Design of a Web-Based Pain Module for a Medication Record Application to Support Pharmacist Self-Medication Services

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Abstract

The role of pharmacists in healthcare services continues to evolve along with technological advancements, especially in internet-based medication recording. In the field of health technology, pharmacists have a significant contribution, particularly in the implementation of digital patient medication recording systems. This research aims to develop and evaluate the usability level of a web-based application designed with a pain module as an aid in self-medication services at pharmacies. Self-medication, which is the use of medication without a doctor's prescription, is a common practice in pharmacies, especially for addressing pain complaints. With the presence of this application, the process of recording medication becomes more systematic, well-documented, and in line with the era of digitalization in healthcare services. This research uses the Research and Development (R&D) method. In the initial stage, interviews were conducted with 10 pharmacists to identify the needs of the application, which showed that self-medication for pain is the most frequently provided service in pharmacies. Based on these findings, the application was developed by adding a pain module. Usability testing was conducted using the USE questionnaire, involving 135 respondents consisting of 45 pharmacists and 90 patients in the city of Semarang. The research results show that the developed application has met the usability criteria based on four main aspects, namely usefulness, ease of use, ease of learning, and user satisfaction. The assessment from pharmacist respondents shows usefulness at 91.94% (very feasible), ease of use at 92.36% (very feasible), ease of learning at 90.78% (very feasible), and satisfaction at 93.65% (very feasible). Meanwhile, patient respondents rated usefulness at 88.25% (very feasible), ease of use at 89.70% (very feasible), ease of learning at 90.61% (very feasible), and satisfaction at 87.59% (very feasible). This indicates that the application is well-received by pharmacists and patients due to its ease of use and its ability to help pharmacists record and manage patient medication data more effectively. The pain module is also considered relevant to support safer and more structured self-medication services.

Keywords: community pharmacist, medication records, pharmacy, technology, usability.

1. INTRODUCTION

One aspect of clinical pharmacy services that pharmacists create is patient medication records. Using this record, pharmacists can enter information about the medications they provide to patients (Permenkes RI, 2016). Medication errors, unintended side effects, and drug interactions are just a few of the detrimental outcomes that patients may experience if medication errors are not meticulously recorded (Baranski et al., 2017). As a result, medication recording is frequently not done consistently and systematically. In actuality, community pharmacists frequently encounter a number of challenges when it comes to recording drugs,

including the absence of a systematic recording system and time limits in filling out these records (Hamada et al., 2019). Electronic medical records are one way that digitalization technology is being developed and used to transform health technology. Manual medical records have been transformed into electronic medical records to stay up to date. Electronic medical records must be implemented in all Indonesian healthcare facilities, including pharmacies (Minister of Health Regulation of the Republic of Indonesia No. 24 of 2022).

The importance of the web-based medication record application in this research lies in its novelty and urgency, namely the development of a web-based application with special features for recording self-medication pain treatments. The design of this application is equipped with a pain module tailored to the needs of community pharmacists, considering that they often handle pain complaints through self-medication services. In addition, this application also supports the digitalization of pharmaceutical services, thereby improving the efficiency and accuracy of medication recording.

2. METHOD

This research uses the Research and Development (R&D) method with a qualitative and quantitative approach that includes four main stages. The first stage is the collection of design requirements for the medication record application with a web-based pain module, conducted through open interviews with 10 pharmacists to obtain information about the system to be developed. The second stage is the application design process according to the identified needs. In the third stage, validation is carried out by experts, consisting of one academic validator and two practitioner validators, to ensure the application meets the required standards. The fourth stage is an initial trial with limited testing on the application design, involving 135 respondents, consisting of 45 pharmacists and 90 patients. The pharmacist respondents involved in this study were selected based on inclusion criteria, namely community pharmacists who work and are on standby at pharmacies, pharmacies that permit the implementation of the research, and pharmacists who have computer, laptop, or tablet devices at the pharmacy to support the use of the application. The application system's usability is evaluated using a Likert scale, and the usability percentage is then determined using a method taken from Sufandi et al.'s 2022.

3. DATA ANALYSIS

Interview Data

Ten pharmacists were interviewed in order to determine needs. The sorts of diseases and application features are determined using this data. After the interview results are transcribed into a document, NVivo 12 Pro software is used to analyze the data.

Content Validation Results Data

In this study, the validation test was conducted by 3 validators consisting of 1 academic validator and 2 practitioner validators. Validators were given 4 assessment criteria, and then the Content Validity Index (CVI) measurement was conducted by converting the expert score scale into a dichotomous value. The conversion method is that scales 1 and 2 are assigned a dichotomous score of 0, while scales 3 and 4 are assigned a dichotomous score of 1.

Table 1. Score Criteria Validation

Score	Criteria
1	Not Relevant
2	Less Relevant
3	Somewhat Relevant
4	Very Relevant

Table 2. Content Validity Coefficient

Coefficient Value	Validity
0,81 – 1,00	Very high validity (very good)
0,61 – 0,80	High validity (good)
0,41 – 0,60	Moderate Validity (Sufficient)
0,21 – 0,40	Low Validity (Insufficient)
0,00 – 0,21	Very Low Validity (Poor)
0,01	Not Valid

Usability Test Results Data

Respondents were given 5 alternative answers using a Likert scale as shown in table 3, then the usability measurement was conducted by calculating the usability percentage using the formula:

$$\frac{Total\ observation\ score}{Expected\ score}\ x\ 100\%$$

Table 3. Criteria Likert Scale

Criteria	Point
Strongly Disagree (SD)	1
Disagree (DS)	2
Neutral (N)	3
Agree (A)	4
Strongly Agree (SA)	5

The data on usability percentage obtained is then used to draw conclusions referring to table 4.

Table 4. Criteria Usability

Percentage (%)	Criteria
< 21	Very unworthy
21 – 40	Not worthy
41 – 60	Enough
61 – 80	Worthy
81 – 100	Very worthy

4. RESULTS AND DISCUSSION

Stages of needs analysis

Ten pharmacists participated in the needs assessment through interviews. Information about self-medication and the documentation of pharmacy treatments by pharmacists in pharmacies are subject to collection. The types of ailments and characteristics of the applications are determined using this information. After being transcribed into a document, the interview results are examined using NVivo 12 Pro software. Software called Nvivo 12 Pro is useful for qualitatively analyzing interview data. Data visualization, data coding, and interview transcript input are the steps of analysis using the Nvivo 12 Pro program (Tambun et al., 2023).

Based on the NVIVO transcript results, only 2 out of 10 pharmacist respondents have documented their medications, while the other respondents have not done so. Considering that medication recording is a fundamental responsibility of pharmacists as stated in the Minister of Health Regulation No. 73 of 2016 concerning Pharmaceutical Service Standards in Pharmacies, it can be concluded that many pharmacists have not yet adopted medication recording in pharmacies. Pharmacists are responsible for ensuring that the patient medication recording system in their pharmacies meets the appropriate information management standards for prescription and over-the-counter medications (self-medication services).

The implementation of medication recording has not been optimal, due to several obstacles in its execution. These obstacles consist of several factors, namely the practicality factor, the labor factor, and the time factor. According to 5 out of 10 respondents, it is impractical to record treatments manually, while 2 out of 10 respondents stated that the obstacle occurs due to a lack of manpower to record treatments. Meanwhile, according to 6 out of 10 respondents, the obstacle is that recording takes a long time. Based on the observation, all activities related to patient medication records are still done manually, which takes a considerable amount of time to process all patient data and causes the storage media to gradually become full (Fahmi et al., 2017). The solution to this problem is to use an electronic medication record application. Electronic medication records in community pharmacies have the potential to improve the quality and quantity of patients' lives. Additionally, electronic medication records are more structured and systematic, making them more time-efficient (Krauss & Abraham, 2022).

All respondents stated the need for a web-based medication recording application. According to the respondents, the features needed in the medication record application are patient profiles, medication history, and allergy history. According to the Regulation of the Minister of Health of the Republic of Indonesia No. 24 of 2022 concerning Medical Records, the pharmacist's medication records at the pharmacy must include complete patient identity data. The record will include the patient's name, gender, weight, height, age, date of birth, and important patient information such as the treatment received by the patient.

Back pain, headaches, and toothaches are the most common maladies seen at the pharmacy, according to the results of the interviews. Self-medication can be used to manage a number of moderate ailments, including pain. Dewi (2021) reports that 50.5% of patients abuse analgesics. Differences in educational backgrounds and environmental circumstances are the cause of this. Pharmacists must therefore self-medicate in order to ensure that patients receive the appropriate and rational medication.

Application Design Stages

The design of the system to be developed is visualized using use case diagrams (Ihramsyah et al., 2023). A use case model for the planned web-based medication record application is shown in Figure 1. Patients and pharmacists make up the application's users. The add patient option allows pharmacists to view medication history, add new patients, add medication records, print medication reports, and access the pharmacist module. Only the patient module and their medical history are accessible to patients.

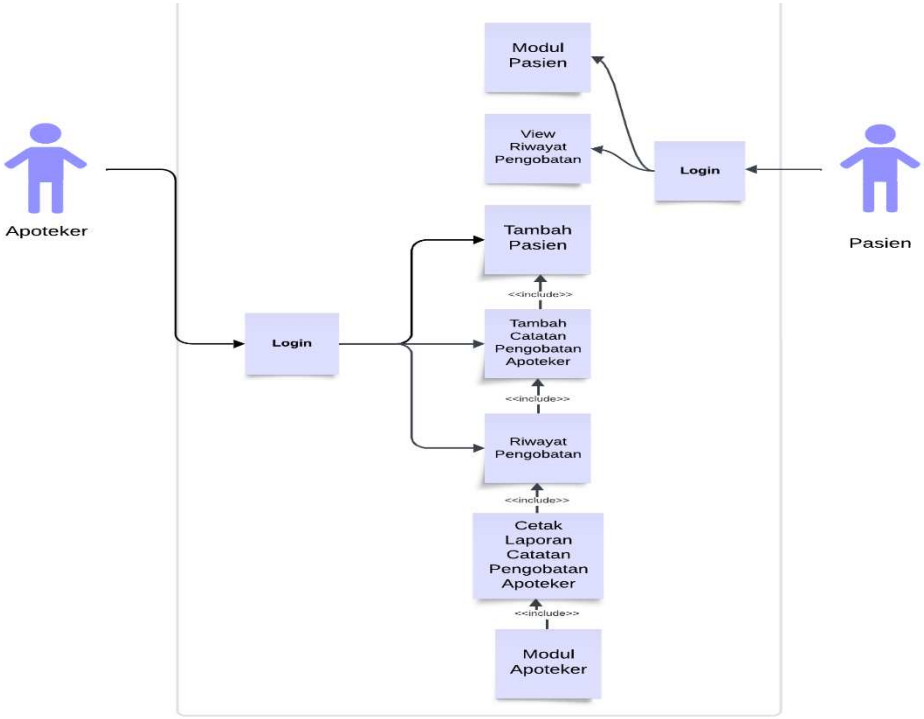

Figure 1. Use Case Diagram for Web-Based Medication Record Application

Using flowcharts to show processes from beginning to end aids readers and researchers in comprehending information flow and the interaction between users and the application system. Using particular symbols, the flowchart is represented as a diagram (Ihramsyah et al., 2023). The web-based medication record application flowchart in Figure 2 includes a pharmacist's account and password. Using their account and password, the pharmacist logs on. The login page will navigate to the pharmacist's dashboard page if the login procedure is confirmed. A patient data menu allows you to add a new patient or search for the right patient name on the pharmacist dashboard page. drug record reports can be viewed and printed by the pharmacist, who also enters complaints, the drug used, and pharmacist notes.

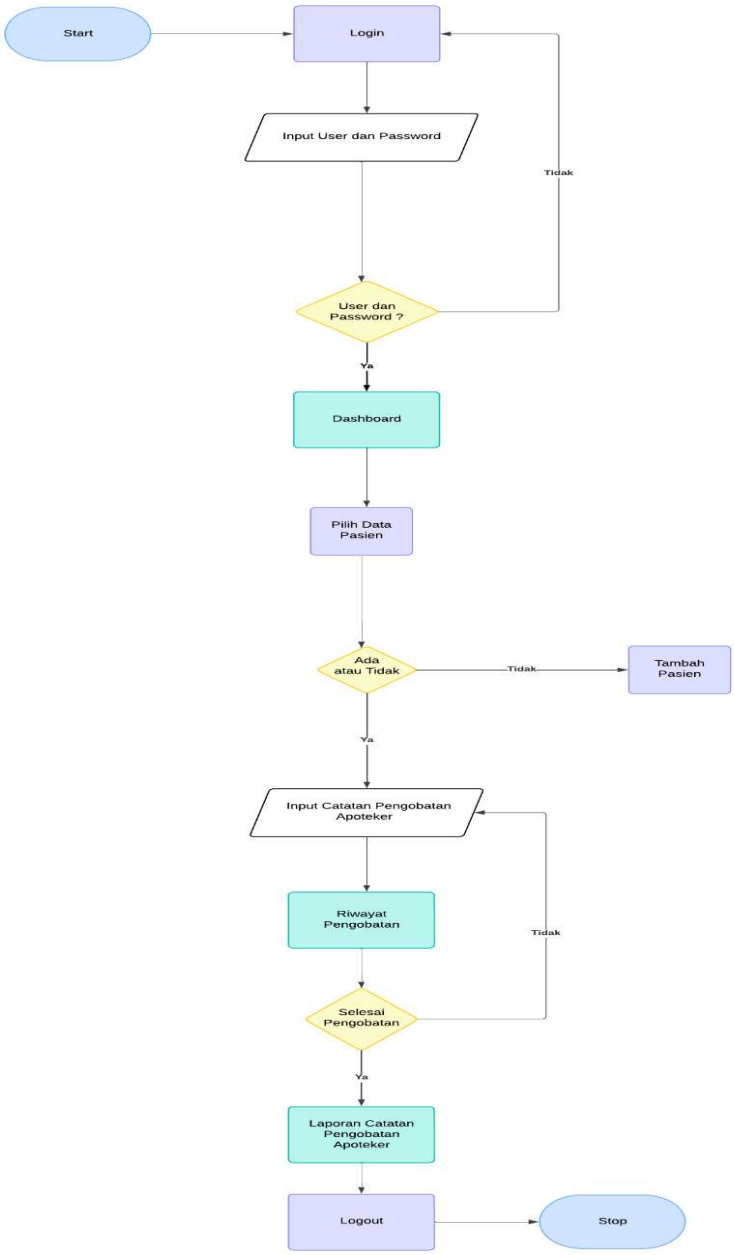

Figure 2. Flowchart of the Medication Record Application with Pharmacist User

The medication record application flowchart with patient users is shown in Figure 3. Patients enter their username and password to log in. After logging in, the patient dashboard page will be displayed, with the medication record report menu. The medication records that the pharmacist has prepared are accessible to patients.

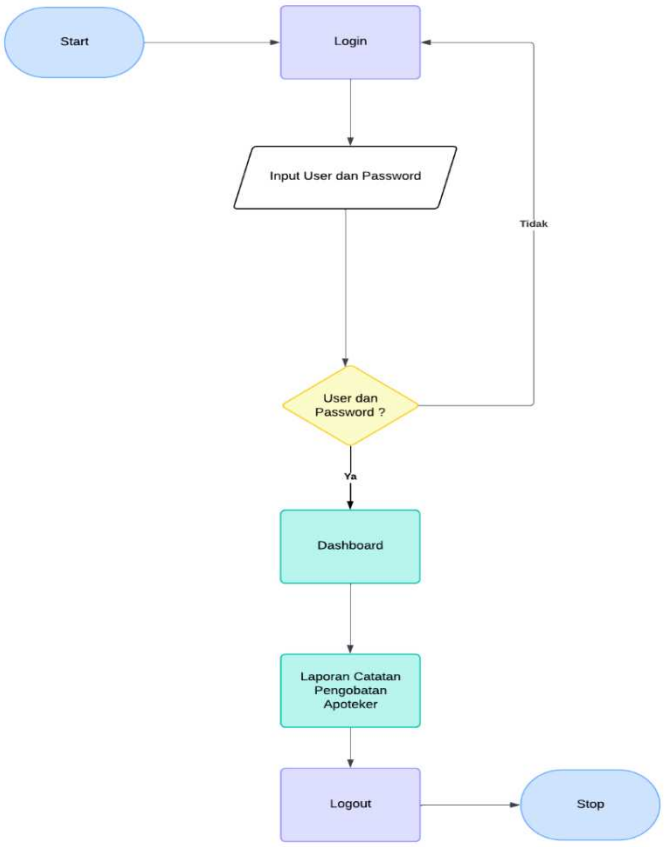

Figure 3. Flowchart of the Medication Record Application with Patient User

Pharmacists and patients can view or access this display by visiting www.catatanapotekerkita.id. The first display will then show up as illustrated in image 4. Pharmacy records, information regarding pain modules, and drugs that pharmacists can use for self-medication of pain are all accessible through the login menu on this page. The pharmacist's information and medication data are accessible to registered patients. This page strives to give users a satisfying and effective experience with its eye-catching design and robust security measures.

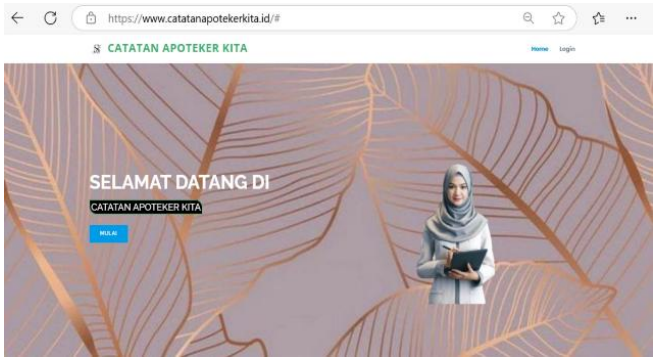

Figure 4. Website Display

Stages of content validation

As determined by the validators, content validity testing seeks to guarantee that the application's material content corresponds with its intended usage. An absolute minimum of three validators is advised (Puspitasari & Febrinita, 2021). A single academic validator and two practitioner validators conducted the validation test for this study. The Educational Content Validation Instrument in Health served as the model for the content validation test questionnaire (Leite et al., 2018). A certified professional translator from Sanata Dharma University Yogyakarta's Language Institute translated the questionnaire from English to Indonesian.

Table 5 shows the evaluations of the three validators. All of the statement items had an i-CVI score of 1, indicating very high validity (very good). Based on the analysis, it can be said that the materials and content in the created application satisfy the requirements for relevance, structure or presentation, and aims.

Table 5. Content validation results

Point	Dichotomous Score			Score i-CVI	Conclusion
	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)

Stages of Application Testing

After conducting the validity and reliability tests of the USE questionnaire, this research continued with an initial trial through the application usability test. This test involved 45

pharmacist respondents and 90 patient respondents. Pharmacists and patients were asked to evaluate the application using the USE questionnaire provided via Google Form. All pharmacist respondents were able to fill out the questionnaire via Google Form, while out of 90 patients, only 28 respondents filled it out via Google Form, and the other 62 respondents used the manual questionnaire sheet found in Appendix 12. The obstacles faced by patients in filling out the Google Form include not bringing a phone, limited internet quota, and lack of understanding in opening and filling out the questionnaire online. This usability test aims to determine the level of comfort, ease, and user satisfaction with the application (Prasetya et al., 2023). Usability test data measures four variables, namely the usefulness variable, which indicates the extent to which the application or system helps users complete tasks. The variable ease of use refers to the level of ease in using the system. The variable ease of learning is the user's ability to quickly learn how to use the system, and the satisfaction variable refers to the user's level of satisfaction with the system usage experience (Sufandi et al., 2022).

Table 6 and 7 displays the results of the first test, which found that the built online application's usability was rated as very practicable across all usability parameters. In addition to helping patients access pharmacists for self-medication services, the proposed web application can help pharmacists maintain a record of medications. Nevertheless, there are still several aspects that need improvement, particularly regarding features for patients. Further research is needed to improve the quality of the application and ensure its effectiveness in supporting self-medication services in pharmacies.

Table 6. Results of Usability Testing of Pharmacist Respondents

	Total Score	**Maximum Score**	**Usability (%)**	**Conclusion**
Usefullness	1.655	1.800	91.94%	Very worthy
Easy of use	2.286	2.475	92.36%	Very worthy
Easy learning	817	900	90.78%	Very worthy
Satisfaction	1.475	1.575	93.65%	Very worthy

Table 7. Results of Usability Testing of Patient Respondents

	Total Score	Maximum Score	Usability (%)	Conclusion
Usefullness	3.177	3.600	88.25%	Very worthy
Easy of use	4.440	4.950	89.70%	Very worthy
Easy learning	1.631	1800	90.61%	Very worthy
Satisfaction	2.759	3.150	87.59%	Very worthy

5. CONCLUSION

Based on the research results, the development of a web-based application with a pain module has proven to meet usability criteria. The assessment from pharmacist respondents shows usefulness at 91.94% (very feasible), ease of use at 92.36% (very feasible), ease of learning at 90.78% (very feasible), and user satisfaction at 93.65% (very feasible). Meanwhile, patient respondents rated usefulness at 88.25% (very feasible), ease of use at 89.70% (very feasible), ease of learning at 90.61% (very feasible), and satisfaction at 87.59% (very feasible). This shows that the application is well-received by pharmacists and patients due to its ease of use and its ability to help pharmacists record and manage patient medication data more effectively. The pain module is also considered relevant to support safer and more structured self-medication services. Overall, the web-based medication record application with a pain module has the potential to improve the quality of pharmacy services in pharmacies. The use of this digital technology allows pharmacists to provide more effective services and ensure more accurate medication recording. In addition, this application also supports safer and more structured self-medication, helping patients use medication more rationally and purposefully.

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