Al'adzkiya International of Computer Science and Information Technology (AIoCSIT) Journal
Vol. 6, No. 1, May 2025, pp. 1~12
ISSN: 2722-0001

Patient Data Processing Information System at the Dolok Masihul Health Center Using the Waterfal Method

Azri Anggara Diva
Department of Information System, Universitas Muhammadiyah Sumatera Utara, Indonesia

ABSTRACT

This patient data processing information system is a system for managing patient data and documents including patient identity, examination results and other services that have been provided to patients. As for the patient data processing system and report generation at the Puskesmas, the processing is still manual and still uses bookkeeping media and takes up a lot of space. Therefore, patient care at the Health Center becomes less effective and efficient. By using the website as a tool in data processing, it can facilitate the processing of medical record data and make reports in an easier and more efficient way and can save the space provided. The method used in building this website application uses the waterfall method which starts from analysis, design, coding, testing, implementation and maintenance. Patient data processing information systems play an important role in improving services at the Dolok Masihul Health Center, making it easier for the Health Center to process patient data, visit data, patient medical records and reports.

Keyword : Data Processing, Services, Waterfall, Medical Records

Corresponding Author:
Azri Anggara Diva,
Department of Information System,
Universitas Muhammadiyah Sumatera Utara,
Jalan Kapten Muktar Basri No 3 Medan 20238, Indonesia.
Email: azrianggara@gmail.com

1. INTRODUCTION

Progress in the field of information technology is currently growing rapidly. Computers as a tool in processing all types of work and have a high level of process capability and large data capacity, as well as computers are technologies that can overcome the limitations of humans. In addition, computers can also be used in making an application program for making reports and processing data quickly, efficiently and accurately, so that in making reports that were originally done manually become more effective and efficient.

As a public health service, Puskesmas must be able to serve the community, especially patients who seek treatment quickly and accurately and carefully in providing information to patients. Data processing of health services at the Dolok Masihul Health Center is one very important component to realize an information system that is more efficient in the use of time. Where at the Dolok Masihul health center still uses data processing using bookkeeping media and still uses ms word for example patient data which is still recorded in the book so that it takes up a lot of space and creates difficulties for health center staff, so it takes time to search for patient data. Making reports takes a long time so that reports are less detailed and the service process to the community is hampered. Therefore, a system is needed that can help process data quickly and efficiently so that the service process to the community can run quickly.

In overcoming this problem, researchers are trying to create a system that can help employees in carrying out the health service process to the community. The system in question is a patient data processing system, which can process patient data more quickly and efficiently, so that the public health service process can be more effective. This system was developed using the Waterfall method. Waterfall is a system development model in which each stage of development is carried out sequentially. The stages in the waterfall model include 6 stages starting from the analysis, design, coding, testing, implementation to maintenance stages. According to Nadhiva et all (vol 1, no 2, 2022). Waterfall is a classic life cycle where this model applies classic sequential stages and is dynamic in software design.

By using the waterfall model, the development of this system is done sequentially so that if the system created is not in accordance with user needs, the next process will not run. With the existence of a fast and accurate data processing system, the faster the health service process in the community and it is hoped that with this system the health center and patients (community) can be helped in the health service process.

Based on all the advantages that can be obtained with computer technology, researchers are interested in creating an application software that will be used to manage computer-based health processing and services at the Dolok Masihul Health Center. This patient data application software was developed to make it easier to manage patient data. So that health workers can search for these data in the application that has been entered data.

2. RESEARCH METHOD

The research method is basically a scientific way to get data with specific purposes and uses. The data obtained through research is empirical data (observed) which has certain criteria, namely valid. Therefore, in general, the data that has been obtained from research can be used to understand, solve, and anticipate problems. Therefore, researchers use qualitative research methods to determine how to search, collect, process, and analyze the research data. Qualitative research is carried out by the process of searching or collecting data by observation and interviews with several users.

This research was conducted at a government agency, namely the Dolok Masihul Health Center, which is located at jln Ismailiyah Dolok Masihul week, Dolok Masihul District, Serdang Bedagai Regency, which began by asking permission from the relevant parties followed by a research permit on February 8, 2023. After obtaining research permission from the Dolok Masihul Health Center, which was marked by a reply letter from the Health Center stating that it allowed research at the Dolok Masihul Health Center.

The technique used in sampling is a probability sample selection technique, namely Probability sampling, which provides an equal and unlimited opportunity for each element of the population to be selected as a sample. Probability sampling is a sampling technique in which each member of the population has an equal chance of being selected as a sample. In other words, all single members of the population have a non-zero chance. In Probability Sampling there are at least five types of sampling methods that can be used, namely: simple random sampling, stratified random sampling, cluster random sampling, systematic sampling, multi-stage sampling. On this occasion the researcher chose to use Simple Random Sampling.

3. RESULTS AND DISCUSSION

A. System Implementation

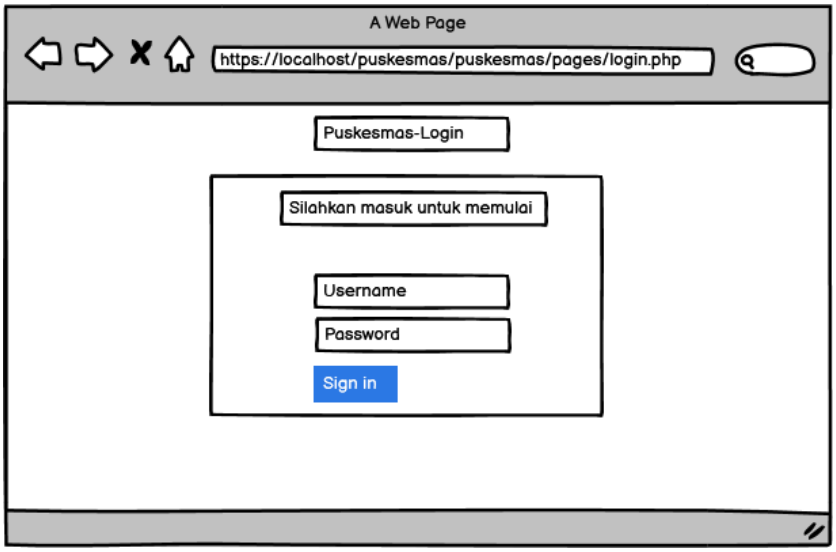
At this stage the researcher applies the system that has been made to the Dolok Masihul Health Center to complete the data collection that has been done at the health center. In completion to achieve system implementation, software “software” and hardware “hardware” are needed and to implement the system. The software “software” and hardware “hardware” needed are as follows:

1. Software
   a. Operating System: Windows 11 64 bit
   b. Apache Web Server (XAMPP v3.2.3)
   c. MySQLi which is used to create a database that functions to store data
   d. Visual Studio Code for website creation software
   e. Google Chrome
   f. Balsamiq Wireframes
2. Hardware
   a. Processor : Intel core i5-1035G1 CPU @ 1.00GHz (8 CPUs), ~1.2GHz
   b. Hard disk : 256 GB
   c. Memory : 4 GB DDR4
   d. VGA: Intel Pentium
3. User
   Users are people who use and process the system.

System Design

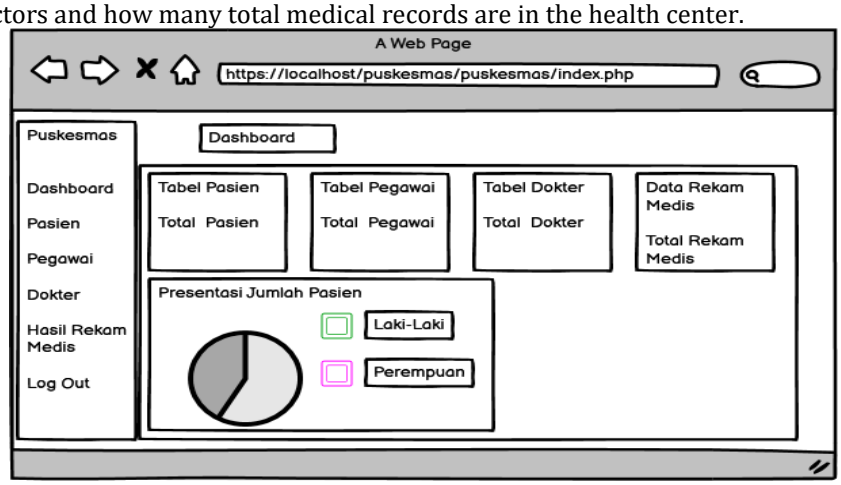
a. Login Page

On the login page the admin will enter the username and password that has been determined in order to enter the system that has been prepared where the admin can access all systems to manage patient data.



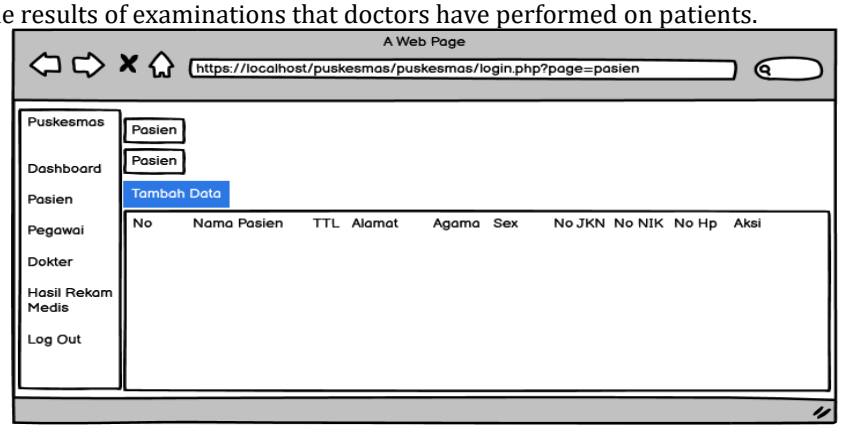
b. Dashboard Page

After successfully logging in the admin will be directed to the dashboard page, where the dashboard page shows the presentation of data at the health center. On the dashboard page the admin can see and review the total existing data such as, the number of patients, the number of employees, the number of doctors and how many total medical records are in the health center.



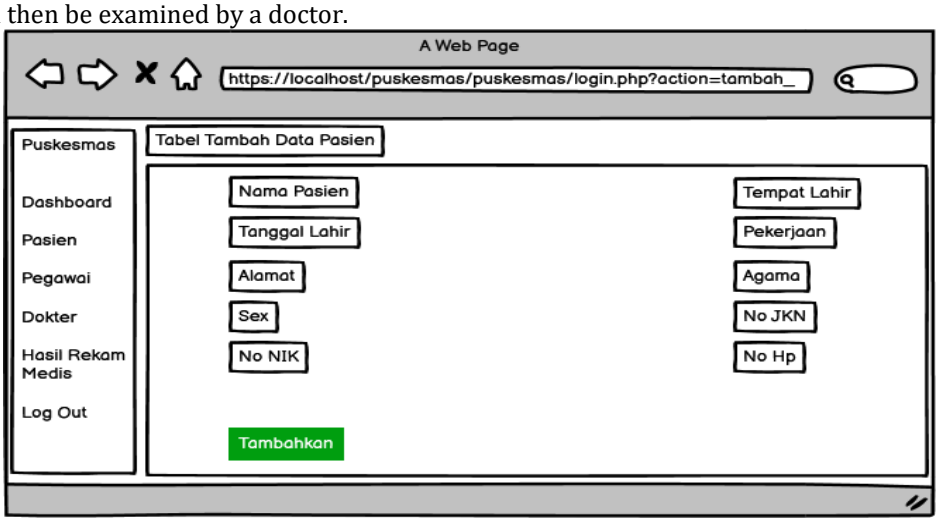
c. Patient Data Page

On the patient data page, employees or admins see more details about patients and admins can add data on the results of examinations that doctors have performed on patients.



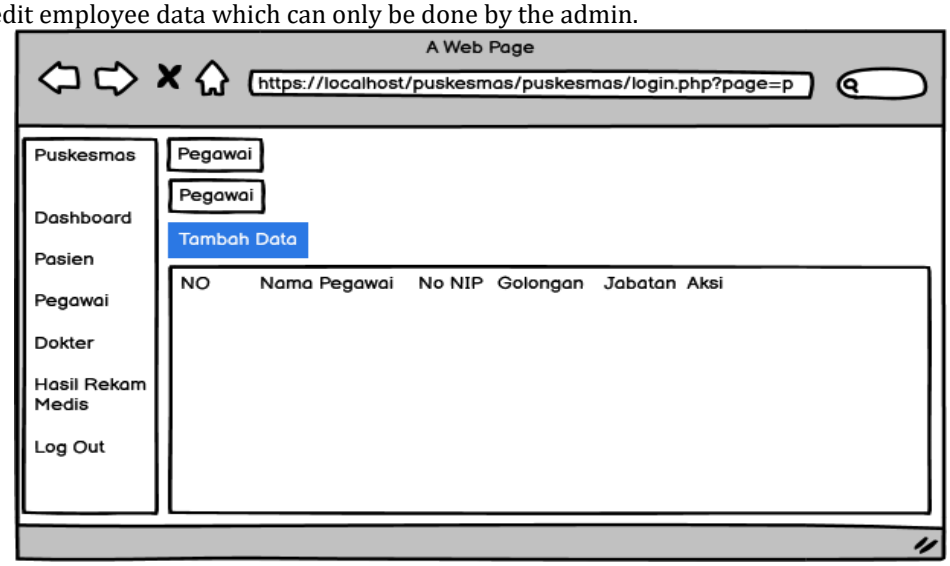
d. Add Patient Data Page

On this page the admin or health center employee can add new patient data that has registered which will then be examined by a doctor.



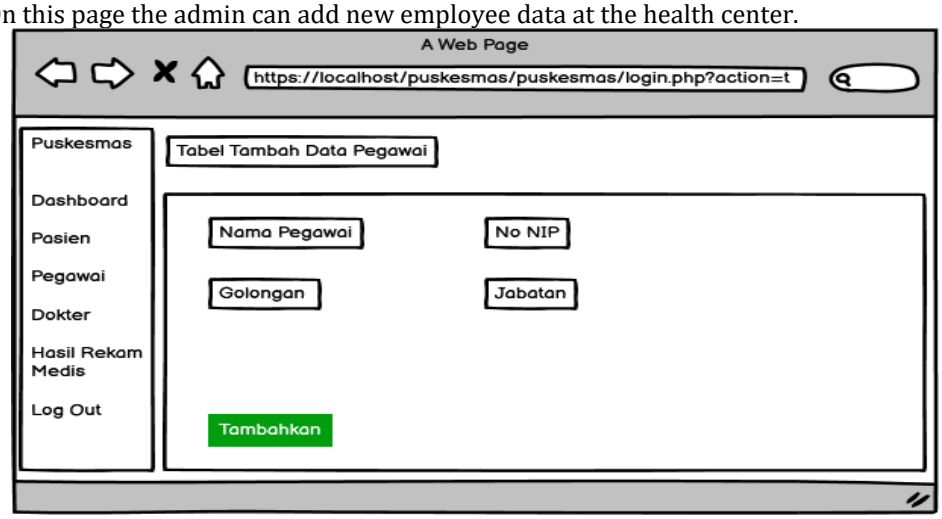
e. Employee Data Page

On this employee data page, the admin can add new employee data or delete old patient data and can edit employee data which can only be done by the admin.



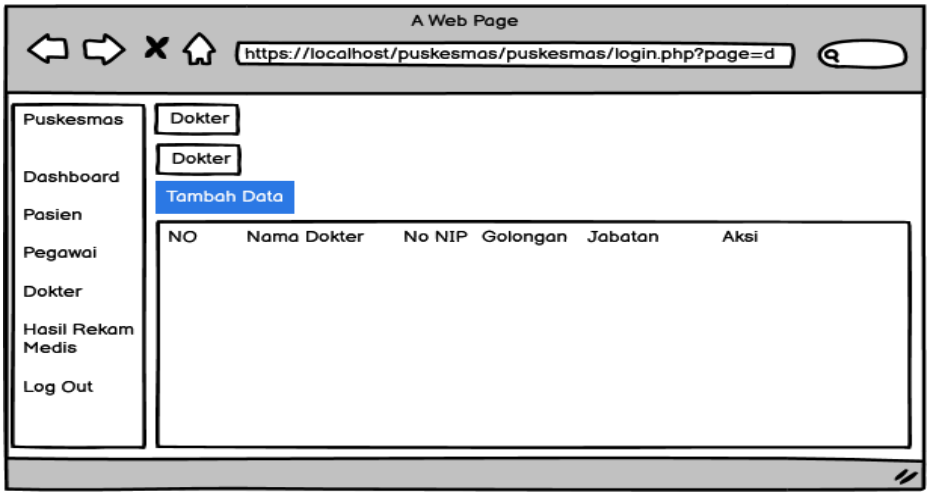
f. Add Employee Data Page

On this page the admin can add new employee data at the health center.



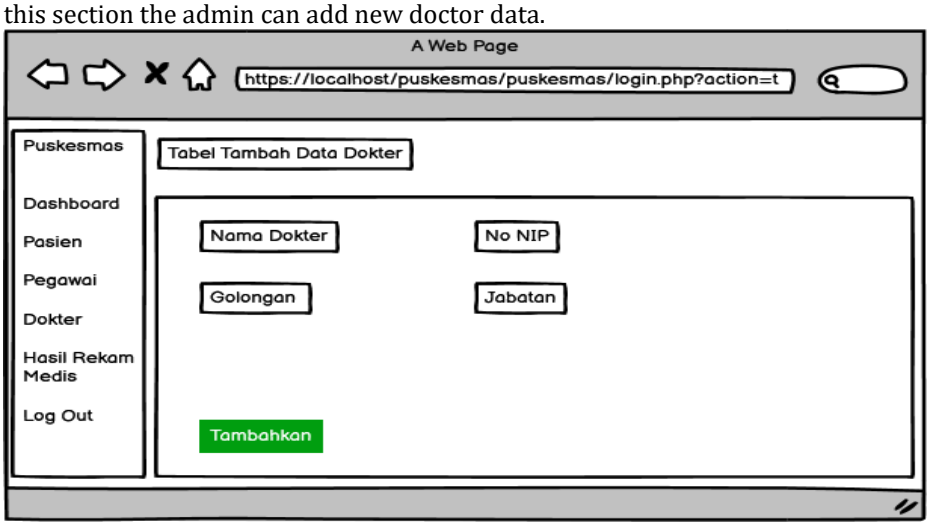
g. Doctor Data Page

On the doctor's data page, the admin can see and review doctors at the health center and the admin can add new doctors and the admin can edit and delete doctor data at the health center.



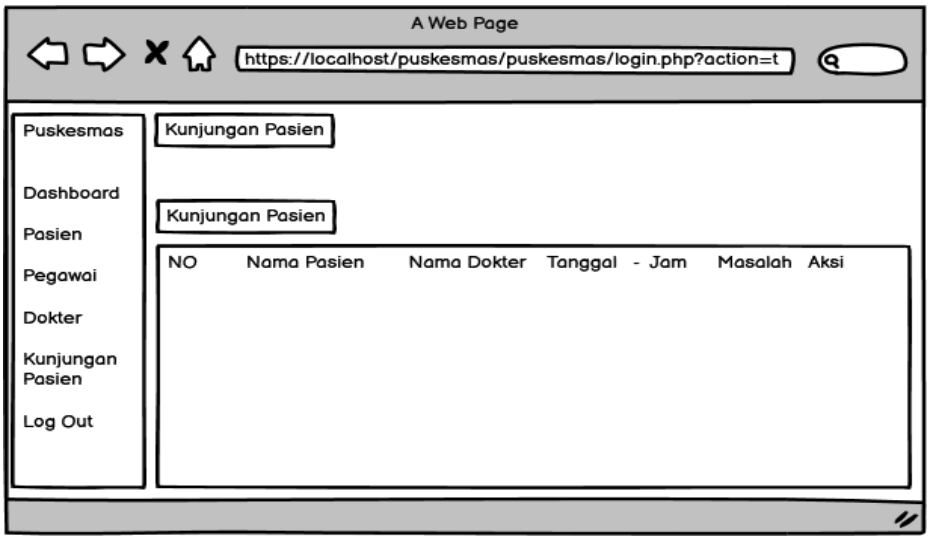
h. Add Doctor Data Page

In this section the admin can add new doctor data.



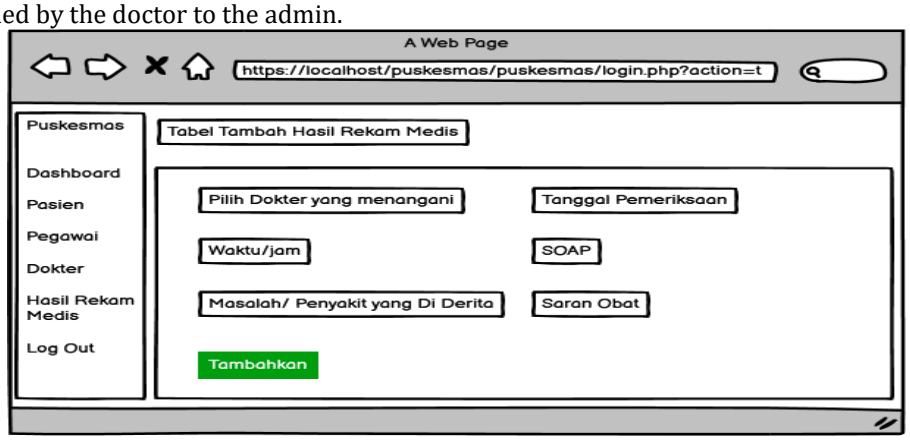
i. Medical Record Data Page

The medical record page displays the results of examinations that have been carried out by doctors and inputted by employees which will later be printed into patient medical records and given to patients.



j. Add Medical Record Data Page

On this page the admin/community health center employee can enter the examination result data provided by the doctor to the admin.



B. System Testing

System or application testing is the process of finding errors in the application system that has been made, recording the results and evaluating parts of the system. The test used to test the patient data processing application system at the puskesmas is black box testing.

Table 4. 1 Login Testing

Case	Expectation	Testing Result
Textbox (Incomplete) Username, password	Unsuccessful login	As expected
Textbox (Complete) Username, password	Successful login	As expected
Pressing the login button	Successful page switching	As expected

Table 4. 2 Testing add patient data, employee data, medical record results & doctor data

Case	Expectation	Testing Result
Adding Patient Data	Move to the page used for patient data input	As expected
Adding Employee Data	Move to the employee data input page	As expected
Adding Doctor Data	Move to the doctor data input page	As expected
Adding Medical Record Result Data on Patient Page	Move to the medical record result input page	As expected

Table 4. 3 Test add, edit and print medical record results

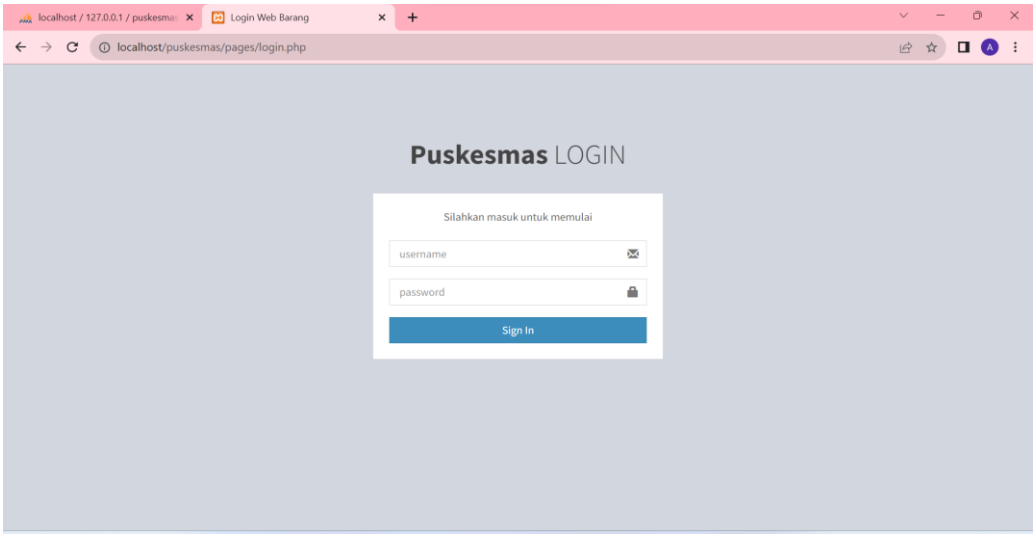
Case	Expectation	Testing Result
Add and Edit Employee and Doctor Data	Success	As expected
Print Medical Record Results	Success	As expected

C. Application Page View

The results obtained from this research are web-based patient data processing information applications at Dolok Masihul health center that can be accessed by admins or employees. This system is built in accordance with the results of the design that has been designed previously. The following are details of the application page display addressed on each page as well as the screenshoot results.

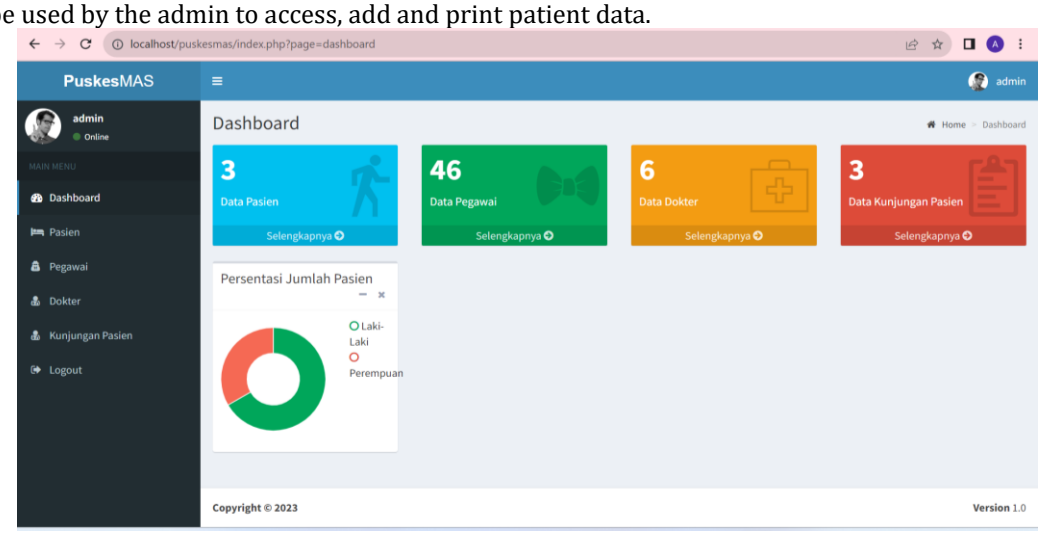
1. Login Page Display

On this page the employee or admin will enter a username and password that has been determined previously in order to enter the system that has been created so that the admin can access the patient data processing system.



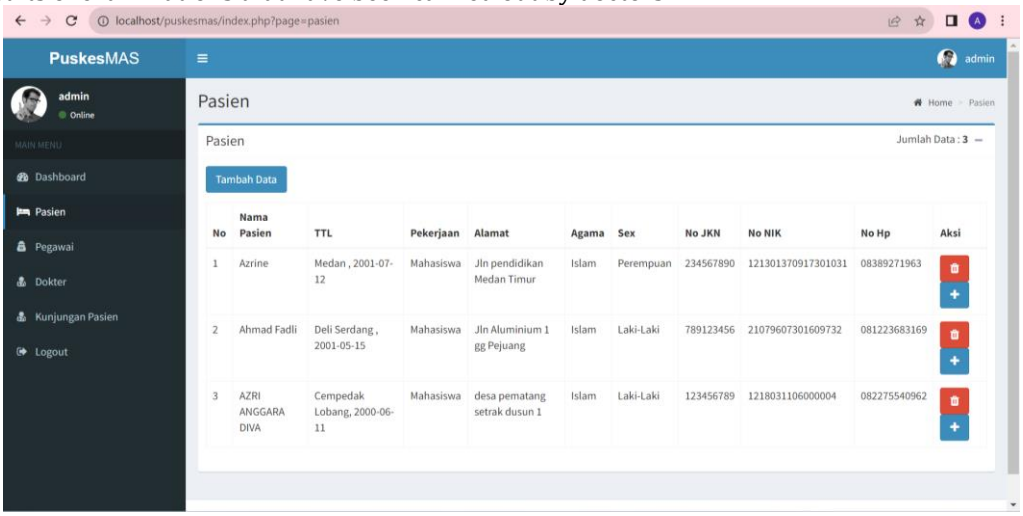
2. Dashboard Page Display

After the admin has successfully logged in, the admin will move to the dashboard page which can be used by the admin to access, add and print patient data.



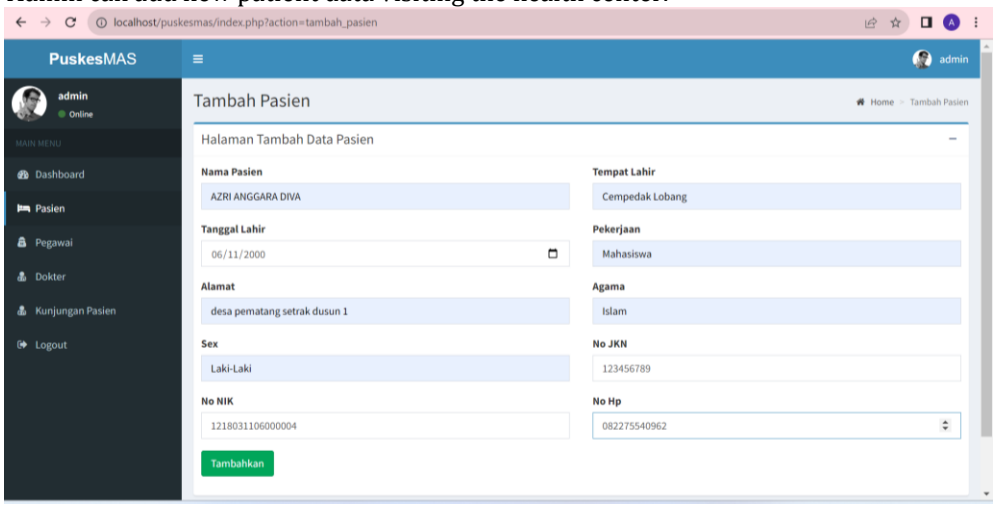
3. Patient Data Page Display

On this page the admin can input patient data who wants treatment and the admin can also add the results of examinations that have been carried out by doctors.

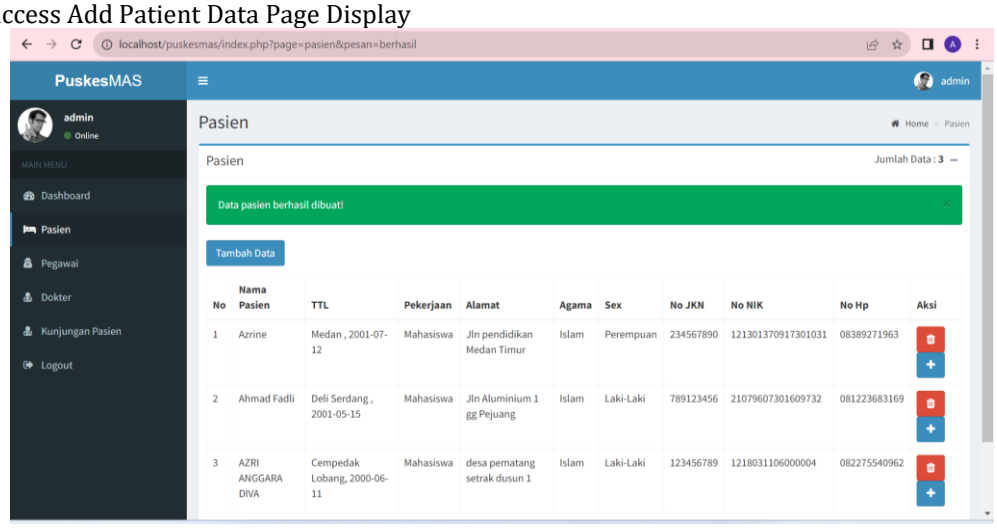


4. Add Patient Data Page Display

Admin can add new patient data visiting the health center.

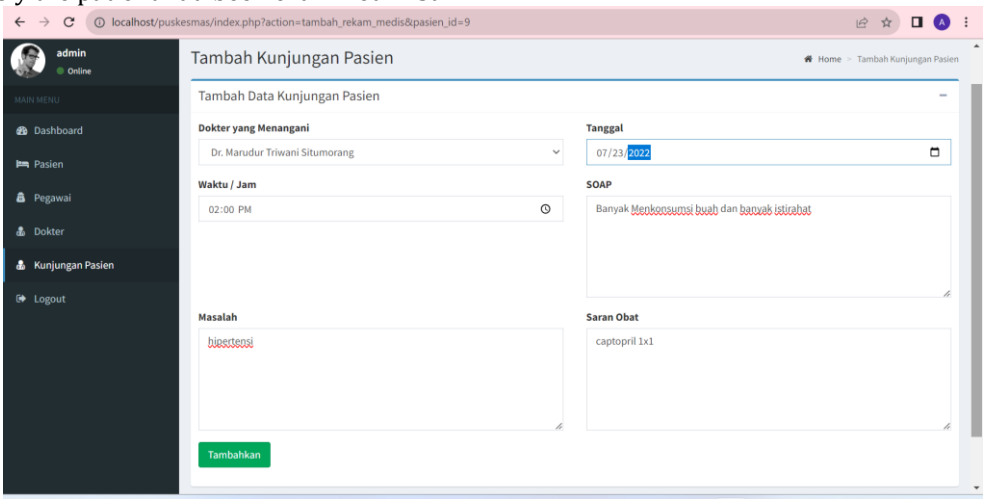


5. Success Add Patient Data Page Display



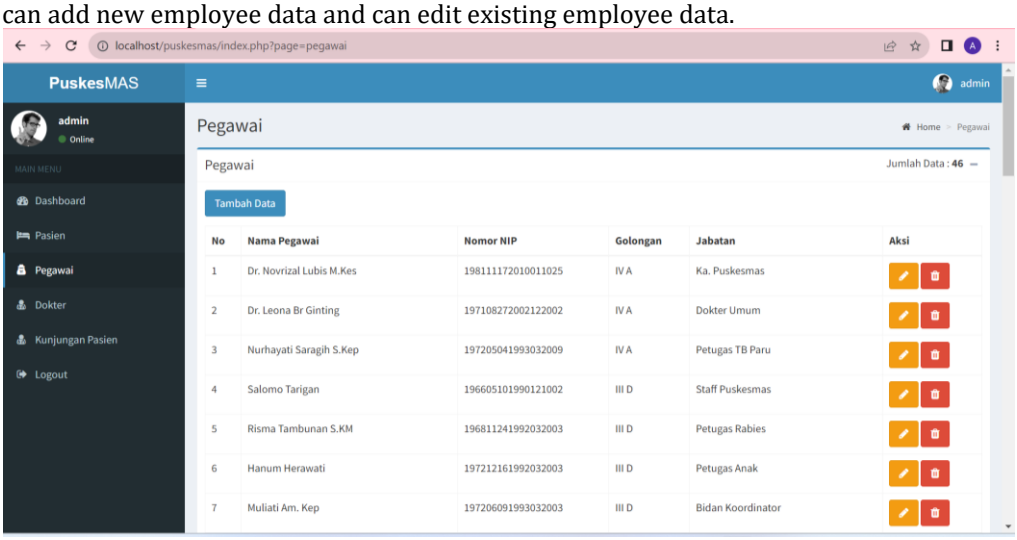
6. Add Patient Visit Data Page Display

On this page, employees input the medical record results data provided by the doctor, where previously the patient had been examined first.



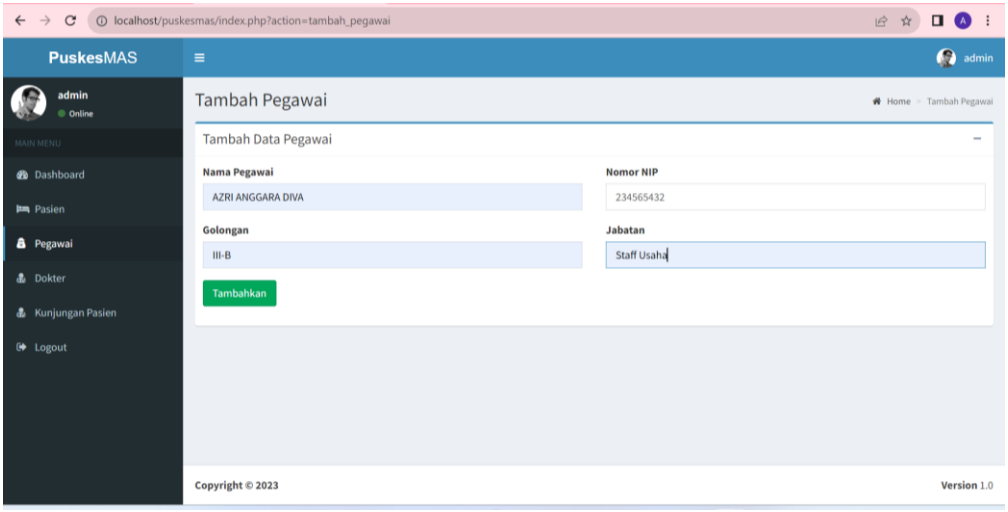
7. Employee Page Display

On this page displays employee data at the Dolok Masihul health center where on this page the admin can add new employee data and can edit existing employee data.

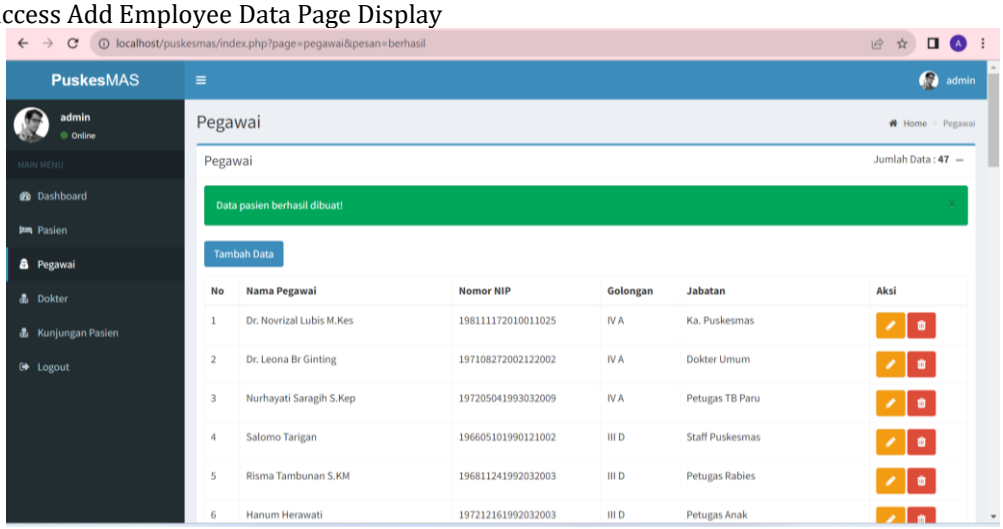


8. Add Employee Data Page Display

This section of the page displays the employee data add page, where only admins can add employee data.

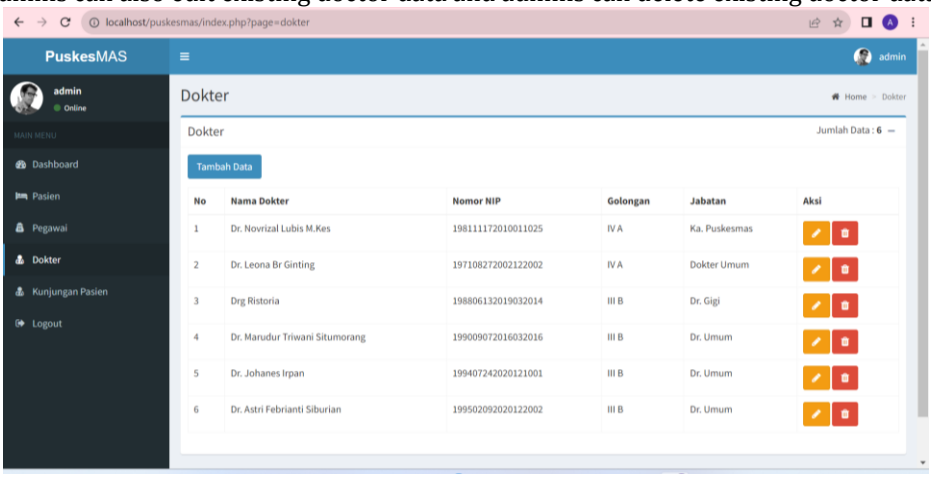


9. Success Add Employee Data Page Display



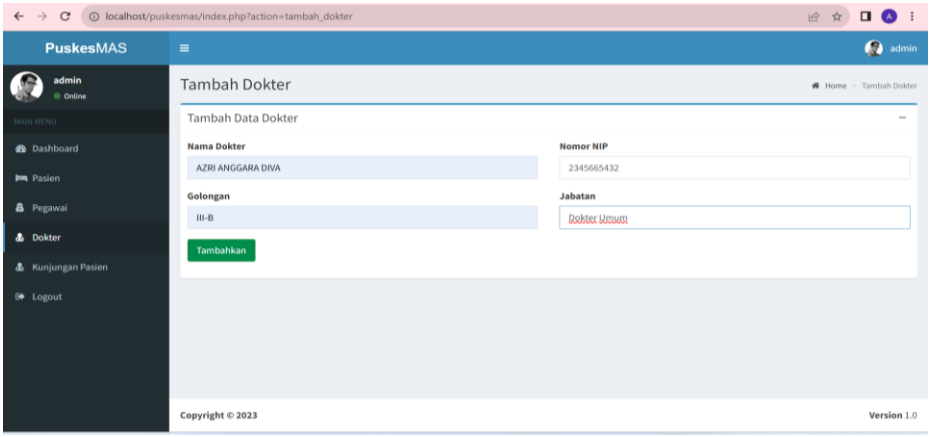
10. Doctor Page Display

This page displays existing doctor data at the health center. Admins can also add new doctor data and admins can also edit existing doctor data and admins can delete existing doctor data.



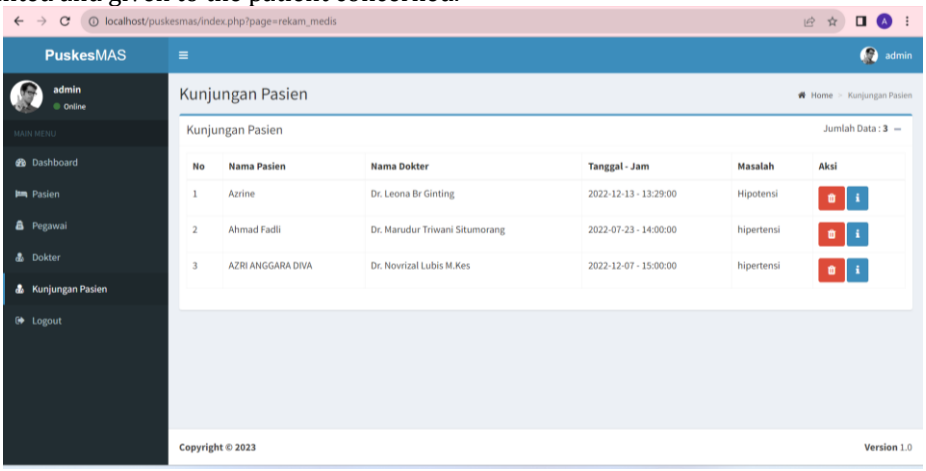
11. Add, Edit and Delete Doctor Data Page Display

On this page the admin can add new doctor data, the admin can also edit doctor data if there is a data error and the admin can also delete old doctor data if needed.



12. Patient Visit Page Display

On this page displays data on patient visits that have been examined by doctors and have been inputted by employees into the system, which will become patient medical record results data and will then be printed and given to the patient concerned.



13. Patient Medical Record Result Page Display

This page displays the patient's medical record results along with patient data that has been inputted previously.

4. CONCLUSION

Based on the results of the analysis, design, and implementation that has been done, it can be concluded that the patient data processing information system at the Dolok Masihul Health Center developed using the waterfall method is able to support all stages of system development in a systematic and structured manner. This system is proven to be able to help admins or employees in managing patient data and processing medical record results, so that the service process becomes more optimal. The existence of this information system also facilitates the process of controlling the data of patients who seek treatment, and is able to produce the final report needed accurately. In addition, this system allows the production of medical record reports to be done quickly and accurately, so as to minimize patient data errors. Overall, this patient data processing information system makes a real contribution in improving employee work efficiency, especially in preparing medical reports more quickly and accurately.

REFERENCES

[1] Undang-Undang Republik Indonesia No 25 Tahun 2009 Pasal 1 Tentang Pelayanan Publik
[2] Peraturan Menteri Kesehatan Republik Indonesia No 75 Tahun 2004 Pasal 1 Ayat 2 Tentang Pusat Kesehatan Masyarakat
[3] Abduh, R. (2021). Kajian Hukum Rekam Medis Sebagai Alat Bukti Malapraktek Medis . *Jurnal Ilmu Hukum* , 221-234.
[4] Abdur Rochman, R. T. (2019). Perrancangan Sistem Informasi Data Pasien Di Klinik Aulia Medika Pasarkemis. *Sisfotek Global, 9*, 1-6.
[5] Abdur Rochman, R. T. (2019). Sistem Informasi Data Pasien di Klinik Aulia Medika Pasarkemis. *Jurnal Sisfotek Global, 9*, 15-16.
[6] Achmad Nuzul Mariyus, N. P. (2019). Aplikasi Pengolahan Data Puskesmas (Pusat Kesehatan Masyarakat) Desa Margodadi Kab. Tulang Bawang Barat. *Sistem Informasi Manajemen Basis Data (SIMADA), 2*, 15.
[7] Adi Pradana Putra, F. A. (2020). Pengujian Aplikasi Point Of Sale Berbasis Web Menggunakan Blackbox Testing. *Bina Komputer, 2*, 74-78.
[8] Agus Tugiarto, F. P. (2018). Pengolahan Data Pasien Rawat Jalan Puskesmas Bumi Ayu Kota Dumai Berbasis Web . *Jurnal Informatika, Manajemen Dan Komputer* , 13.
[9] Agustin, H. (2018). Sistem Informasi Manajemen Menurut Prespektif Islam. *Jurnal Tabarru': Islamic Banking and Finance, 1*, 63-70.
[10] Agustini, W. J. (2019). Sistem E-Learning Do'a Dan Iqro' Dalam Peningkatan Pembelajaran Dalam Tk Amal Ikhlas . *Jurnal Mahasiswa Aplikasi Teknologi Komputer Dan Informasi* , 154-159.
[11] Aulianita, R. (2017). Penerapan Metode Waterfall Pada Perancangan Sistem Informasi Rumah Sakit Berbasis Web . *Simposium Nasional Ilmu Pengetahuan Dan Teknologi*, 4-9.
[12] Prasetyo, A., & Azis, M. S. (2018). Perancangan sistem informasi rekam medis pada puskesmas jomin berbasis web. *Jurnal Interkom: Jurnal Publikasi Ilmiah Bidang Teknologi Informasi Dan Komunikasi*, *13*(2), 31-38.
[13] DITA SYIFANI, A. D. (2018). Aplikasi Sistem Rekam Medis Di Psukesmas Kelurahan Gunung . *Jurnal Sistem Informasi, Teknologi Dan Komputer* , 22.
[14] FHIRMAN RAMADHAN, D. M. (2021). Kualitas Pelayanan Kesehatan Puskesmas Ibun Kabupaten Bandung. *Jurnal Administrasi Negara* , 58.

[15] HENDRA NUSA PUTRA S.Kom, M. (2018). Implementasi Diagram Uml (Unifed Modeling Language) Dalam Perancangan Aplikasi Data Pasien Rawat Inap Pada Puskesmas Lubuk Buaya. *Jurnal & Penelitian Teknik Informatika, 2*, 67-77.
[16] Jafar Shadiq, A. S. (2021). Pengujian Aplikasi Peminjaman Kendaraan Operasional Kantor Menggunakan Blackbox Testing. *Information Management For Educators And Professionals, 5*, 97-110.
[17] Kartika Salma Nadhiva, A. T. (2022). Implementasi Sistem Informasi Rekam Medis Berbasis Web Klinik Gigi Menggunakan Metode Waterfall Dan Pieces Framework. *Jurnal Sistem Dan Tekologi Informasi*, 168.
[18] Putra, A. B. (2019). Perancangan dan Pembangunan Sistem Informasi E-Learning Berbasis WEB (Studi Kasus Pada Madrasah Aliyah Kare Madium). *Seminar Nasional Teknologi Informasi Dan Komunikasi*, 81.
[19] Ratna Ekasari, M. S. (2017). Analisis Kualitas Pelayanan Puskesmas Dengan Metode Servqual. *Jurnal Pendidikan, Komunikasi Dan Pemikiran Hukum Islam* , 86.
[20] ULUMIYAH, N. H. (2018). Meningkatkan Mutu Pelayanan Kesehatan Dengan Penerapan Upaya Keselamatan Pasien Di Puskesmas . *Jurnal Administrasi Kesehatan Indonesia* , 149-155.
[21] Wahyu Nugraha, M. S. (2018). Penerapan Metode Sdlc Waterfall Dalam Sistem Informasi Inventory Barang Berbasis Dekstop. *Jurnal Sistem Informasi Musiwaras* , 23.
[22] Wijaya, H. O. (2017). Penerapan Metode Waterfall Pada Sistem Informasi Pendaftaran Pasien Rawat Jalan Berbasis Web Mobile. *Jurnal Sisfokom*, 80.