

## **Development Of Pharmacist Counseling Application Android-Based For Hypertension Patients**

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### **Abstract**

In Indonesia the use of telepharmacy in clinical services is still not widely utilized. The counseling activities conducted by community pharmacists have not yet been optimal, and the documentation related to clinical pharmacy services is still considered very poor. This research aims to determine the usability of the Android-based pharmacist counseling application developed for hypertensive patients. The usability of the application includes the criteria of usefulness, ease of use, ease of learning, and user satisfaction. The method used in this research is Research and Development with the 4D model (define, design, develop, and disseminate). The sample in this study consists of 45 pharmacists practicing in pharmacies in Semarang City and 100 patients aged 18-40 years residing in Semarang City. The sampling technique in this study used purposive sampling. Usability testing used the USE questionnaire via Google Forms with assessment using a Likert scale. The collected data were analyzed using usability percentages. The research results show that the developed Android-based pharmacist counseling application for hypertensive patients meets usability criteria with a usefulness score of 87.66%, ease of use score of 91.40%, ease of learning score of 93.48%, and user satisfaction score of 87.92% with category very diserving. Based on the results of the usability testing analysis, it is known that the developed application provides real benefits for pharmacists and patients by helping them carry out counseling activities and counseling documentation.

**Keywords:** counseling, documentation, pharmacist, telepharmacy, usability

### **1. INTRODUCTION**

In Indonesia, the use of telepharmacy in clinical services is still not widely utilized. As many as 76.10% of community pharmacists have not yet utilized telepharmacy in counseling services due to the still low knowledge of pharmacists about telepharmacy (Naufal et al., 2023). The counseling services provided by pharmacists can ensure that patients use medications correctly and improve patient adherence. According to Parera et al., (2021), only 57.8% of community pharmacists conduct counseling activities in accordance with pharmaceutical service standards, and only 21.9% of pharmacists document counseling activities. The same was found in the research by Puspita et al., (2022), that counseling documentation is an activity rarely performed by community pharmacists.

Telepharmacy counseling has proven to be an effective form of pharmaceutical service with significant improvements in clinical outcomes and patient therapy adherence. Many benefits are obtained from telepharmacy counseling, but there are still many limitations in the development and utilization of telepharmacy technology in society. A secure and user-friendly platform or application that can ensure patient privacy is needed to facilitate communication between pharmacists and patients (Iftinan et al., 2021). The Android-based counseling application allows pharmacists, as counselors, to view patients' medication history by entering the patient's name or phone number, thereby facilitating pharmacists in documenting counseling activities (Ariyani et al., 2022).

Pharmacist counseling for hypertensive patients has a significant impact on patient adherence and clinical outcomes (Febrianti et al., 2023). Hypertension is the most common cardiovascular disorder in the world. The prevalence of hypertension in Indonesia is increasing and is very concerning. Based on Riskesdas data from 2018, there was an 8.7% increase in hypertension cases in Indonesia. In 2019, mortality occurred at a rate of 25% among hypertensive patients in Indonesia (WHO, 2023). According to data from the Semarang City Health Office in 2021, hypertension is the most prevalent disease in Semarang City, with a total of 387,196 cases. Providing counseling can increase adherence to the hypertension therapy given. Patient compliance has a positive and significant impact on the reduction of systolic and diastolic blood pressure (Febrianti et al., 2023).

The purpose of this research is to develop an Android-based counseling application that can be used by community pharmacists in telepharmacy counseling services, making it easier for pharmacists to document counseling activities regularly and systematically, and to include a module on hypertension.

The urgency of this research is that counseling needs to be conducted comprehensively and documented. Counseling is important to ensure that patients use medication correctly and to improve patient adherence to treatment. Counseling documentation is important to carry out not only as a record related to the patient's condition, but also to document the information and education that have been provided to the patient so that it can be used as a follow-up for future counseling. Providing counseling to hypertensive patients can improve patient compliance, clinical outcomes, and the quality of life for hypertensive patients. According to Minister of Health Regulation No. 73 of 2016 on pharmaceutical service standards in pharmacies, hypertension falls under the criteria of chronic diseases requiring long-term treatment, thus prioritizing it for counseling services.

The novelty of this research is the application design that can not only be used for pharmacist-patient counseling but also for documenting counseling activities in a structured and systematic manner. This study involving the direct participation of pharmacists through in-depth interviews in determining the design of the developed application.

## **2. METHOD**

### **Research Design**

This research uses the Research and Development method with the 4D model (define, design, develop, and disseminate). The development of the pharmacist counseling application in this study uses the waterfall model.

### **Subjects**

The subjects of this study are community pharmacists practicing in pharmacies in the city of Semarang and patients aged 18-40 residing in the city of Semarang.

### **Sampling Techniques and Sample**

The sampling technique in this study uses purposive sampling. The inclusion criteria in this study are community pharmacists practicing in pharmacies, patients aged 18 – 40 years. Exclusion criteria in this study are community pharmacists and patients who do not have an Android device, community pharmacists and patients who cannot operate Android devices.

#### **a. User Analysis**

At the user analysis stage, the sample or respondents consisted of **10 pharmacists practicing** in pharmacies in the city of Semarang. The sampling in the needs analysis stage is based on a saturated sample, where data collection is stopped when no new information emerges. According to Sugiyono (2013), qualitative research is considered complete when no new data is deemed to emerge.

#### **b. Testing the Validity and Reliability of the USE Questionnaire**

The sample or respondents used in the validity and reliability testing phase of the USE questionnaire consisted of 30 respondents, including 15 pharmacists practicing in pharmacies in Semarang City and 15 patients aged 18–40 years residing in Semarang City.

#### **c. Usability Testing**

At the usability testing stage, the sample or respondents consisted of **45 pharmacists practicing** in pharmacies in Semarang City **and 100 patients** aged 18 – 40 years residing in Semarang City. The size of the pharmacist sample was calculated using the Yount (1999) formula. Based

on data from the Semarang City Health Office in 2022, there are 425 pharmacies, so the pharmacist sample is calculated as follows:

Sample size = 10% x population size

Sample size = 10% x 425

Sample size = 42.5 rounded up to 45 pharmacists

The patient sample was calculated using the Lemeshow formula because the exact population size was not known.

$$n = \frac{Z_{\alpha}^2 \times P \times Q}{L^2}$$

$$n = \frac{1,96^2 \times 0,5 \times 0,5}{10^2}$$

n = 96,04 rounded up to 100 pasien.

Explanation :

n : the minimum number of samples required

Z $\alpha$  : The standard value of the distribution according to the value  $\alpha = 5\% = 1.96$

P : Outcome prevalence 50%

Q : 1 – P

L : Accuracy level 10%

## Methods

### a. User Analysis

A small-scale field study was conducted through interviews with **10 pharmacist respondents** practicing in pharmacies in Semarang City. The interview data were analyzed using Nvivo 12 Pro software.

### b. Testing Validity Content

Content validation is conducted face-to-face with validators consisting of 1 academic pharmacist and 2 practicing pharmacists using a questionnaire. The questionnaire used was adapted from the Educational Content Validation Instrument in Health (ECVIH) questionnaire. Validators are given 4 alternative answers. The scores obtained are then converted to a dichotomous scale of 0, meaning not eligible, and 1, meaning eligible, and the I-CVI value is calculated based on the average scale of each item from the 3 validators.

c. Usability Testing

At the usability testing stage, **45 pharmacists and 100 patients** were asked to provide their assessments by filling out a questionnaire through Google Forms. Respondents were given 5 alternative answers using a Likert scale (1 meaning strongly disagree, 2 meaning disagree, 3 meaning neutral, 4 meaning agree, and 5 meaning strongly agree), then usability measurement was conducted by calculating the usability percentage. The usability percentage data acquired is thereafter utilized to formulate findings pertaining to Table 1.

**Table 1.** Usability Category

<b>Percentage (%)</b>	<b>Category</b>
< 21	Very unworthy
21 – 40	Not worthy
41 – 60	Sufficient
61 – 80	Worthy
81 – 100	Very deserving

**3. RESULTS AND DISCUSSION**

This research uses the 4D model, which consists of the define, design, develop, and disseminate stages. The four stages are carried out sequentially and systematically. Define is the stage for conducting user analysis, design is the stage for planning, develop is the stage for developing and producing the product, and disseminate is the stage for product dissemination.

A small-scale field study was conducted through interviews with **10 pharmacist respondents** practicing in pharmacies in Semarang City. The purpose of conducting the interviews is to understand the implementation of counseling services and counseling documentation carried out by the pharmacist respondents, as well as the application needs and application design required by the pharmacist respondents. Based on the results of the interviews with 10 pharmacist respondents that have been transcribed into documents, the data was analyzed using NVivo 12 Pro software.

Table 2 is the result of coding with the theme of counseling services and counseling documentation. There are 3 codings from the 10 pharmacist respondents' answers regarding the implementation of counseling services.

**Table 2.** Coding Counseling Services and Counseling Documentation

<b>Theme</b>	<b>Coding</b>	<b>Respondents</b>
Counseling services	Implemented but not optimal	1 and 4
	Not implemented	6, 7, 9 and 10
Counseling documentation	Implemented	2,3,5 and 8
	Implemented	2
	Not implemented	1, 3, 4, 5, 6, 7, 8, 9 and 10

Based on Table 2, it is known that the respondents indicated that the counseling service has been implemented, has been implemented but not optimally and has not been implemented. Pharmacist counseling should be conducted comprehensively, continuously, and periodically, thereby providing a significantly positive impact on patients (Rina, 2023). According to the International Pharmaceutical Federation, counseling is considered a top priority in clinical pharmacy services. Pharmacists have the obligation to provide information and advice to patients to optimize treatment. Pharmacists must have good pharmacotherapy knowledge and strong communication skills to provide effective counseling. Pharmacists must use open-ended questions and actively listen to obtain information from patients, as well as understand the culture, beliefs, attitudes, and feelings of patients regarding the healthcare system (Hamadouk et al., 2023). Based on the data from the interviews conducted, it was found that the majority of respondents had not yet performed counseling documentation, with only respondent 2 having done so. According to (Puspita et al., 2022), (Parera et al., 2021), (Anggreni & Wirasuta, 2021), the activity of counseling documentation is still rarely performed by pharmacists. Documentation of pharmaceutical services by pharmacists is very important to carry out. Failure to document pharmaceutical services can have a negative impact on patients (Baranski et al., 2017). Failure to document can complicate the retrieval of documents when needed and hinder pharmacists from evaluating the quality of the practice activities that have been conducted (Parera et al., 2021).

Table 3 is the result of coding with the theme barriers of the implementation of counseling services and counseling documentation. There are 5 codes from the 10 pharmacist respondents' answers.

**Table 3.** Coding Barriers to Counseling Implementation and Counseling Documentation

<b>Theme</b>	<b>Coding</b>	<b>Respondents</b>
Obstacles to the implementation of counseling and counseling documentation	Patient factor	1, 4, 6, 7 and 9
	Labor factor	4, 5, and 6
	Time factor	1, 4, 5, 6, 7, 8, 9 and 10
	Storage factor	2
	Practicality factor	1, 3 and 6

The results of coding the obstacles to the implementation of counseling and counseling documentation can be seen more clearly in Table 2. The obstacles to the implementation of counseling services and counseling documentation are caused by several factors, namely patient factors, workforce factors, time, storage, and practicality. The time factor is the most frequently mentioned by respondents (respondents 1, 4, 5, 6, 7, 8, 9, and 10). The counseling activities conducted by community pharmacists have not been optimal, and the documentation related to pharmaceutical services is still considered very poor. One of the contributing factors is the limited time available for providing counseling (Parera et al., 2021).

Patient factors are the second most common barrier (respondents 1, 4, 6, 7, and 9). The large number of patients and some patients tend to be in a hurry when buying medication, making them unwilling to receive counseling services. The labor factor causes obstacles in the implementation of counseling services and counseling documentation, due to the excessive workload of pharmacists. As many as 3 respondents (respondents 4, 5, and 6) experienced obstacles related to the workforce factor. Storage and practicality factors become obstacles in counseling documentation activities. Counseling documentation conducted in writing is considered impractical in terms of recording and storage. The factor of impracticality was mentioned by respondents 1, 3, and 6, while the factor of storage was mentioned by respondent 2. Respondent 2 had documented the counseling, but the documents went missing during the renovation of the practice space.

Table 4 is the result of coding with the theme feature requirements for the android-based pharmacist counseling application. There are 9 codes from the 10 pharmacist respondents' answers. According to all pharmacist respondents, they need an application that supports counseling services and counseling documentation. The results of the feature coding for the application needed by the respondents can be seen in Table 3.

**Table 4.** Feature Requirements for the Android-Based Pharmacist Counseling Application

Theme	Coding	Respondents
Application features	Patient profile	2, 3, 4, 5, 6, 7, 8, 9 and 10
	Drugs use history	1, 2, 3, 4, 5, 6, 7, 8, 9 and 10
	How to use the drug	1 and 2
	Allergy history	1, 2 and 3
	Side effect of the drug	9
	Drug interactions	8
	Medical history	2 and 10
	Educational material	2, 6, 7, 9 and 10
	Simptomp	5, 6, and 7

At the application development stage, the waterfall method is used. In this research, the Unified Modeling Language (UML) method is used in the application design phase. Unified Modelling Language (UML) is an object-oriented application modeling language in various visual forms. The visual form used in this research is the Use Case Diagram. Use Case Diagram is used to identify the functions available in the application and who can use those functions (Ratningsih et al., 2022).

Figure 1 is the Use Case Diagram of the developed application. The application users consist of pharmacists and patients, each of whom has access to the menus or functions within the application.

Pharmacists and patients can access drug information, drug classifications, and educational videos on the application's homepage without having to log in first. Login is done when the pharmacist and patient are about to have a counseling session. The pharmacist has access to the patient activation menu, input counseling documentation, print counseling documentation, and update profile. Patients have access to the registration menu, profile update, and counseling.

In this study, content validation was conducted face-to-face with validators consisting of 1 academic pharmacist and 2 practicing pharmacists using a questionnaire. The questionnaire used was adapted from the Educational Content Validation Instrument in Health (ECVIH) questionnaire, which consists of 3 main criteria: objectives, structure or presentation, and relevance, encompassing 18 statement items.

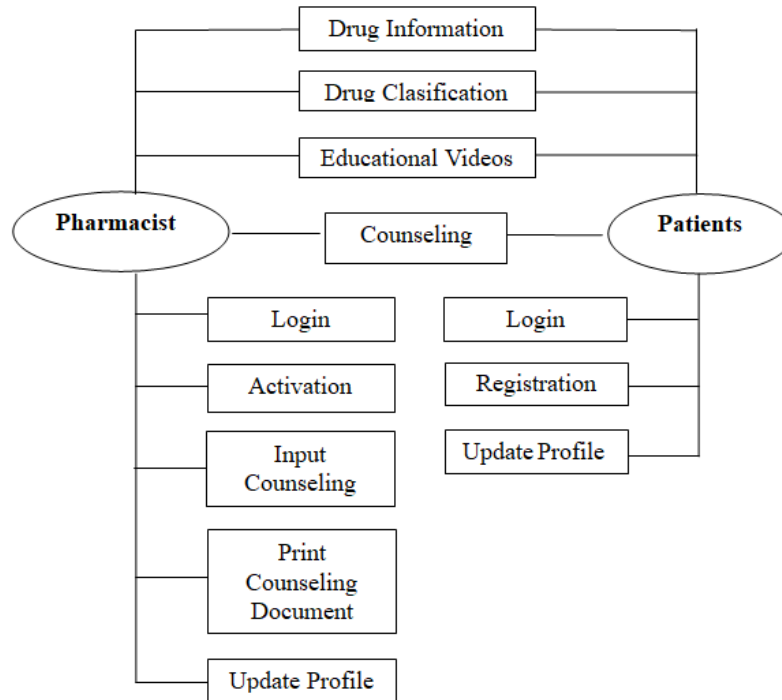


Figure 1. Use Case Diagram of the Android-Based Pharmacist Counseling Application

Table 5. Results of Content Validity Test Analysis

No	Dichotomous Scale			i-CVI	Category
	Validator 1	Validator 2	Validator 3		
1	1	1	1	1	very high validity (very good)
2	1	1	1	1	very high validity (very good)
3	1	1	1	1	very high validity (very good)
4	1	1	1	1	very high validity (very good)
5	1	1	1	1	very high validity (very good)
6	1	1	1	1	very high validity (very good)
7	1	1	1	1	very high validity (very good)
8	1	1	1	1	very high validity (very good)
9	1	1	1	1	very high validity (very good)
10	1	1	1	1	very high validity (very good)
11	1	1	1	1	very high validity (very good)
12	1	1	1	1	very high validity (very good)
13	1	1	1	1	very high validity (very good)
14	1	1	1	1	very high validity (very good)
15	1	1	1	1	very high validity (very good)
16	1	1	1	1	very high validity (very good)
17	1	1	1	1	very high validity (very good)
18	1	1	1	1	very high validity (very good)

In Table 5, the assessment results from the three validators show that all statement items have an i-CVI value of 1; if the i-CVI value is 0.81 – 1, it has very high validity (very good)

(Puspitasari & Febrinita, 2021). Based on the results of the analysis, it can be concluded that the content of the developed application is deemed feasible or has very good validity.

The usability testing phase in this research falls under the disseminate stage, which is the product dissemination phase. Usability is the measurement of how useful an application is based on the values of effectiveness, efficiency, and satisfaction after achieving certain goals. An application is said to meet usability criteria if it is useful, satisfying, easy to learn, accessible, effective, and efficient (Theovanus et al., 2023). The purpose of usability testing is to assess the usability level of the developed application (Waruwu, 2024).

At the usability testing stage, **45 pharmacists and 100 patients** were asked to provide their assessments by filling out a questionnaire through Google Forms. Respondents were given 5 alternative answers using a Likert scale, then usability measurement was conducted by calculating the usability percentage. The results of the usability testing can be seen in Table 6.

**Table 6.** Usability Testing Results

<b>Criteria</b>	<b>Total Score Respondents (n = 145)</b>	<b>Maximal Score</b>	<b>Usability (%)</b>	<b>Category</b>
<i>Usefulness</i>	5.084	5.800	87.66	very diserving
<i>Easy of use</i>	7.289	7.975	91.40	very diserving
<i>Easy learning</i>	2.711	2.900	93.48	very diserving
<i>Satisfaction</i>	4.462	5.075	87.92	very diserving

Based on the results of the usability testing analysis, it is known that the developed application provides real benefits for pharmacists and patients by helping them carry out counseling activities and counseling documentation effectively. Patients and pharmacists can use the application easily and can learn how to use it effortlessly. The experience of pharmacists and patients as users of the application provides a positive assessment in the form of satisfaction and the desire to continue using the application.

#### **4. CONCLUSION**

The Android-based pharmacist counseling application for hypertensive patients developed meets usability criteria with results in the usefulness category at 87.66%, ease of use at 91.40%, ease of learning at 93.48%, and satisfaction at 87.92% with category very diserving. Based on the results of the usability testing analysis, it is known that the developed application provides real benefits for pharmacists and patients by helping them carry out counseling activities and counseling documentation.

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