Design of Information System for Pajjaiang Makassar Clinic Based on Web and Mobile

Muhammad Alwali[1)] , Alvian Bastian[2)] , Asriyadi[3)]
[1,2,3] Multimedia and Network Engineering Study Program, Department of Electrical Engineering,
Ujung Pandang State Polytechnic
asriyadi@poliupg.ac.id (Corresponding Author) [3], muhammadalwali025@gmail.com[1],
alvianbastian@poliupg.ac.id[2]

***Abstract* — The role of information technology is currently developed according to the current rapid development of the times. The most developed types of information technology are web-based and mobile devices. Web-based and mobile devices are used to facilitate daily activities along with technological advances. One of the important things for everyday life by utilizing technological advances is in the field of health services, especially services at health clinics. In this regard, a web-based and mobile information system was designed at the Pajjaiang Makassar clinic to facilitate service. Making this system uses the waterfall method which is often used in the development of information systems or software. This system consists of 4 actors, namely patients, admins, doctors, and pharmacists. Patients are connected to the mobile application, while admins, doctors, and pharmacists are connected on the web side. The patient registers for the examination, the admin manages the patient's data, the doctor conducts the examination, and the pharmacist manages the available drugs. Everything is interconnected using mysql database as the database and Application Programming Interface (API) to connect it. With this web-based and mobile information system is a form of digitalization process in the field of health services.**

Keywords; *Information System, Technology, Pajjaiang Clinic*

I. Introduction

In everyday life, the role of technology cannot be separated from people's lives, and one of the technologies that play an important role today is the much-needed information technology. The role of information technology is developed according to the current rapid development of the times. The most developed types of information technology are web-based and mobile devices.

A clinic is a public service institution engaged in health services. Health clinics are classified as First Level Health Facilities (FKTP) which are the spearhead of health services in the community and have a function as the first contact of BPJS Health participants so that they have a major impact on improving the health status of the community. First Level Health Facilities (FKTP) are health facilities that provide non-specialized individual health services for the purposes of observation, diagnosis, care, treatment, and or other health services [1].

Currently, there are still many clinics that record daily operational activities manually in paper archives, such as patient registration, medical record data management, and so on. The archives of various clinic data become piled up, requiring more storage space and extra maintenance so that the paper records are not lost or easily damaged. The process of searching for patient data and medical records takes a long time, due to being in an increasing pile of archives [2].

Thus, based on this analysis, a web and mobile-based clinic information system was created in one of the First Level Health Facilities (FKTP) in Makassar city which can help overcome the above problems with the title "Design of Information System for Pajjaiang Makassar Clinic Based on Web and Mobile".

II. Literature Review

Related Research

Andrianto's research is related to a web-based health service information system at the health center. The purpose of making this health service information system is to help the performance of officers and doctors at the health center, such as searching for patient data, adding medical records, and making reports. System development with the objectives described, using the prototype development method with the stages of

gathering requirements, building prototyping, evaluating prototyping, coding the system, testing the system, evaluating the system, and using the system [3]. In this web-based research, it only makes it easier from one side, namely services at the government clinic, while for patients who want to seek treatment there is no online registration feature or access to treatment history so that prospective patients must still come to the government clinic to register themselves .

Another research conducted by Hidayatullah is the design of an android information system. The purpose of this study is to facilitate the author to design and produce the information system needed by the clinic. So that it can help the clinic get an effective and useful system [4]. The system that has been built can only be accessed by clinic employees, and there is no queuing system for patients who want to seek treatment and only use one android-based device.

Putra with research on building web and mobile-based health clinic information system applications. in this study, the system in health clinics still runs in a conventional way, such as manual patient registration with patients coming to the clinic to register and waiting until they get a call according to their queue number or recording the results of patient diagnoses by therapists who still use paper [5]. However, in this study the patient's treatment history cannot be printed, and the health clinic referred to in this study is not a health clinic with an examination by a doctor but a therapist.

Information System

The system is a network of interconnected procedures, gathered together to carry out an activity or to complete a specific goal, while information is data that has been processed into a form that is more useful for those who receive it[6].

First Level Health Facilities (FKTP)

First Level Health Facilities (FKTP) or often also called Level I Health Facilities are health services that become the main gate to serve people who are participants of the Social Security Administration (BPJS) and non-participants (General). There are several types of First Level Health Facilities, including government clinics, private clinics, government clinic, and general practitioners.

Web

The web is one of the many services on the internet. This service is most widely used on the internet to convey information because it supports multimedia. This means that information is not only conveyed through text, but also images, videos and sounds [7].

Mobile

Mobile is an adjective that means able to move or can be moved freely and easily. However, mobile can also mean an object that is high-tech and can move without using wires. Examples include smartphones, PDAs, and tablets. Mobile can also mean a motorized vehicle that can move. Mobile is free like water and can flow anywhere. Mobile can change and change easily [8].

III. Research Methodology

A. Place and Time of Research

The place of this research was conducted at the Pajjaiang Clinic which is located at Jl. Pajjaiang, Paccerakkang, Kec. Biringkanaya, Makassar City, South Sulawesi, the author analyzes the needs needed to build the application.

B. Waterfall Method

The waterfall model is one of the SDLC models that is often used in the development of information systems or software. This model uses a systematic and sequential approach. The stages in this model start from the planning stage to the maintenance stage and are carried out in stages. Developers need to know more about how the system development process if using the waterfall model and also the characteristics of the waterfall model [9].

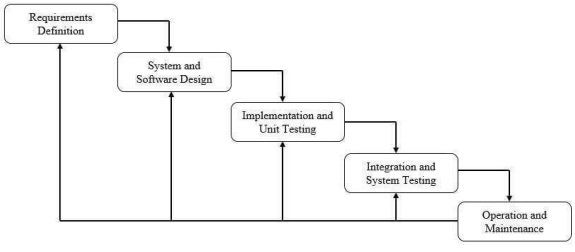

Figure 1. Stages of the waterfall method

C. System General Description

This information system is designed web-based and mobile android with Java, Kotlin and PHP programming languages and Mysql as the database. This system was created for the Pajjaiang Makassar clinic as a First Level Health Facility (FKTP) which requires this system in order to facilitate the clinic and prospective patients.

Prospective patients who want to seek treatment at the clinic can register online by choosing a date, schedule and polyclinic via a smartphone. Then after the prospective patient registers and gets a queue number, it will appear on the web dashboard on the admin side of the patient's registration clinic. Patient registration data reaches the admin thanks to Mysql which acts as a backend service. After that the clinic admin directs the patient to the intended polyclinic room to meet with the doctor for examination. After the patient is examined by a doctor, the doctor will fill in complaints, diagnoses and actions taken to the patient online which is called a medical record, and the doctor will also prescribe medicine to the patient. For drug prescriptions, patients can redeem drugs that have been prescribed by the doctor at the pharmacy. Later the medical record and drug prescription can be seen by the patient sent to the patient's registration account via smartphone.

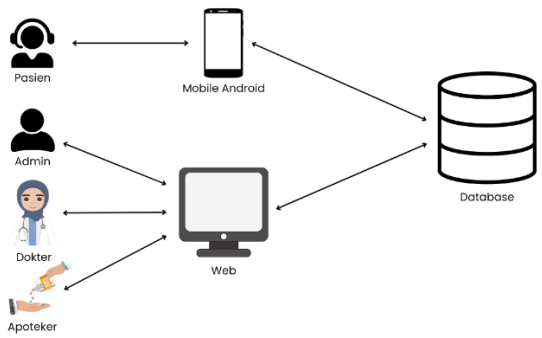

Figure 2. System Workflow

D. Activity Diagram

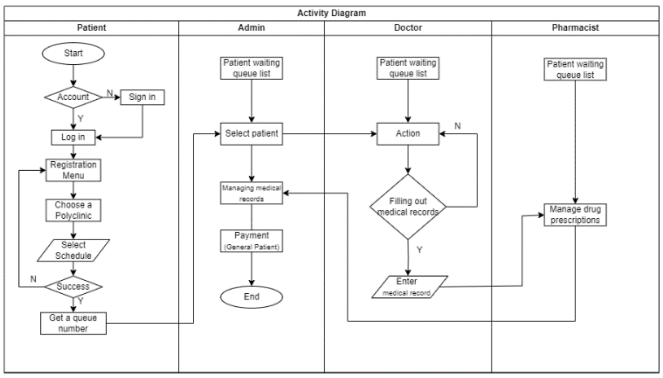

Figure 3. Activity Diagram

The figure above shows the Activity Diagram of this system that will be designed later. If the patient who wants treatment does not have an account, then the patient is required to sign in first, but if the patient already has an account then the patient can immediately log in. After logging in the patient will be directed to the main page, namely the registration menu, then the patient can choose the polyclinic to be addressed and then choose the examination schedule, namely day, date, month, and session, then after the patient has successfully registered, the patient will get a queue number. Patient data that has registered will appear to the admin, then the patient data will be checked by the clinic admin, if it is correct then the patient will be directed to meet with the doctor at the polyclinic to carry out the examination. After the examination, the doctor will fill in the patient's medical record online and then input it into the system. The medical record will reach the admin and will also be entered into the patient's account.

IV. Results and Discussion

View

- Mobile Application Interface Display

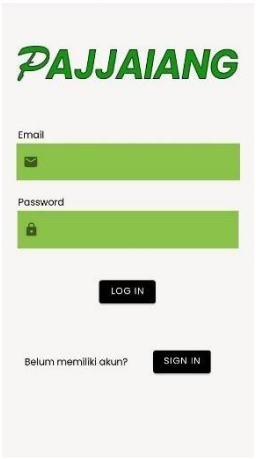

Figure 4. Initial view of the mobile application

Figure 5. Mobile application registration view

Figure 6. Patient registration view

Figure 7. Patient queue view

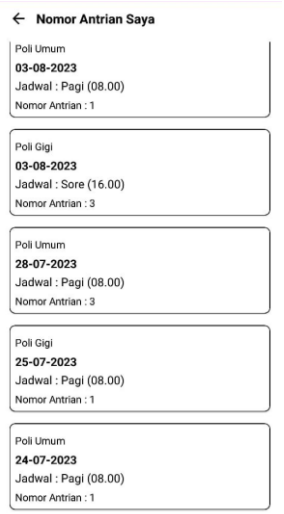

Figure 8. Patient Treatment History Display

- Web Interface Display

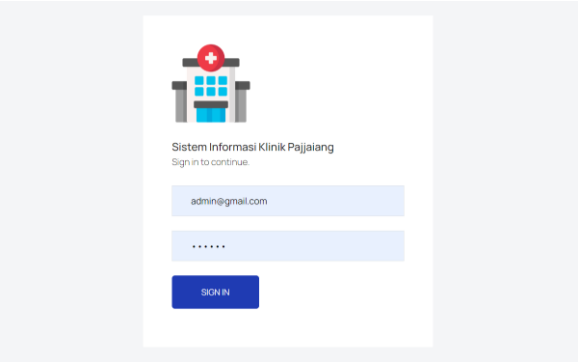

Figure 9. Login page view

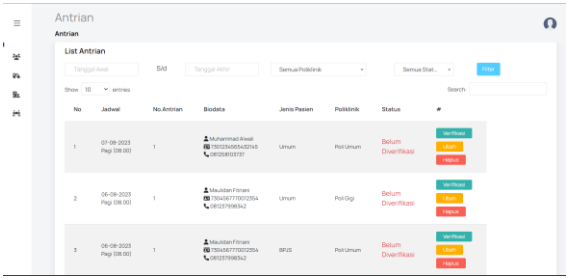

Figure 10. Queue page view

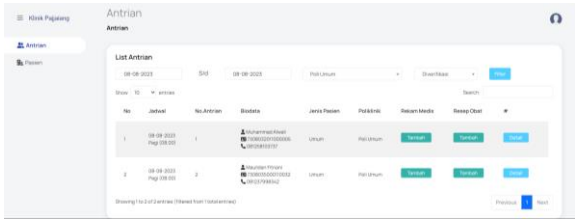

Figure 11. Inspection page view

Figure 12. View of the add patient medical record page

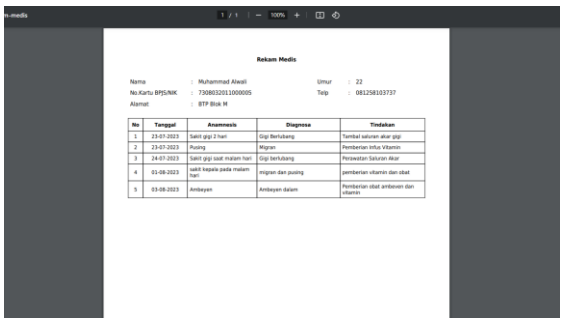

Figure 13. Medical record print view

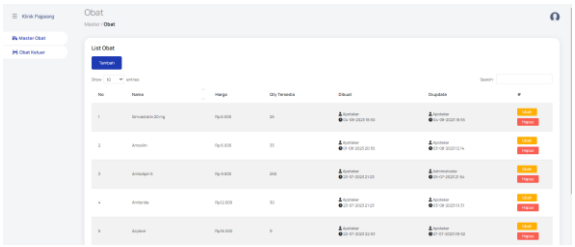

Figure 14. Display of medicine master page

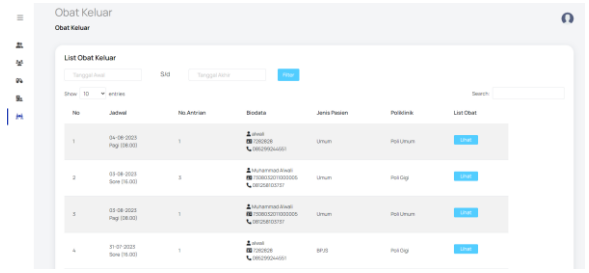

Figure 15. Display of outgoing medicine page

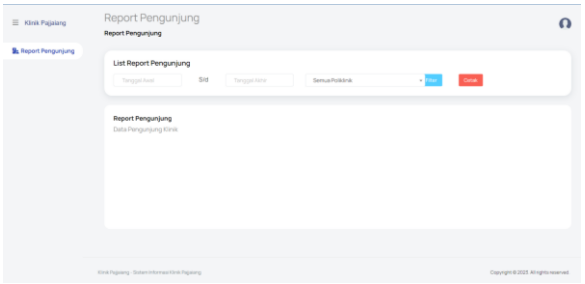

Figure 16. View of the clinic visitor report page

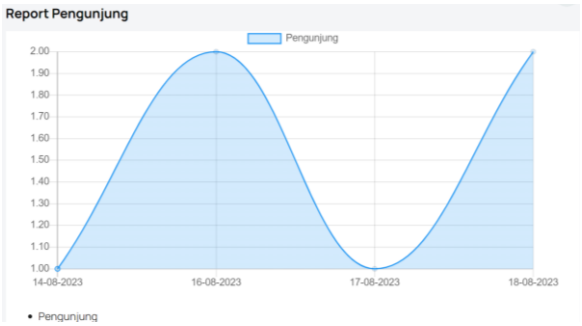

Figure 17. Graphical display of clinic visitors

Database View

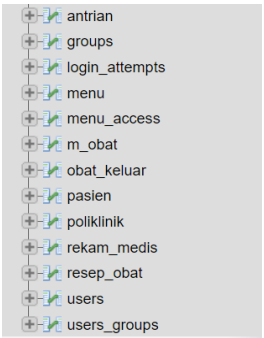

Figure 18. System database design

Blackbox Testing Results

From the results of system testing that has been carried out using blackbox testing, the results of testing both from the mobile and web application side (admin, doctor, and pharmacist) run well and as expected. Testing is done by doing each test scenario by following the test case. From this test, users or patients can only access the system through the mobile application, while admins, doctors, and pharmacists can access the system via the web. Every mobile user who is a prospective patient is required to create an account first in order to register. Admins have access to the web as a whole except for the part of filling in medical records and drug prescriptions, because it can only be filled in by doctors. Doctors and pharmacists have access according to their respective professional work fields.

Analysis of System Usage Results at the Clinic

From the results of using the system at the pajjaiang clinic, it received a positive response from the clinic. From the results of using the system, interviews were conducted to determine the level of satisfaction of the clinic with the system that had been created. The system that has been created is in accordance with the system and service flow that runs at the clinic, namely offline and still using paper records, and a digitization process is carried out to facilitate service. In the appearance of the system that has been made, the clinic responds that it is quite interesting and easy to understand each content and part of the system, and for further use it is necessary to conduct some kind of training or training for employees so that this system is truly understood. The clinic also said that the system that has been made can be very helpful in providing services because it is similar to services in large clinics or hospitals, with the hope that it can facilitate health services.

V. Conclusion

From the results of system design and testing, it can be concluded that:

1. All views, menus, access, buttons and processes can run correctly and according to their functions.
2. In designing this system using mysql database as the database and in accordance with the initial design, and using Application Programming Interface (API) to connect web and mobile applications so that an information system for the Makassar pajjaiang clinic is formed.
3. This information system supports and facilitates community services in the health sector and digitizes the service process at the Makassar pajjaiang clinic.

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