Telepharmacy intervention: Can it impact medication adherence among patients with chronic disease?

Pretty Falena Atmanda Kambira [ID], Lusy Noviani [ID], Angelina M. E. L. Hendrawan

The Department of Pharmacy, School of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia, Jakarta, Indonesia

Abstract

Background: Medication adherence among patients with chronic diseases remains challenging for healthcare professionals. The large number and types of drugs that must be taken in the long term and the lack of knowledge related to drugs and diseases are factors that affect patient compliance. Telepharmacy is expected to improve patient medication adherence by providing easy access to consult with pharmacists. **Objective**: To assess the effect of telepharmacy on chronic patient medication adherence. **Methods**: This study had a cross-sectional study design, and the study population was Lifepack application users. The data was collected through an online questionnaire distributed through the Lifepack platform. The adherence was evaluated using the Morisky Medication Adherence Scale, and the association of telepharmacy and patient medication adherence was examined using the chi-square independence test with significance at $p < 0.05$. **Results**: In a study comprising of 94 respondents, a proportional ratio of respondents who used and did not use telepharmacy services was observed (45.75% and 54.25%, respectively). Analysis using the chi-square statistic (χ^2) demonstrated a significant association between telepharmacy and patient adherence ($\chi^2 = 64.745$, df = 1, $p < 0.001$). Furthermore, the odds ratio (OR) revealed a substantial difference in adherence, with an OR of 122.67 (95% CI [27.58, 545.66]). **Conclusion**: Telepharmacy has a significant impact on medication adherence in chronic patients.

Introduction

In 2018, hypertension, diabetes mellitus, and heart disease were the chronic diseases with high prevalences of 32%, 23%, and 1.5% respectively, according to the Indonesian Ministry of Health. This finding was reported in Regional Health Research (RISKESDAS) 2018 (Badan Penelitian dan Pengembangan Kesehatan, 2018). Chronic disease management therapy takes a long time, often spanning a patient's lifetime, potentially influencing patient adherence (World Health Organization, 2003). Adherence, defined as the extent to which patients follow their prescribed treatment regimens, is one crucial factor in achieving therapeutic goals, particularly in patients with prolonged therapy for chronic diseases. Various factors could impact patient adherence to medication regimens, including sociodemographic and socioeconomic factors, patient demographics, psycho-social aspects, pharmacological properties, disease severity, facility and healthcare, communication, and type of interventions (Edi, 2020). One strategy to enhance medication adherence was implementing disease co-management consultation or counselling (Kini & Ho, 2018). However, instances have been observed where counselling has not achieved the anticipated outcomes due to patients' non-attendance. The key elements contributing to this issue are patients' inability to effectively communicate their requirements during the early phases of counselling and their uneasiness when discussing intimate matters in a direct face-to-face environment (Henselmans *et al*., 2015).

Technology may address these challenges by enhancing patient knowledge and fostering self-efficacy in managing complex chronic conditions (Bickmore *et al*., 2018). Mobile health (mHealth) applications have demonstrated their effectiveness in enhancing

communication, offering user-friendly accessibility, facilitating self-management processes, promoting better adherence to medication regimens, and leading to enhanced control of blood sugar levels (Cotter *et al.*, 2014).

In Indonesia, smartphone users are ranked fourth in the world after China, India, and America, with over 100 million people using smartphones (Rahmayani, 2015). Using smartphones to transform healthcare is feasible, especially if telepharmacy application programs are integrated into mobile devices (Connelly *et al.*, 2006). Telepharmacy optimises the role of pharmacists in providing services to patients with distance and time constraints and could increase by 62.6% patient compliance (Farid *et al.*, 2022).

Therefore, this study aims to assess the impact of telepharmacy services provided by the Lifepack application on the level of medication adherence among chronic patients in Indonesia (Lifepack, 2023) by comparing the adherence between those utilising telepharmacy and those who do not. The research was conducted through the Lifepack application, an online pharmacy service licensed as Pharmacy Electronic Facility Organiser (PESF) by the Indonesian Ministry of Health.

Methods

The research design was a cross-sectional study design. The inclusion criteria of the study population were the Lifepack platform users, ages between 18 and 65. They were diagnosed with chronic diseases such as hypertension, heart disease, and/or diabetes mellitus. The respondents were chosen using a simple random sampling technique. Data was collected using an online questionnaire distributed through the Lifepack platform and collected between February and May of 2023. The adherence of the respondents was assessed using the Morisky Medication Adherence Scale and the questionnaire was translated and validated in Bahasa Indonesian (Sinuraya *et al.*, 2018). The association between telepharmacy usage and patient adherence was examined with the Chi-square independence test. A p-value of less than 0.05 will indicate statistical significance. The statistical analysis was performed using Jeffrey's Amazing Statistics Program (JASP Team, 2023). The ethical clearance was obtained from the research ethics commission of the Faculty of Medicine and Health Sciences Atma Jaya Catholic University of Indonesia with approval number 11/04/KEP-FKIKUAJ/2023.

Results

The sample size was 94 respondents. The collected data showed that 103 respondents filled out the questionnaire, 94 met the inclusion criteria, and nine did not meet the inclusion criteria because of their age and data completeness (Table I).

Table I: Demographic of study population

		Using telepharmacy		Not using telepharmacy	
		Number	%	Number	%
Sex					
	Male	20	44.44	20	40.82
	Female	25	55.56	29	59.18
Age (years)					
	17-25	0	0	1	2.04
	26-35	0	0	0	0
	36-45	1	2.22	3	6.12
	46-55	14	31.11	17	34.69
	56-65	30	66.67	28	57.14
Education					
	High school	13	28.89	18	36.735
	Higher education	32	71.11	31	63.265
Chronic disease					
	Diabetes mellitus	11	24.44	31	63.26
	Hypertension	37	82.22	26	53.06
	Heart disease	26	57.78	18	36.73
	Diabetes mellitus and heart disease	2	4.44	3	6.12

		Using telepharmacy		Not using telepharmacy	
		Number	%	Number	%
	Diabetes mellitus and hypertension	7	15.56	8	16.33
	Hypertension and heart disease	18	40.00	5	10.20
	Hypertension, diabetes mellitus and heart disease	1	2.22	5	10.20
Duration of illness					
	0-1 year	3	6.67	7	14.29
	1-2 years	12	26.67	20	40.82
	2-3 years	8	17.78	12	24.49
	3-4 years	13	28.89	9	18.37
	4-5 years	7	15.56	1	2.04
	> 5 years	2	4.44	0	0
Number of medicine types					
	1 type	10	22.22	20	40.82
	2 types	5	11.11	12	24.49
	3 types	11	24.44	7	14.29
	> 3 types	19	42.22	10	20.41

The study population obtains a proportional representation of respondents who used and did not use telepharmacy services (45.75%, 54.25%). Respondent's demographic characteristics that were asked in this study were sex, age, level of education, type of chronic disease, duration of illness, and number of medicine types taken.

The association between telepharmacy and patient adherence assessed with the chi-square statistic (χ^2) yielded a value of 64.745 with one degree of freedom and a p-value of less than 0.001. There was a significant difference in the odds of patient adherence between patients who used telepharmacy compared to patients who did not use telepharmacy (OR = 122.67, 95% CI [27.58, 545.66]) (Table II).

Table II: Association between telepharmacy and adherence in chronic disease patients calculated using chi-square independence test

Telepharmacy usage	Patient adherence		Total	Chi-square statistic (χ^2)	*P*-value	Cramer's V	Odds ratio (OR)
	Yes	No					
Yes	40	3	43				
No	5	46	51	64.745	< 0.001	0.830	122.67
Total	**45**	**49**	**94**				

Discussion

The analysis revealed a highly significant association between telepharmacy usage and chronic disease patients' adherence. The chi-square statistic (χ^2) of 64.745 with one degree of freedom and a *p*-value of less than 0.001 emphasises the robustness of this association. Moreover, the substantial effect size, as indicated by Cramer's V with a value of 0.830, demonstrates a strong and meaningful relationship between telepharmacy services and patients' adherence. These findings suggest that telepharmacy is pivotal in strengthening medication adherence, holding promising implications for healthcare practices and

policies seeking to enhance patient compliance with prescribed treatments.

The significance of telepharmacy in enhancing patient medication adherence is high, as evidenced by an odds ratio (OR) of 122.67. This statistic implies that patients who utilise telepharmacy services are 122 times more likely to adhere to their prescribed medication regimens. Beyond this significant improvement in medication adherence, telepharmacy has demonstrated efficacy in decreasing the number of hospital stays and physician visits. The accomplishment might be attributed to the execution of pharmaceutical care plans and services by pharmacists, which include a

comprehensive approach to managing and preventing problems associated with medication therapy *(*Xin *et al.*, 2015).

The telepharmacy features offered by Lifepack are accessible through the mobile application, available on Android and iOS, and the website. Users can access these services after registering themselves in the Lifepack system. The services include consultations with healthcare professionals (doctors and pharmacists), and medication reminders. Furthermore, Lifepack complements its telepharmacy services by facilitating medication purchases and deliveries. This capability is possible because Lifepack operates as an online pharmacy service duly authorised by the Indonesian Ministry of Health under the Pharmacy Electronic Facility Organiser classification. At the time of this research, no other telepharmacy services were identified on alternative healthcare platforms in Indonesia. This observation highlights a distinct characteristic of Lifepack's telemedicine approach, as most telemedicine providers in the country predominantly offer consultations with doctors without including a pharmacist. This unique combination of services provided by Lifepack addresses the essential healthcare needs of patients by integrating medical consultation and pharmaceutical support, thereby enhancing the overall quality of care and convenience for users.

Telepharmacy utilisation was rising, particularly during and after the COVID-19 pandemic (Iannitti *et al.*, 2015). This technology was a solution offered when there was a restriction in social distancing, resulting in patients having difficulty visiting healthcare facilities or even doing face-to-face consultations with pharmacists.

Moreover, telepharmacy can respond to time and distance problems, enabling patients to access health services in remote locations, providing convenience, and enhancing patient medication adherence. This enhancement can be attributed to the pharmaceutical services provided by clinical pharmacists, who offer patient education regarding drug therapy, provide prompt notifications for medication administration, and conduct follow-ups through regular telephone communication. These interventions enhance patients' understanding and awareness of their ongoing therapy.

The rapid advancement of technology and the internet in the pharmaceutical business needs close monitoring to ensure the safety and quality of available pharmaceutical products. Therefore, the Indonesian government regulated the online pharmacy by issuing Pharmacy Electronic Facility Organisers permits. This permit represents a license granted to registered entities to operate online pharmaceutical services under Indonesian FDA supervision and monitoring (Badan POM RI, 2020).

Although the telepharmacy feature could increase patient medication adherence, this service is not optimally utilised by the platform users, with not more than 50% of the respondents being telepharmacy users. Several factors may contribute to the limited adoption of telepharmacy on the platform. These factors include a lack of awareness regarding the availability of the services, limited digital technology access and experiences, a preference for conventional in-person healthcare interaction, and concerns about the security and privacy of telepharmacy services. Further research and analysis are needed to uncover the root causes behind this observed underutilisation.

This study may be a preliminary exploration into the impact of telepharmacy effects in Indonesia, especially considering the limited availability of telepharmacy platforms during the study period. The results of this study may encourage pharmacists to develop technology-enabled systems that enhance pharmaceutical treatment and improve patient adherence.

Conclusion

The study findings revealed a significant association between the utilisation of telepharmacy services and the adherence of patients with chronic diseases to their medication regimen. The use of telepharmacy demonstrated a considerable positive influence on patient adherence to medicine, supported by a robust odds ratio (OR) of 122.67 (95% CI [27.58, 545.66].

Acknowledgement

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