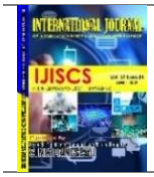

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DEVELOPMENT OF A WEB-BASED ONLINE QUEUE INFORMATION SYSTEM FOR THE PAGELARAN HEALTH CENTER

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Abstract
The implementation of a web-based queue ticket registration system is an effective solution to improve the efficiency of patient services at the Pagelaran Health Center. Currently, the queue registration process is still done manually by handwriting patient information, which often leads to inefficiencies, long queues, and data errors. This research aims to design a web-based queue information system that simplifies the registration process for both patients and health center staff. The system was developed using the waterfall method with PHP as the programming language and MySQL as the database. The features provided include online patient registration, automatic queue number generation, and queue status display. The results show that the system can reduce waiting times, facilitate real-time access to patient data, and improve service flow. The novelty of this study lies in its development of a simple, adaptable digital solution tailored to health centers still using traditional queue systems, enhancing healthcare access and service quality.

1.0 INTRODUCTION

Based on data from the Pringsewu Regency Health Office released by the Pringsewu Regency BPS on February 24, 2025. There are three types of health centers in this area: 10 inpatient health centers, 3 inpatient health centers, 7 mobile and 33 auxiliary health centers, In addition, there are 13 villages or sub-districts that have health facilities in the form of village or sub-district health centers that have health facilities in the form of health centers, and 34 villages that have auxiliary health centers Data on the number of health workers by district in Pringsewu Regency from 2018 to 2024 shows that there are 750 nurses, 676 midwives, 167 professionals Pharmaceuticals: 27 public health experts, 51 environmental health staff, and 58 nutrition experts. In addition, there are also 333 medical personnel, 14 physical therapists, 64 medical technical professionals, 19 biomedical technicians, and 418 traditional health actors. It is important to note that medical personnel include doctors, dentists, specialist doctors and specialist dentists, both who practice domestically and abroad, which are officially recognized by the government of the Republic of Indonesia in accordance with Law Number 29 of 2004 concerning Medical Practice.

Based on a study conducted by Edhy Poerwandono et al (2024) From the findings obtained, it can be concluded that the implementation of an online patient registration information system at the Tamba Health Clinic will provide great benefits from the implementation of this queue system. Thus, patients who want to receive treatment will get a

queue number by immediately reducing the waiting duration and increasing the overall patient satisfaction level [1]. Furthermore, research conducted by Hendra Rohman (2022) is a queue registration system via the internet that is able to solve problems such as registering queue numbers and recording patient visits every day, this platform makes it easier for officers and patients to register and manage queues. The inspection of the implementation of online registration for outpatient treatment can be seen simply, namely it has gone well because the web-based online registration process is very easy to understand and understand [2]. Furthermore, a study conducted by Mutia Azizah and her colleagues (2024) succeeded in creating a web-based queuing system at the Gasan Gadang Health Center, Padang Pariaman Regency. The researchers concluded that the system has been successful in improving the efficiency of the queue process, allowing users to register online, shortening on-site wait times and improving convenience [3]. Furthermore, the research carried out by Sri Lestari and colleagues (2023) succeeded in creating a web-based Online Queue registration system at the Seputih Health Center on this online queue site, there is a dashboard for admins and patients where the public can register as patients via mobile phones or computers online after registering, the community can open the menu and click login After successfully logging in, They can select the poly queue they want to retrieve and then print it [4]. Furthermore, the research carried out by Ardimansyah and colleagues in 2023 was successful in developing a web-based online queuing system at the Antang Health Center. Thus, the online queue system allows patients to register online. Based on the black box tests that have been carried out, it can be concluded that this application is free of errors in its functionality [5].

This study focuses on designing a web-based online queuing system using the waterfall development method, implemented with PHP and MySQL. The system includes essential features such as patient registration, polyclinic categorization, queue scheduling, and queue status display. Through testing and performance evaluation, the system demonstrates improved efficiency and user experience for both patients and health center staff. Patients can register and schedule appointments online, significantly reducing waiting times, while staff benefit from automated queue calls and streamlined scheduling features that support better queue management. The queuing system applies the FIFO (First In, First Out) method, ensuring that patients are served in the order of their arrival. Although this method maintains fairness, it still reflects the limitations of a traditional manual system-patients at the back of the queue may experience long waiting times. Consequently, while the online approach helps in organizing the registration process, it has not yet fully addressed the issue of long queues and waiting periods. This highlights the need for further refinement in system design to better manage high patient volumes and enhance service speed.

The research aims to solve this problem by developing a more structured and efficient web-based queue management system using the waterfall method. This approach allows for a clear and sequential development process, making it suitable for implementing an online patient registration and queue system. With features that improve communication, scheduling, and service flow, the system supports the health center in delivering timely and effective healthcare services. Ultimately, the goal is to provide a digital solution that reduces patient crowding and enhances the overall quality of healthcare delivery through the integration of technology.

2.0 RESEARCH METHOD

2.1. Data Collection Methods

A. Observation

The observation method was carried out by directly observing the research subjects at the Pagelaran health center, which is located in the village of Panutan.The purpose of this visit is to gain insight and direct insight into the queuing process that occurs at the health center. By making these observations, the researcher hopes to collect accurate data and information and gain a deeper understanding of the problems that occur.

B. Interview

The interview method is carried out by asking several questions from the interviewer to the interviewer so that they give answers that can be used to obtain certain information. The following are the results of the interview session that was conducted on Monday, May 13, 2024. At the Pagelaran Health Center, the staff of the Pagelaran Health Center said that the

Pagelaran Health Center is currently still using manual queuing which still uses handwriting on paper, the Pagelaran Health Center is currently still implementing manual queuing which requires bringing a copy of ID card, family card, and BPJS as a requirement as a patient. So people immediately come to the health center to queue and then register themselves as patients, as a result of which it causes a long queue and requires a long process to obtain a queue number.

C. Literature Study

The method used is to review references, books, and articles related to the theme of web-based online queues in health centers, clinics, and hospitals.

2.2. System Development Methods

In the process of creating an online queue information system at this performance health center, I apply a waterfall approach that operates in a planned and structured manner step by step in the development of the system[6]–[8].

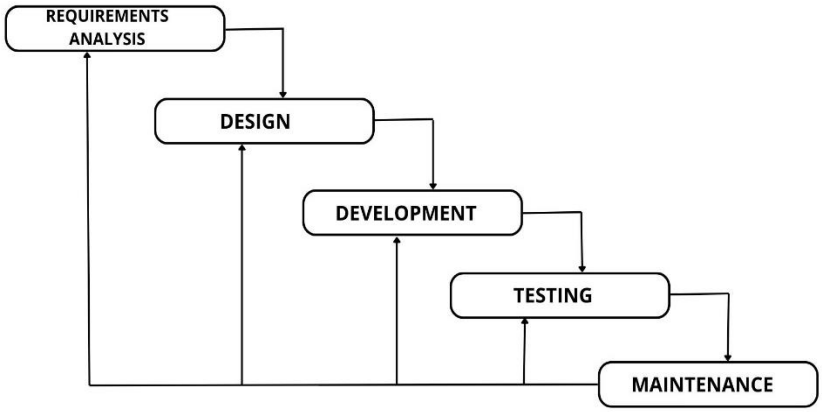

Figure 1. Waterfal Method

In the image above, there are processes carried out to develop an online queue information system. The following are the steps to take:

1. Requirements Analysis: The first step that must be taken is to recognize all the needs needed in creating an online queue information system by conducting observations and interviews.
2. Design: This second stage is related to the design that will be made according to the needs that have been identified.
3. Development: Next, the third step is to implement system coding based on a pre-arranged design. This coding process utilizes the PHP and MariaDB programming languages to store data.
4. Testing: In the fourth stage, an assessment of the system that has been developed is carried out to meet the desired expectations.
5. Maintenance: The last stage is the implementation of the online queue information system application at the Pagelaran Health Center.

3.0 DISCUSSION

3.1 System Design

System design is to help a designer to design the system to be developed. When designing this online queuing system, the system design will include a use case diagram, sequence diagram, class diagram, and activity diagram.

A. Use Case Diagram

According to Pooley (2003:15) The use case model can be described in a use case diagram, but keep in mind, the diagram is not synonymous with the model because the model is broader than the diagram. In this use case system, there are 2 actors, namely patients and officers. Here are the tasks of several use case actors:

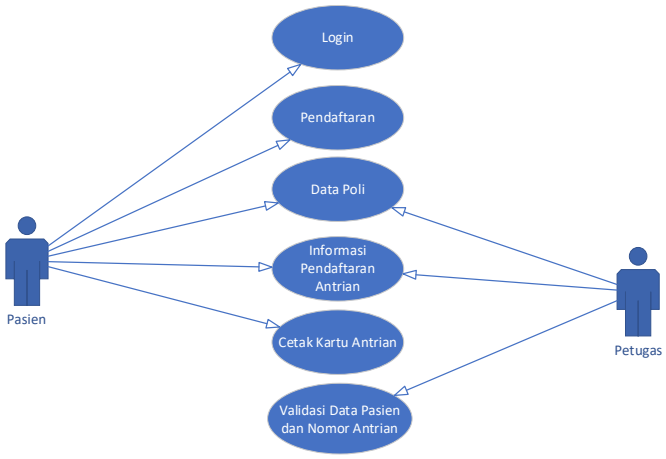

Figure 2. Use Case Diagram

A patient is a person who has a physical weakness who surrenders himself to be treated and receive care provided by a doctor or nurse at a health center. Patients can only access and cannot manage the system. This patient cannot manage the system, but this patient accesses registration, poly data, queue registration information, and queue card printing. Officers are people who work at health centers, who have various roles and functions in providing health services at health centers, who have various functions and roles that provide health services to the community. Puskesmas officers can include various professions such as doctors, nurses, pharmacists, midwives and environmental health workers. This officer can also manage the information system at this health center. The task of this officer is to manage the system. However, this officer will monitor the running of this system more often.

B. Sequence Diagram

According to Haviluddin (2011), in simple terms, a sequence diagram is a step-by-step description, including the chronology (sequence) of logical changes that should be made to produce something according to the use case diagram. This system has 2 entities, namely patients and officers. Officers have the authority to regulate the system. But the officer is more about monitoring the system, patients cannot manage reports, but can only see reports and information about health centers on the system.

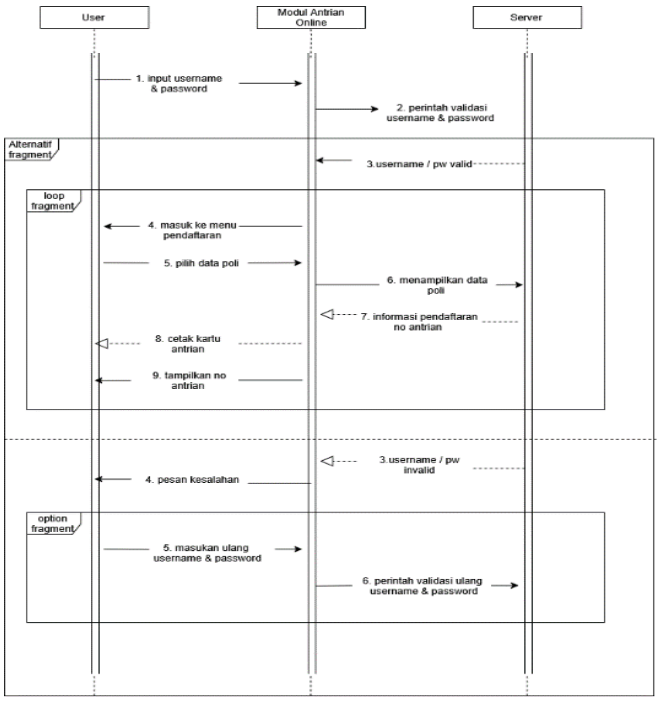

Figure 3. Sequence Diagram

C. Class Diagram

According to Scott W. Ambler (2005:47) a Class Diagram is a diagram that refers to the relationships between classes in which there are attributes and functions of an object. In this study, there are 2 entities in the diagram class, namely patients and officers. Officers have the authority to regulate the system. But the officer is more about monitoring the system, patients cannot manage reports, but can only see reports and information about health centers on the system.

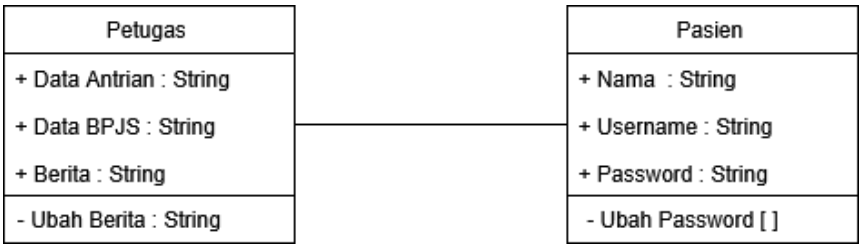

Figure 4. Class Diagram

D. Activity Diagram

According to Conrad Bock (2003:45) Activity Diagram is a diagram that describes the concept of data flow or control, structured and well-designed actions in a system. This activity diagram explains the running of the system that is being created. Using the activity diagram this time it explains about online queues. In this system, it can only be processed by patients.

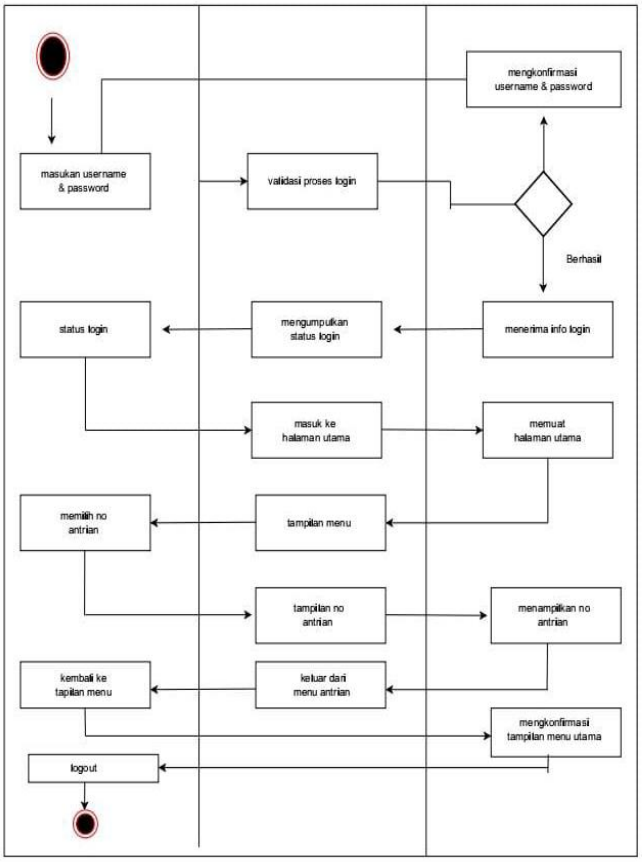

Figure 5. Activity Diagram

3.2. User Home Page

On the user page, there are details about the queue number at the health center, registration form, entry form, and address.

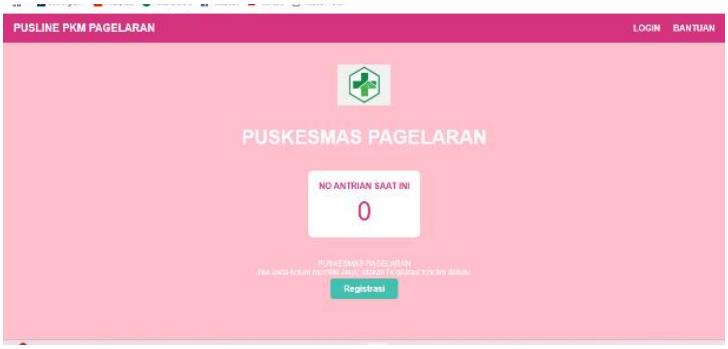

Figure 6. Website login page

If users want to log in and obtain access permissions to the site, they can register by clicking on the registration button on the main page. The image below shows the registration form.

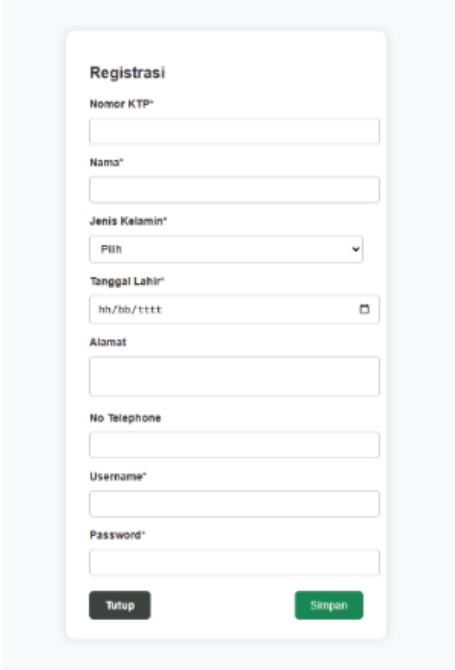

Figure 7. user registration form

If users want to get access to the website, they can register by pressing the registration button on the main page. After that, users can directly log in and fill in their personal data to get a queue.

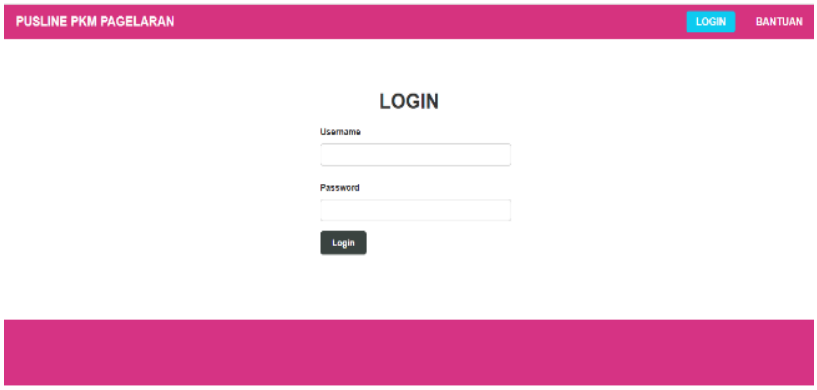

Figure 8. user login page

Once you've successfully logged in to the site and obtained permission as a user, you'll be immediately visible on your home page. This page provides functions to go out, take the

queue, and get help to understand how to use the site as well as the contact number of the health center. In addition, users can also view the queue list in real-time and can print the queue number after retrieving the queue number.

Figure 9. Poly Queue Number Page

After successful login, the user can directly retrieve the queue via the Take queue option by selecting the poly, and the system will automatically assign the queue number to the user.

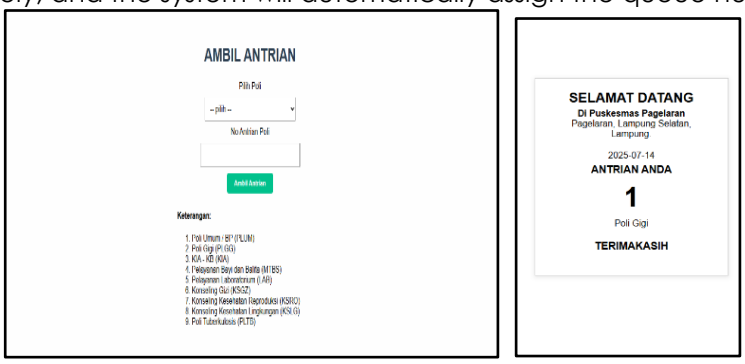

Figure 10. of the Poly's preferred user pages

When the user clicks the button to print the queue number, they will be redirected to get the queue number download, as shown in the following image.

3.3. Discussion

Based on the research findings, the implementation of the online queuing system at the Sungai Pinyuh Health Center has shown significant improvements in service efficiency and the digital experience for the public. The system was designed with consideration for two types of users-patients and health center staff-each granted different access rights and responsibilities. The user-friendly interface has proven effective in speeding up service processes, reducing long queues, and providing easy access to information such as doctors' schedules and current queue numbers. These results are supported by previous studies, such as those by Rika Melyanti et al. (2020) and Muhammad Luthfi et al. (2024), which found that online queuing systems provide accurate data and simplify the process of obtaining queue numbers[9][10][11][12][13]. Furthermore, system testing involving both staff and patients indicated that all functions operated as expected. Prior research, including studies by Amelia Devi et al. (2023), Herman Susilo et al. (2023), and Adhika Pramita et al. (2023), also demonstrated the successful development and deployment of similar systems in other healthcare facilities. Notable features such as automatic queue position notifications, reduced waiting times, and ease of online registration add significant value. Additionally, testing approaches like black box testing and the Technology Acceptance Model (TAM) confirmed that the system meets user needs and performs reliably. These findings highlight that a well-designed and adaptable online queuing system can play a crucial role in enhancing the quality of healthcare services in the digital era [14][15][16][17][18][19].

4.0 CONCLUSION

Based on the findings, this research successfully designed a web-based online queue information system for the Pagelaran Health Center using MySQL, HTML, and PHP, developed through the waterfall method. The system helps minimize long queues by enabling online patient registration and scheduling, resulting in more organized and efficient services. This improvement is expected to enhance patient satisfaction and positively impact healthcare access and service quality in the Pringsewu Regency. The study also suggests future enhancements by adding features such as service criteria and polyclinic categories to create a more accurate, functional, and comprehensive online queuing system.

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