiating the claim that the mere adoption of telecare services is insufficient. A successful implementation will require readiness and acceptance in the patients, equalling a high intention to use the services (Kampa, 2023; Kim *et al.,* 2023). According to the TRI and TAM framework, this can be achieved by optimising the motivators and reducing the inhibitors to use the technology. Understanding these issues may help to improve general comprehension and literacy of the technology (Hermansyah *et al*., 2020).

This study found optimism and innovativeness were the key motivators determining general readiness in TB patients. This means the provider needs to build their service based on these two motivators (Chung *et al.,* 2015; Buyle *et al.,* 2018; Chen & Lin, 2018; Tsang *et al.,* 2019). Users who possess optimism and are open to innovation are more likely to use telecare (Sugiarto *et al*., 2015). For example, the younger generation and creative workers are more likely to be potential users of the service (Kampa, 2023).

Perceived ease of use and perceived usefulness representing the TAM framework in this study affected the behavioural intention to telecare ($p < 0.05$). This amplified the findings of the TRI framework, suggesting that the TB patient's intention to use telecare can increase once they have perceived these features. The intention to use digital technology is significantly affected by the user's attitude (Gurupur *et al*., 2017). This also demonstrated that TRI and TAM can predict user adoption of telecare services.

Conclusion

Not all patients were ready for telecare despite their general acceptance of the service. Optimism about the service, recognition of its innovativeness, and positive perceptions of ease of use and usefulness can be leveraging factors in adopting the service.

Acknowledgement

This research received funding from the Directorate General of Higher Education, Ministry of Education, Culture, Research and Technology of the Republic of Indonesia 2023.

References

AshaRani, P. V, Hua, L. J., Roystonn, K., Kumar, F. D. S., Peizhi, W., Jie, S. Y., Shafie, S., Chang, S., Jeyagurunathan, A., Yiang, C. B., Abdin, E., Vaingankar, J. A., Sum, C. F., Lee, E. S., Chong, S. A., & Subramaniam, M. (2021). Readiness and acceptance of Ehealth services for diabetes care in the general population: Cross-sectional study. *Journal of Medical Internet Research*, **23**(9), e26881.

Buyle, R., Van Compernolle, M., Vlassenroot, E., Vanlishout, Z., Mechant, P., & Mannens, E. (2018). Technology readiness and acceptance model' as a predictor for the use intention of data standards in smart cities. *Media and Communication* 6(4Theoretical Reflections and Case Studies), 127–39.

Chang, J. E., Lai, A. Y., Gupta, A., Nguyen, A. M., Berry, C. A., & Shelley, D. A. (2021). Rapid transition to telehealth and the digital divide: Implications for primary care access and equity in a post-COVID era. *The Milbank Quarterly*, **99**(2), 340–68.

Chen, M-F., & Lin, N-P. (2018). Incorporation of health consciousness into the technology readiness and

acceptance model to predict App download and usage Intentions. *Internet Research*, **28**(2), 351–73.

Chung, N., Han, H., & Joun, Y. (2015). Tourists' intention to visit a destination: The role of Augmented Reality (AR) application for a heritage site. *Computers in Human Behavior*, **50**, 588–599.

Gurupur, V., Shettian, K., Xu, P., Hines, S., Desselles, M., Dhawan, M., Wan, T. Th H., Raffenaud, A., & Anderson, L. (2017). Identifying the readiness of patients in implementing telemedicine in Northern Louisiana for an oncology practice. *Health Informatics Journal*, **23**(3), 181–96.

Hermansyah, A., Sukorini, A. I., Asmani, F., Suwito, K. A., & Rahayu, T. P. (2020). The contemporary role and potential of pharmacist contribution for community health using social media. *Journal of Basic and Clinical Physiology and Pharmacology*, **30**(6), 1–8.

Kampa, R. K. (2023). Combining technology readiness and acceptance model for investigating the acceptance of M-learning in higher education in India. *Asian Association of Open Universities Journal*.

Mucheleng'anga, L, A., Himwaze, C. M., Telendiy, V., Simumba, S., Soko, J., Kayonde, N., Mulenga, B., Hamukale, A., Shibemba, A. L., Lungu, P. S., Tembo, J., Bates, M., Chanda-Kapata, P., Mwaba, P., Kapata, N., Ntoumi, F., & Zumla, A. (2022). Incidental tuberculosis in sudden, unexpected, and violent deaths in the community Lusaka, Zambia - A descriptive forensic post-mortem examination study. *International Journal of Infectious Diseases*.

Nielsen, A. S., Hanna, L., Larsen, B. F., Appel, C. W., Osborne, R. H., & Kayser, L. (2022). Readiness, acceptance and use of digital patient reported outcome in an outpatient clinic. *Health Informatics Journal*, **28**(2), 14604582221106000.

Peixoto, M. R., & Ferreira, J. B. (2022). Drivers for teleconsultation acceptance in Brazil: Patients ' perspective during the COVID-19 pandemic. *Journal of Contemporary Administration*, **26**(2), 22.

Sugiarto, M., Soeprapto, A., & Dewanti, I. S. (2015). Technology readiness and acceptance model technology. *The2nd University Research Coloquium*, 78–86.

Tsang, Y. F., Kumar, V., Samadar, P., Yang, Y., Lee, J., Ok, Y. S., Song, H., Kim, K-H., Kwon, E., E., & Jeon, Y. J. (2019). Production of bioplastic through food waste valorization. *Environment International*, **127**, 625–644.

WHO Global TB Report. (2022). Global tuberculosis report 2022. *World Health Organization 2022*, **4**(1), 168.

Wijkman, M., Carlsson,M., Darwiche, G., & Nystrom, F. H. (2020). A pilot study of hypertension management using a telemedicine treatment approach. *Blood Pressure Monitoring*, 18–21.