Web-based Ukp Public Health Center Services System Using the Waterfall Method

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ABSTRACT
Basic health services for the community are community health centers which have Health Service Units (UKP). UKP provides general health services to the community, which has many polyclinics and is interconnected with doctors, patients and administration. So far, in processing service data, there have been difficulties in general polyclinic units when receiving patient information, which is still done by recording it in a book, so there are often errors in information in patient registration services that should be received by the polyclinic that corresponds to the target polyclinic. The storage of patient data based on poly is not yet organized because the files that are stored and archived do not exist in each unit, so that when presenting data and searching you have to confirm who is archiving it, making it difficult for the data or information service department and services to be hampered. The method used in this research is the Waterfall method. This service system uses the waterfall method. The service system provides benefits in inputting and presenting data, searching for patient data such as registering online, then checking medical records to go to the clinic, online medical record results and viewing prescription information, then doctors can meet patients who carry out examinations. This system can provide good benefits and increase effectiveness and efficiency in health services for the surrounding community.


INTRODUCTION
The era of digitalization of technology in the health service sector is aimed at managing the daily activities of health centers starting from patient registration, diagnosis management, drug management, patient management, to capturing data reporting on all aspects of health to improving conventional activities to become collaborative. actions by utilizing information technology. can improve the quality of an institution that is managed properly and correctly in order to achieve the goal of providing more effective and flexible health services. The Abab Penukal District Health Center, Lematang Ilir Regency (PALI) is the District Health Service which is tasked with providing basic health services for the community in one sub-district area, especially in the Abab District area, which has 8 (eight) definitive villages and 4 (four) definitive villages. four) preparatory villages, which were established in 2014 to provide comprehensive, integrated and equitable health services. The obstacle faced in the UKP unit service is that data has not been integrated at each polynya, resulting in problems in managing patient data efficiently, the recording process is still done manually, which can cause errors in filling in patient data, treatment given, etc. processing information. Lack of coordination between service units in a health center environment can affect the smoothness of the service process and the quality of service provided to patients. And the difficulty of monitoring and evaluating the performance of health center services can hinder efforts to improve and increase the quality of services. Limited access to
information for UKP units such as doctors, nurses, midwives and leaders can slow down the
service process and hinder the effectiveness of coordination. Having an integrated information
system will make it easier for health center staff to access information, optimize services and
increase patient satisfaction.

LITERATURE REVIEW
Previous research has discussed and developed a web-based outpatient information system and
delivery services in clinics carried out, According to A web-based outpatient registration
information system at the Rancajigang Medika clinic carried out, According to (Ghiffari, 2021),
and a website-based outpatient administration information system at the Wangon Warehouse
Pratama Clinic, According to (Handayani, 2020)

METHOD
In this research, the author discusses research using a system development technique, namely
waterfall. This research method has several supporting theories to strengthen the theoretical basis
of the research carried out and is explained as follows:
  a. Information Systems (Sallaby, 2020)
     An information system is a collection of data in one unit that is useful to convey properly and
correctly so that the recipient can receive the information properly and correctly, According to
(Sallaby, 2020) to (Sallaby, A. F., & Kanedi, I, 2020)
  b. Service
     Service always has an aspect of interaction between consumers and producers, although the
parties involved are not always aware of it. Services are not goods, but rather intangible
processes or activities, According to (Gubbi et al., 2019)
  c. Public health center
     A health center is a health center that measures, determines and tests materials originating from
humans to determine types of disease, causes of disease, health conditions or factors that can
influence individual and community health. According to (Suwartika Kusumadiarti et al., n.d.)
  d. Databases
     Databases are one of the important components in information systems, because they are the
basis for providing information, determining the quality of accurate, timely and relevant
information, According to (Hartati & Efendy, 2016)
  e. Hypertext Preprocessor (PHP)
     Hypertext Preprocessor (PHP) is interpreter programming, namely the process of translating
lines of source code into machine code that the computer understands directly when the line of
code is executed, According to (Riyanti, 2021)
  f. Flow chart
     A flowchart is an image that shows the sequence or steps of a program and the relationships
between processes along with their statements, this image is expressed with symbols, According
to (Ayumida et al., 2022)
  g. Data Flow Diagram (DFD)
     Data Flow Diagram (DFD) is a technique that describes the components of a system and the
data flows in these components, origin, destination and data storage, According to (Safwandi et
al., 2021)
h. Entity Relationship Diagram (ERD)

Entity Relationship Diagram (ERD) is a data model based on real world perceptions consisting of basic objects called entities and the relationships between these objects, According to (Herlina et al., 2021)

i. Waterfall Method

Waterfall is a software development method that focuses on linear and sequential processes. In this method, each stage must be completed before starting the next stage, According to (Wijaya & Utomo, 2023) An image of the stages of the waterfall method can be seen in Figure 1.

Figure 1. Waterfall method
Source: Fatmariani (2023)

According to (Ridwan & Halim, 2023) the stages of the waterfall method are as follows:

1. Needs Analysis
   In this needs analysis, the aim is to analyze the needs needed in the design, both in the form of documents and other sources that can help in determining solutions to existing problems.

2. System Design
   In software design, database modeling is used using DFD (Data Flow Diagram) and ERD (Entity Relationship Diagram).

3. Implementation
   In this stage, a new system design is created with an application in accordance with the needs analysis to create input and output forms using PHP as a programming language, and MySQL to create a database and xampp as a database server connector.

4. Program Testing
   At this stage, program testing is carried out using black box testing with the hope that the design that has been made can run as desired.

5. Evaluation and Maintenance
In this maintenance process, the author seeks to develop a system that has been designed regarding software and 20 pieces of hardware that can be maximized so that the application can run well.

Based on the problems and obstacles that occur at the Abab District Health Center, Penukal Abab Lematang Iliri Regency (PALI). So the researchers created an information system for the community health center in Abab District, Penukal Abab Lematang Iliri Regency (PALI) using the waterfall method.

A. System Design
System design using flowcharts, context diagrams, Data Flow Diagrams (DFD), and Entity Relationship Diagrams (ERD) is explained as follows:

1. Flowchart of Proposed Community Health Center Services
The proposed community health center service flowchart involves patients, services, poly, pharmacy and leadership can be seen as follows:

![Flowchart of Proposed Community Health Center Services](image)

Figure 2. Flowchart of Proposed Community Health Center Services

2. Context Diagram
A context diagram is a diagram that consists of a process and describes the scope of a system, According to (Safwandi et al., 2021). The context diagram below illustrates the relationship or interaction between admin, doctors and patients who can manage data as follows:
3. Data Flow Diagram (DFD)
At DFD Level 1 there is a process, namely the admin manages doctor, schedule and patient data which will be stored in the doctor, schedule and patient tables, in the validation table. DFD Level 1 can be seen in the image below:
4. Entity Relationship Diagram (ERD)

Entity Relationship Diagram (ERD) is a graphical model that includes all entities, relationships and constraints to assist system analysts in completing system creation, According to (Fatmariani et al., 2023) Identifying the information content that will be displayed in the data management application of a service information system at the Abab District Health Center, Penukal Abab Lematang Ilir Regency (PALI). The content of the information to be displayed is described via the ERD as follows:

![Entity Relationship Diagram (ERD)](image)

**Figure 5. Entity Relationship Diagram (ERD)**

**RESULT**

This system has a database that is organized with each other so that it will make it easier for the service department to present data, provide information easily.
The doctor database is a list of doctors on duty at that location and will make it easy to see the list of doctors when registering a patient.

The doctor's schedule can be used to easily view the doctor's information at each clinic.
The patient display results can make it easier to find patient information.

Enough data provides adequate patient data information and makes it easier to control adequate patients.
Figure 14. Poly database results

The poly results are used for information on the poly data in the UKP unit.

Figure 15. Medical Record database results
The Prescription database results provide information on what drug prescriptions are given to patients.

C. BlackBox Testing
Creating a test table containing test classes and test items is carried out in carrying out BlackBox testing to test whether the program runs according to the requirements specifications, according to (Widhyaestoeti et al., 2021).
In this research, the author carried out black box testing using the equivalence partitioning technique, namely a technique that divides input data from a software unit into several data partitions from which test cases can be derived.

<table>
<thead>
<tr>
<th>id</th>
<th>Test Description</th>
<th>Expected results</th>
<th>Test result</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>A01</td>
<td>Enter admin data</td>
<td>The system will save the data by displaying a saved message.</td>
<td>The system displays a message that the data is saved</td>
<td>In accordance i</td>
</tr>
<tr>
<td>A02</td>
<td>View admin data fields</td>
<td>The system will display data with data in the database.</td>
<td>The system displays data stored in the database.</td>
<td>In accordance</td>
</tr>
<tr>
<td>-----</td>
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</tbody>
</table>

Table 2. Testing using the Doctor's Form

<table>
<thead>
<tr>
<th>id</th>
<th>Test Description</th>
<th>Expected results</th>
<th>Test result</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>B01</td>
<td>Enter the doctor's data entry data</td>
<td>The system will save the data by displaying a saved message.</td>
<td>The system displays a message that the data is saved</td>
<td>In accordance</td>
</tr>
<tr>
<td>B02</td>
<td>View doctor's data entry data</td>
<td>The system will display data with data in the database.</td>
<td>The system displays data stored in the database.</td>
<td>In accordance</td>
</tr>
</tbody>
</table>

Table 3. Testing using the Form on Patients

<table>
<thead>
<tr>
<th>id</th>
<th>Test Description</th>
<th>Expected results</th>
<th>Test result</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>C02</td>
<td>Enter patient data</td>
<td>The system will save the data by displaying a message.</td>
<td>The system displays a message that the data is saved</td>
<td>In accordance</td>
</tr>
</tbody>
</table>
**DISCUSSIONS**

This web-based UKP public health center services system is used by UKP to improve the performance of health services by community health centers, it is hoped that this can become a program that can be continued with better technology and information. With easy access to the UKP Performance Information System, it is easier for UKP to control. Online data It is hoped that this system can be a pilot in other units and can be developed in an integrated manner throughout and can be used by every community health center so that the performance of the UKP can be improved.

**CONCLUSION**

Based on the results of research and testing that has been carried out on the UKP unit's community health center service system, the following conclusions can be drawn: The Information System of the UKP unit's community health center service system is used to process, store data and information, control data processing, has a User automatically save feature The community health center service system application in the UKP unit can present information that visualizes the final results of the data displayed in accordance with the user's needs and the design of this application. With easy access to the food service system, it makes it easier for UKP to monitor online data.

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**REFERENCES**


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