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Design and Contruction of an Android-Based Integrated Posyandu Information System Using Prototyping Method (Case Study: Posyandu Anggrek 1 Pasirwaru Village Garut, West Java)

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ABSTRACT

Posyandu Anggrek 1 in Pasirwaru Village, Garut, West Java, still, uses manual methods in managing data and health services. This research aims to design and build an Android-based Posyandu information system using the prototyping method. The system is designed to simplify the management of data and health services, including weighing of toddlers, immunization, and examination of pregnant women. The use of the prototyping method allows rapid iteration between users and developers to determine system requirements. Test results using the black-box method show that the system functions as expected, with all features operating properly. The implementation of this information system is expected to increase efficiency and accuracy in Posyandu services and facilitate access to information for the Pasirwaru Village community.
Keywords: *Posyandu, Information System, Android, Prototyping, Data Management, Health Services*.

1. Introduction

Posyandu is one of the health service platforms in Indonesian that was created to empower and facilitate public health services, especially for mothers, infants, and toddlers [1]. In the process of carrying out these activities, it is necessary to have a posyandu information system that can be used to support activities so that they can run smoothly and efficiently [2]. Posyandu information systems are needed to improve the services provided, facilitate data management and compile valid activity reports [3]. In reality, there are still many posyandu that use conventional data collection [4].

One of them is Anggrek 1 Posyandu in Pasirwaru Village, Garut, West Java, which still uses manual methods in data management. The conventional posyandu information system is considered less effectiove because it can lead to errors in data collection, vulnerability to data loss, and difficulty in accessing information [5]. Designing a posyandu information system that is in accordance with technology can overcome the problems that occur in the data collection process at Posyandu Anggrek 1, Pasirwaru Village, Garut, West Java, one of which is the use of an Android-based posyandu information system [6]. The use of an Android-based posyandu information system is considered effective because it is easy to use and can be used at any time [7]. The Android-based Posyandu information system is expected to facilitate cadres during Posyandu activities and in managing data [8]. The use of Android as a posyandu information system

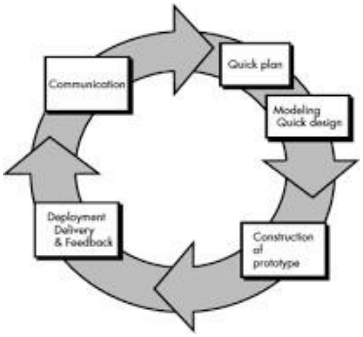
is also an effort to minimize data loss, because with this Android-based information system all data is stored neatly and computerized [9]. The development of information system at Posyandu Anggrek 1 Pasirwaru Village, Garut. West Java, using the prototyping model is a technique used to collect information in the process of analyzing user needs quickly [10]. This prototyping model is suitable for systems whose features require a lot of changes [7]. The prototyping model is used as a tool to connect user incomprehension with the technique and as an illustration to clarify the users desired specifications to the developer [11]. The use of a prototyping development model so that the products is in accordance with user requirements [12]. In the system development, the prototyping model starts from user requirments, analysis, prototyping development, coding, implementation and maintenance [13].

Based on the overall description above, it is concluded that there is a need to design a posyandu information system so that the process of health services and data management becomes effective and efficient. Realizing the importance of efficiency and accurancy in posyandu management and the potential of mobile-based solutions in supporting public health services, we propose this report entitled "Design of an Android-Based Integrated Posyandu Information System Using The Prototyping Method (Case Study: Posyandu Anggrek 1 Pasirwaru Village Garut West Java)". The use of this information system is expected to help managers or cadres in carrying out health service activities and managing data at Posyandu Anggrek 1, Pasirwaru Village, Garut, West Java.

2. Methodology

2.1 Metode Prototyping

The Prototyping method is a process used to assist software development in forming a model of the software to be created [14]. System development method with the Prototype model, where this method is a software development method that is widely use by developers in order to interact with users during the system development process. The following is a picture of the prototype method [15].



Picture 2.1. 1 Prototyping Method

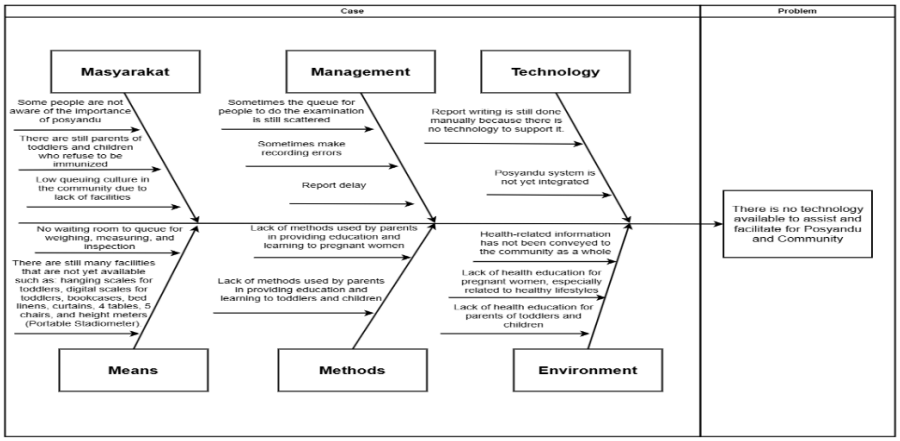
1. Communication, development meets with stakeholders to determine the currently known software requirements and to delineate areas for further definition in the next iteration.
2. Quick Plan, rapid iteration of prototyping is carried out and then system analysis is carried out to create modeling in the form of rapid design.
3. Modeling Quick Design, modeling planning with several object-oriented models using UML (Unified Modeling Language) tools, namely Use case to define the

functions of the system, Class Diagram to show classes in the system, Activity Diagram to describe business processes.

4. Contruction of Prototype, rapid design is the basis for starting the construction of a prototype based on a representation of the aspects of the software that will be visible to end users (For example, user interface design or display format).
5. Development Delivery & Feedback, the development of the prototype is left to the stakeholders to evaluate the prototype that has been created and provide feeback that will be used to improve the requirements specification. Iteration occurs when developers make improvements to the prototype.

2.2 Fishbone analysis method

Ishikawa diagram or known as fishbone diagram is method of Seven Quality Tools used to find the cause of a problem on the production floor. This method divides the problem into cause and effect which consists of several factors, namely: machine, management, material, manpower, environment, measurement, and method .



Picture 2.2. 1 Fishbone Analysis Method

In figure 2.2.1 Fishbone diagram of data analysis of Posyandu Anggrek 1 above has the root of the problem that has been explained because the data information in Posyandu Anggrek 1 Pasirwaru Village is not optimal.

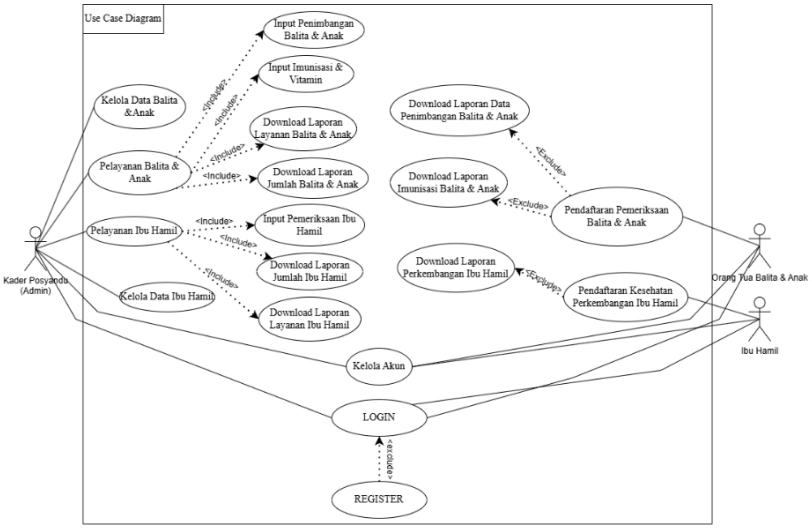
3. **Results and Discussion**

3.1 Unified Modeling Language (UML)

After the data is obtained, the next step is to design a design for the android system. This system design will be described using UML diagrams. Will be described using the UML diagram as follows:

A. Use Case Diagram

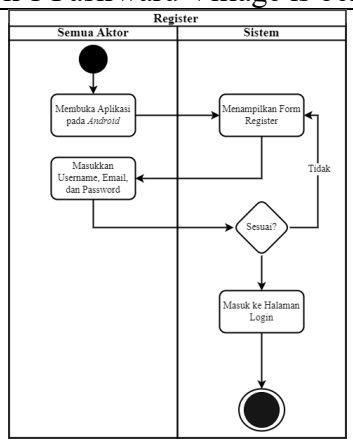
Use Case Diagram on the information system of Posyandu Anggrek 1 Pasirwaru Village is below:



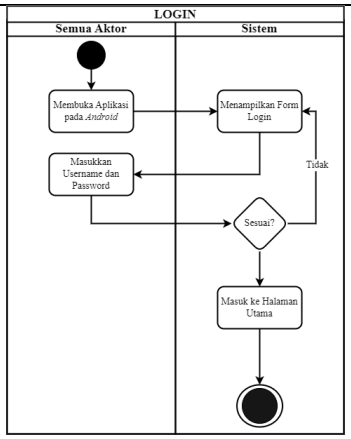
Picture 3.1. 1 Use Case Diagram

B. Activity Diagram

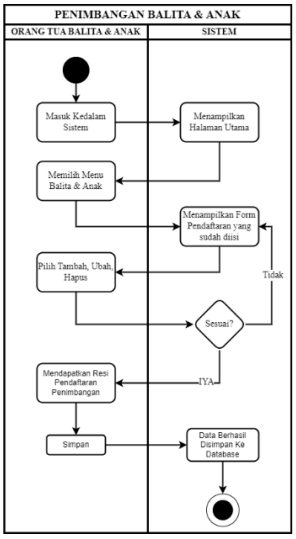
Activity Diagram on Android-based information system Posyandu Anggrek 1 Pasirwaru Village is below:



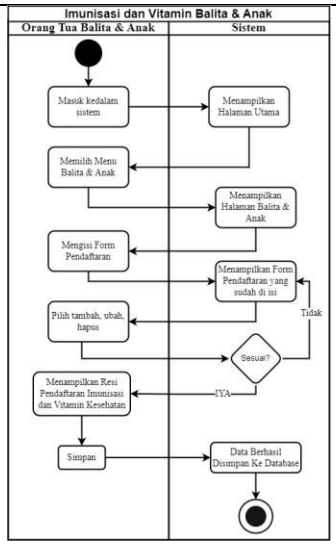
Picture 3.1. 2 Activity Diagram Register



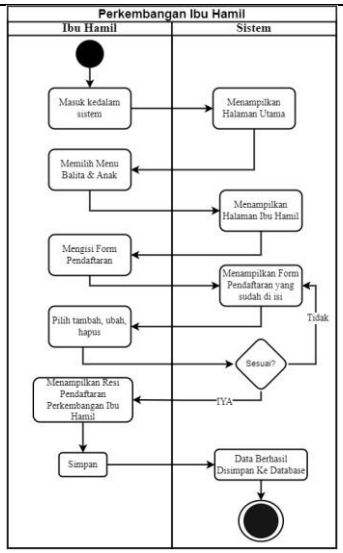
Picture 3.1. 3 Activity Diagram Login



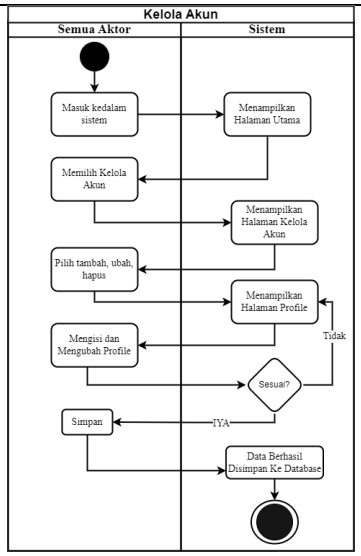
Picture 3.1. 4 Activity Diagram Penimbangan Balita & Anak



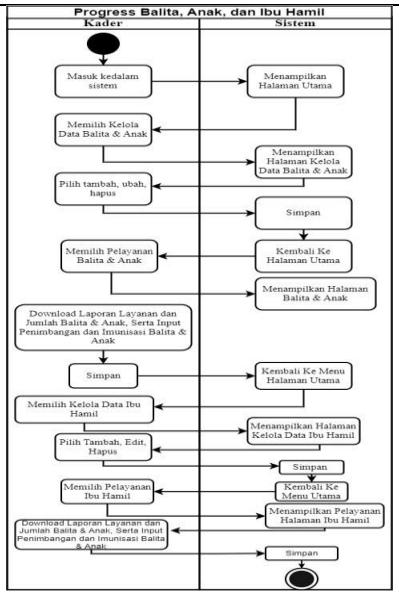
Picture 3.1. 5 Activity Diagram Imunisasi dan Vitamin Balita & Anak



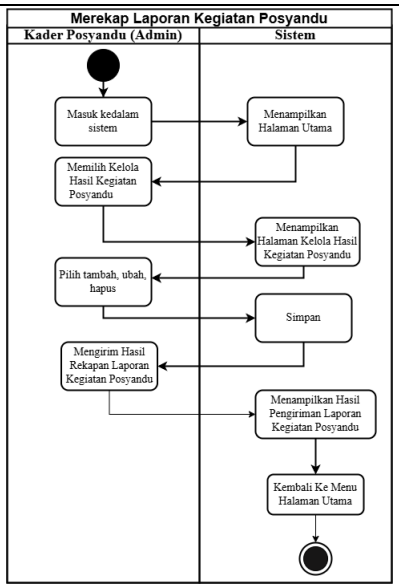
Picture 3.1. 7 Activity Diagram Perkembangan Ibu Hamil



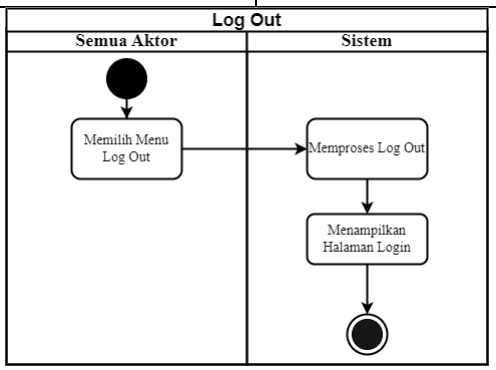
Picture 3.1. 8 Activity Diagram Kelola Akun



Picture 3.1. 9 Activity Diagram Kader Posyandu Melihat Progress Balita, Anak, dan Ibu Hamil



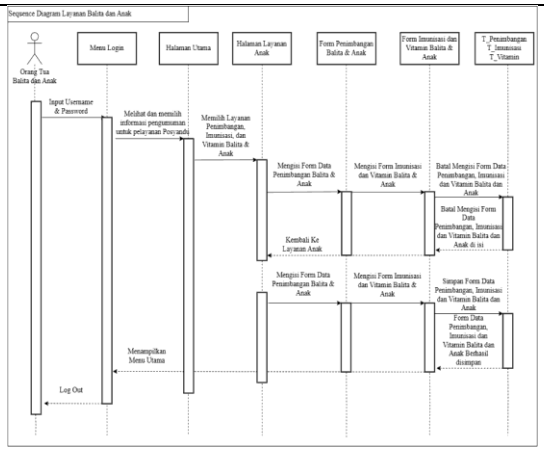
Picture 3.1. 10 Activity Kader Posyandu (Admin) Merekap Laporan



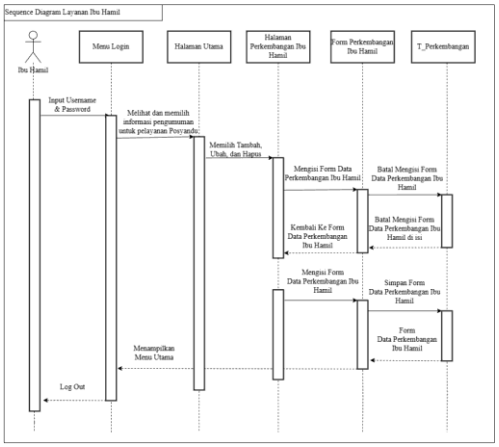
Picture 3.1. 11 Activity Diagram Logout

C. Sequence Diagram

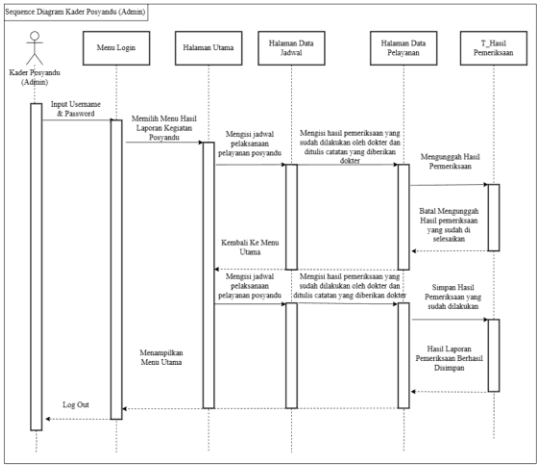
Sequence Diagram on Android-based information system Posyandu Anggrek 1 Pasirwaru Village is below:



Picture 3.1. 12 Sequence Diagram Layanan Anak



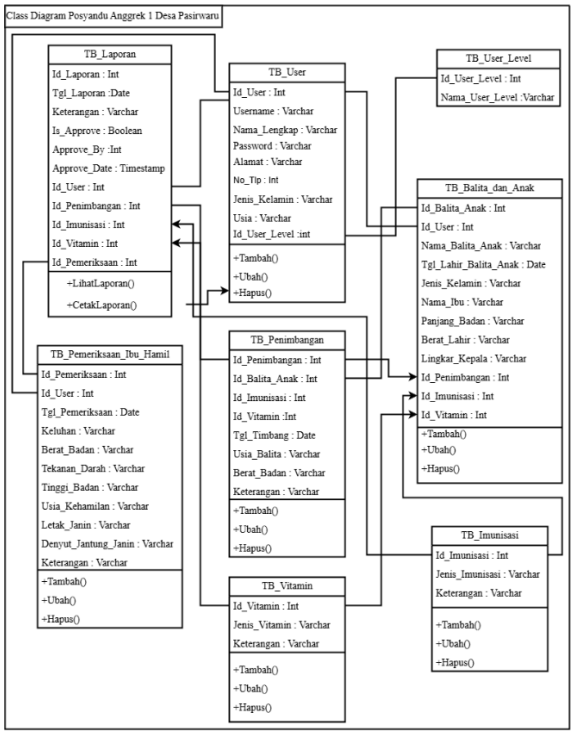
Picture 3.1. 13 Sequence Diagram Layanan Ibu Hamil



Picture 3.1. 14 Sequence Diagram Kader Posyandu (Admin)

D. Class Diagram

Class Diagram on Android-based information system Posyandu Anggrek 1 Pasirwaru Village is below:

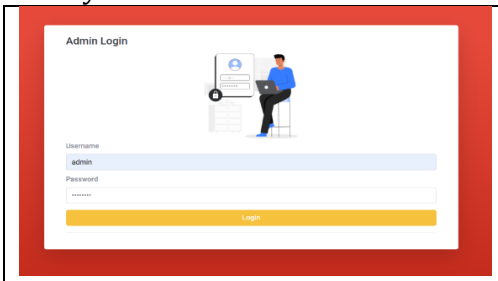


Picture 3.1. 15 Class Diagram

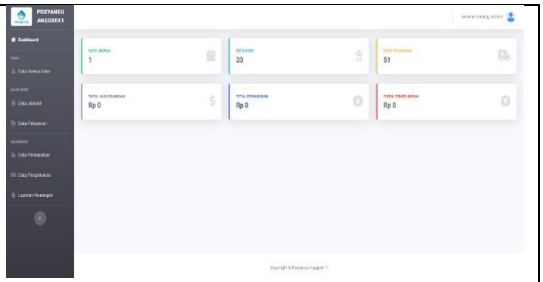
3.2 Implementation

After UML design, the next stage is the system implementation stage. At this stage, the results of the design and design that have been made will be implemented with a programming language. Programming languages used in the front-end side of the website are HTML, CSS, JavaScript and for the mobile side with the Dart programming language and Flutter framework. Then from the backend side, the Laravel Framework and MySQL database help. The following is the implementation of the application system that has been carried out.

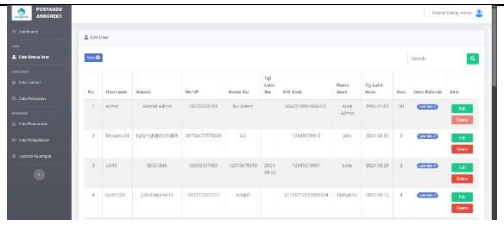
A. Web System View for Admin



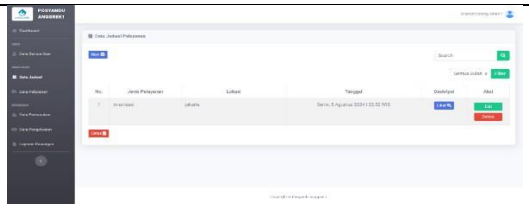
Picture 3.2. 1 Login Admin



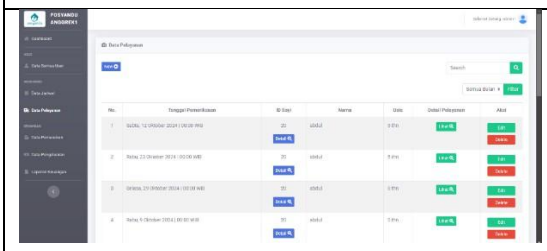
Picture 3.2. 2 Home



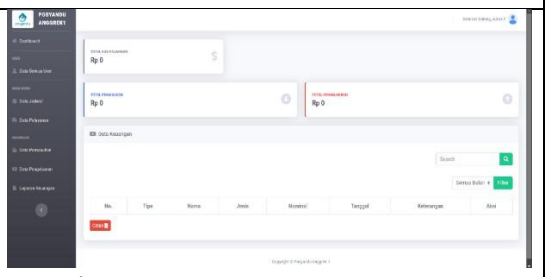
Picture 3.2. 3 Data User



Picture 3.2. 4 Data Jadwal



Picture 3.2. 5 Data Pelayanan

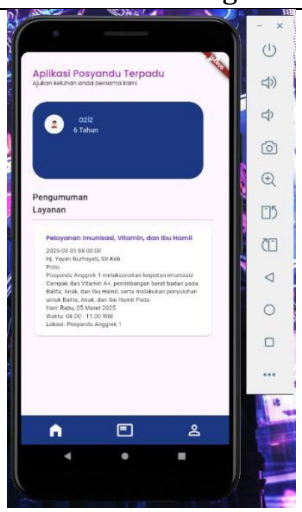


Picture 3.2. 6 Laporan Keuangan

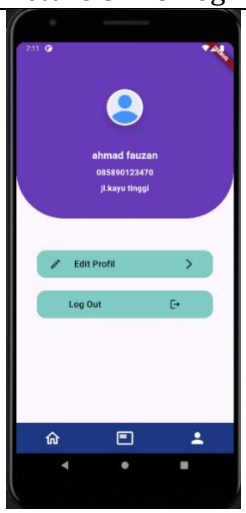
B. Android System View for User

Picture 3.2. 7 Register

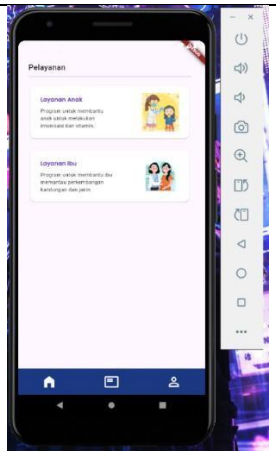
Picture 3.2. 8 Login



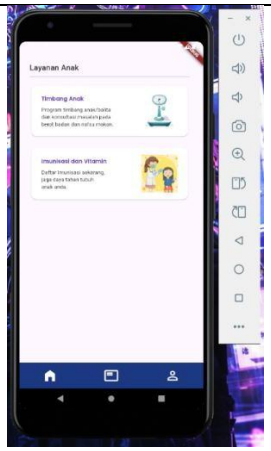
Picture 3.2. 9 Home



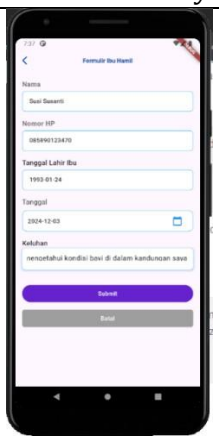
Picture 3.2. 10 Profile



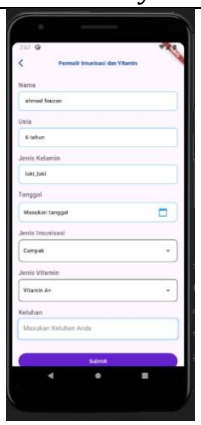
Picture 3.2. 11 Pelayanan



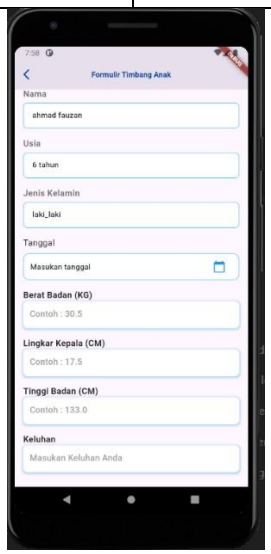
Picture 3.2. 11 Layanan Anak



Picture 3.2. 13 Form Ibu Hamil



Picture 3.2. 14 Form Imunisasi & Vitamin



Picture 3.2. 15 Form Timbangan Balita

4. **Conclusions**

The Posyandu Anggrek 1 Application information system carried out, it can be concluded that this system successfully fulfills the needs of recording and managing data at Posyandu Anggrek 1 Pasirwaru Village. The use of the prototyping method in developing this system facilitates the process of identifying needs and improving the system iteratively. The system built is able to accommodate various features such as recording member data, schedules, services, income, expenses, and financial reports. The test results show that all features run as expected and can be accessed properly by users, both admins and user. The implementation of this system is expected to increase efficiency and accuracy in data management at Posyandu Anggrek 1.

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