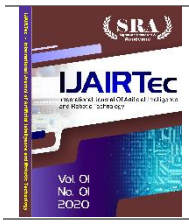

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DATA INFORMATION SYSTEM FOR TODDLERS AND PREGNANT WOMEN BASED ON ANDROID FOR HELPING EARLY HEALTH DISORDERS FOR TODDLERS AND PREGNANT WOMEN IN THE VILLAGE

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Abstrct
Data collection for toddlers and pregnant women using an Android-based application can help in early handling of health problems, especially for toddlers and pregnant women. Early detection and treatment of health problems for toddlers and pregnant women is important to minimize the occurrence of errors in data collection and handling. Dependence on the presence of a village midwife is very high, especially for toddlers and pregnant women. One of them is a problem which occurs in the information system for data collection for toddlers and pregnant women which is still manual in inputting the data, so it is not efficient and has to input data for toddlers and pregnant women one by one and this is very time consuming. Based on this, the researcher provides a solution to the village apparatus so that the information system is more adequate by developing an android-based application for data collection information for toddlers and pregnant women. This data collection research uses the System Development Life Cycle (SDLC) method so that the results can be more accurate. Researcher has developed an easy system for users to search for data on toddlers and pregnant women, so that it is easier without having to search one by one, and users can also delete or add data easily.

I. INTRODUCTION

In an effort to improve the welfare of the community, several developments have been carried out in the area to the village level. One of them is to improve the quality

of its human resources by collecting data on rural areas about toddlers and pregnant women. In some countries, especially developing countries, pregnant women are still at high risk during childbirth. The maternal mortality rate in Indonesia is one of the highest in Southeast Asia (WHO, 2018)[1]. According to data from the Asia Pacific Economic and Social Organization, the Maternal Mortality Rate in Indonesia is the fourth highest among Southeast Asian countries (220/100,000 live births) after Cambodia, Timor Leste and Laos[2].

Research conducted by Musliani (2017) explained that there are data processing applications for data collection for toddlers and pregnant women which can assist in data processing such as inputting baby data, pregnant women data, and displaying annual weight tables, sex weight tables and graphs of weight results of body in babies[3]. Research conducted by Sholihah (2015) described the application when writing this data set which in the future will be easier for cadres to record Posyandu activities, especially on maternal and child health[4]. Research conducted by Ahmad Crusyairi (2019) explained that in this study the designer of an Android-based Infant Health Information System which can support and assist data collection on the Puskesmas Management Information System, making it easier for the MCH Coordinator to report to the MCH PWS[5]. Research conducted by Bella Hidayah (2016) conducted an in-depth study of the Information System for data collection of toddlers and pregnant women who are currently running at Posyandu. Researcher tried to find a solution by creating a new data collection information system to correct and reduce errors in the system for early childhood, provide continuous data collection information with pregnant women so that it would be more effective in collecting data about early childhood and help performance at the time of data collection. In terms of health services, PUSKESMAS is one of the leading health workers who provide health services. PUSKESMAS also makes every effort to provide services to the community, especially in overcoming the health problems of pregnant women and toddlers. With the hope to help reduce the Maternal Mortality Rate (MMR) by providing quality and best services in order to assist in carrying out their duties, it is necessary to provide an application which can assist in the implementation of the data collection and mapping.

Based on the above research which applies an android-based information system, this makes it easier for the village to record data on toddlers and pregnant women as well as handling health problems, especially for toddlers and pregnant women. The new system can help solve problems on the old system because on the old system users spend more time. With the support of this new system, this can obtain information quickly and accurately. By utilizing technology to collect data about pregnant women and toddlers and develop an information system which can record pregnant women and toddlers who are carrying out control, this is expected to help PUSKESMAS provide information and take action based on the information provided by the application [5].

In collecting data on toddlers and pregnant women, of course, a lot of data is still recorded manually. Making reports manually often causes errors in recording and monitoring the development of health problems for toddlers and pregnant women. This can cause ineffectiveness if the recording has not used an android-based system. Therefore, a system is needed to facilitate the data collection process for toddlers and

pregnant women in the village. With the android-based data collection information system for toddlers and pregnant women, it is easier for midwife in each village to record changes in data and they can monitor and input data more often every month. At Posyandu, they become aware of the ups and downs in the number or development of toddlers and pregnant women in Tanjung Anom village.

II. LITERATURE REVIEW

2.1. Basic Concepts of Information System

Information system is a combination of information technology and community activities which use this technology to support operation and management. A system cannot be driven alone, but if it is supported by related components/entities, the system can operate properly, and work together to achieve a goal. The system was divided into two parts, partly emphasizing on procedures and partly emphasizing on elements. These two types of people are real, not contradictory[6]. The difference lies in the way they treat them. At the same time, according to Tyoso's research (2016), systems were various collections of components which formed a unity. From the opinions of these experts, it can be concluded that the system is "a collection of elements/components which are interconnected, work together and form a single unit to achieve a goal". The components of the information system are[7]:

a. The input component is the media for entering data into memory from the outside to produce the required information.
b. Process component is the data which is processed to produce some of the information needed.
c. Control component is the components which control disturbances to the information system.

One of the advantages of this information system is as a decision-making advice because with this information system, we can find out the decisions we have taken and their impacts or consequences, whether it benefits one party or both parties in trouble.

2.2. Data collection and services

Data collection is a process or activity to collect data. Data collection is conducted to determine the increase and decrease in the number of toddlers and pregnant women. Service is a process to fulfill demand through direct activities. Every toddler and pregnant woman gets health services according to standards. Health services for toddlers and pregnant women are carried out by village midwives and or pediatricians who have been provided with health facilities from the government and the private sector. Service is a series of activities because this is a process. As a process, service is carried out regularly and continuously, covering all organizations in the community[8][9].

2.3. Pregnant Woman and Toddler

Pregnant women are people who continue their offspring in the process of fertilization. In the body of a pregnant woman, a fetus grows in her womb. Pregnancy is an important time in life. Pregnant women must prepare themselves as much as possible to avoid interference with the health of the mother, baby, and delivery process. What affects maternal health is nutritional status. During

fertilization, the metabolism of energy and other nutrients in the body increases. The growth of the fetus in the womb requires an increase in energy and other nutrients. Insufficient nutritional needs during pregnancy can cause incomplete fetal development[10][11]. Toddler refers to a person or group of people of a certain age group. Infants were divided into three groups, the infant age group (0-2 years), the toddler group (2-3 years), and the preschool group (> 3-5 years). Meanwhile, according to data from the World Health Organization, the age range of infants is 0-6 months. In the research of Marmi and Raharjo (2015) (toddlers (12-59 months old)), the current growth rate is starting to decline, and motor development (big and fine motor) is also increasing. The growth and development of brain cells continues, nerve fibers and their branches also continue to develop, so that they will form a complex network of nerves and brain. The number of arrangements for the relationship between these nerve cells will greatly affect the overall performance of the brain, starting from learning to walk, the ability to recognize letters, social skills and so on[11][1], [12].

2.4. Health Problems in Toddlers and Pregnant Women

Health in toddlers and pregnant women is very important and needs to be considered. Pregnant women are required to eat healthy foods to meet the needs and growth of the fetus. Compared to pregnant women who are not pregnant, pregnant women need more nutrition to prevent health problems in babies and pregnant women by consuming various and balanced food, quantity and proportions. In addition, pregnant women must prepare nutrients to produce breast milk. Pregnant women must have enough nutrients in their daily diet, because the fetus will consume the mother's body supplements. Fat cells are a source of calories and iron is a source of iron. Therefore, pregnant women must have a good nutritional status before becoming pregnant, and must consume foods which vary in proportion and quantity as well as the health status of toddlers[13].

2.5. Android

Android is a system for Linux-based mobile devices, which includes an operating system, middleware and android applications, and provides various open platforms for developers to create applications. The advantages of Android and other systems are as follows[14]–[16]:

1. Superior switching and multitasking on Android. Users only need to touch the icon on the system to easily switch applications,
2. Better accommodate various widgets,
3. Improve copy and paste function,
4. Chrome browser is faster and easier,
5. Simple notifications, and
6. Improved drag and drop function and larger multi-touch size

2.6. Tanjung Anom Village

Tanjung Anom Village is one of 12 villages in the Kotaagung Timur Regency and is located in the northern part of the Regency. This village is about 3 KM away and surrounded by 4 villages in Kotaagung Timur Regency.

a. In the north it is bordered by the Kebun Sembilan Village.

b. In the east, it is bordered by Talang Rejo Village
c. In the south, it is bordered by Karta Village
d. In the west, it is bordered by Campang Tiga Village, Central Kotaagung District

In addition to the close distance from the sub-district, Tanjung Anom Village is also 20 km from the district and 56 km from the province. The area of Tanjung Anom Village is approximately 1,500,375 hectares or 15,00375 square kilometers. The entire area of Tanjung Anom Village is a highland, and hills or mountains and part of it is a mountainous area with rice fields and plantations.

III. RESEARCH METHOD

3.1. Data collection Method

Data collection is carried out to obtain information in conducting a valid data.

1. Observation
   At the Observation stage, researcher must conduct a review first and observe directly to see how the implementation of data collection for toddlers and pregnant women in the village is currently running. Then the researcher solves the problem by applying a data collection system for toddlers and pregnant women as well as handling health problems in Android-based toddlers in Tanjung Anom Village.
2. Interview
   In this interview method, researcher gets information directly, by asking and answering questions with village officials and the people of Tanjung Anom Village, about what obstacles and problems are experienced, the purpose of which is to make the application, researcher gets various data and information which are appropriate with the facts on the ground.

3. Libraries
   In addition to the Observation and Interview method, the researcher also uses books or journals, village documents and library materials, and collects data and quotes from the experts in it, to further strengthen the theoretical basis of this research, which is being carried out in the library and at the research site.

3.2. Development Method of Information System

The method in this study uses the Software Development Life Cycle (SLDC). (Muhammad muslihudin 2016) SLDC is a software development model which includes Planning, Analysis, Design, Testing, Processing[17]. Here are the steps which need to be considered in this method

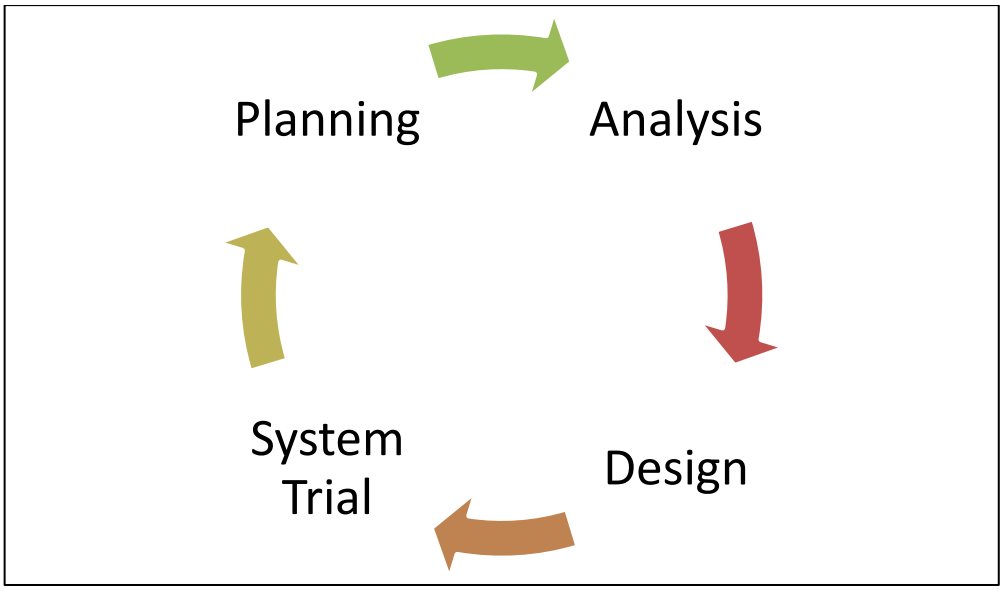


Figure 1. SDLC Method Chart

1. Planning Stage
   At this stage, by learning the programming language PHP, MYSQL and other matters related to making this application, an android-based data collection plan for toddlers and pregnant women is made.
2. Analysis Stage
   This stage is carried out to find out the tasks which users need to complete and how to create an Android-based data collection system for toddlers and pregnant women which is easy to use for each user.
3. Design Stage
   At this stage, do the design to guide the making of this application.
4. Trial Stage
   The complete system will be tested on data collection for toddlers and pregnant women. This is very useful for evaluating data collection requirements by using a complete system to adjust.

3.3. Research Flow

The flow of this research describes the stages of research in Tanjung Anom Village for the application development program for data collection of toddlers and pregnant women, as well as the handling of health problems in toddlers and pregnant women with the aim of facilitating government relations with the community which is carried out with android-based development. The following is a fishbone diagram research flow.

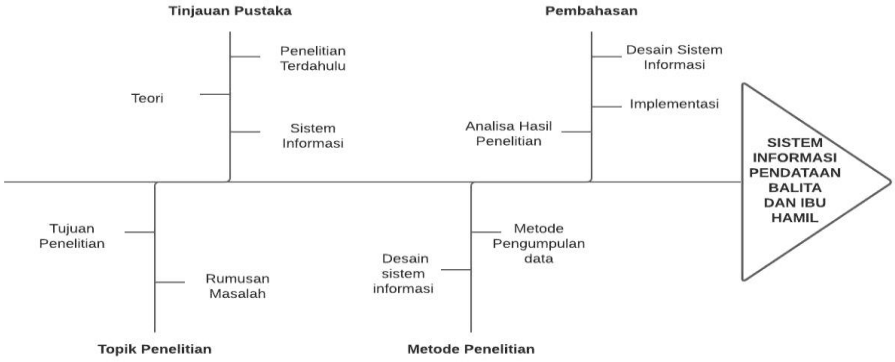


Figure 2. Fishbone Diagram

Information:

1) At the literature review stage, the researcher determines the topic or research theory, looks for references in the form of examples of previous research with the same method used by the researcher. After the research topic, it can be concluded with the research title.
2) On the research topic, the researcher determines the purpose of this study, such as formulating problems which occur in data collection for toddlers and pregnant women in Tanjung Anom Village to get a solution.
3) In the research method, researcher determines attributes and design fishbone diagrams and design using the SLDC (System Development Life Cycle) method, and researcher collects data.
4) In the discussion section, researcher creates and designs systems using context diagrams and DFD, then researcher implements application systems so that errors do not occur when running this system. After carrying out the implementation, the researcher conducts the final analysis of a study, and the researcher gets a conclusion from a research which is examined.

IV. DISCUSSION

4.1. Information System Design

In general, the system created is described by using context diagrams. From this context diagram, it can be seen in general about the process flow handled by the system. These activities complete the system plan at runtime.

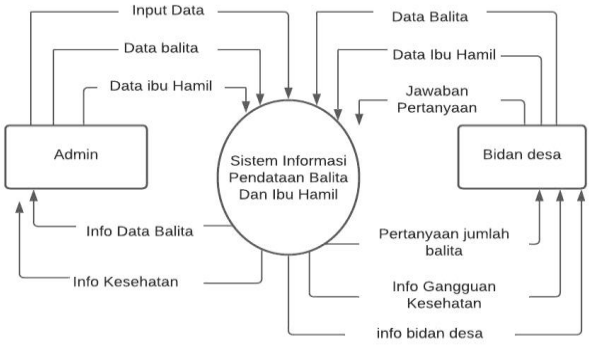


Figure 3. Context diagram

The function of the flow context diagram above is to describe an interaction between the admin and the information system for data collection of toddlers and pregnant women in the village which involves the village midwife in it to process data. Data Flow Diagram (DFD) describes the flow which is interconnected with each other and interrelated between the admin and the village midwife. From the system planning made with the context diagram above, the data flow in the system is described in more detail using a data flow diagram (DFD).

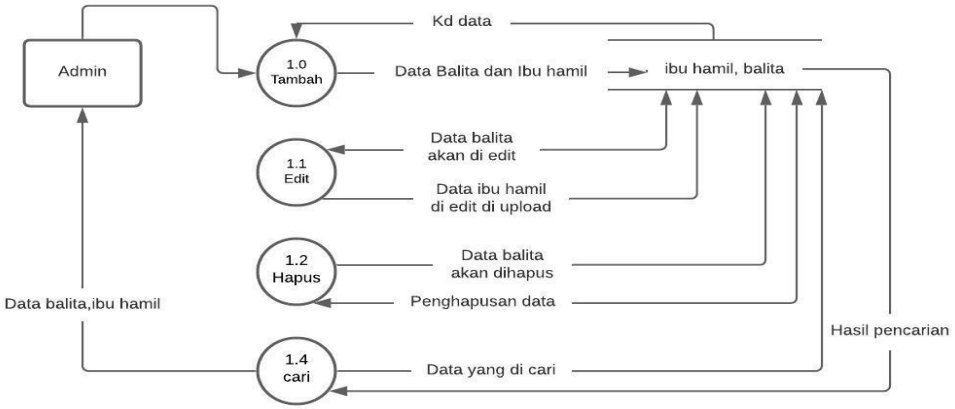


Figure 4. DFD level 0

The above process starts from DFD level 0 and describes the program design. The program guides the flow of data through a decomposition method which can be used to identify data that the system can easily accept for users and system manufacturers. The data above describes more complex data flows in each process, then forms data storage or story data and data flows which partially or in detail describe the system.

4.2. Implementation

The admin login page uses the admin or village operator to manage data collection for toddlers and pregnant women.

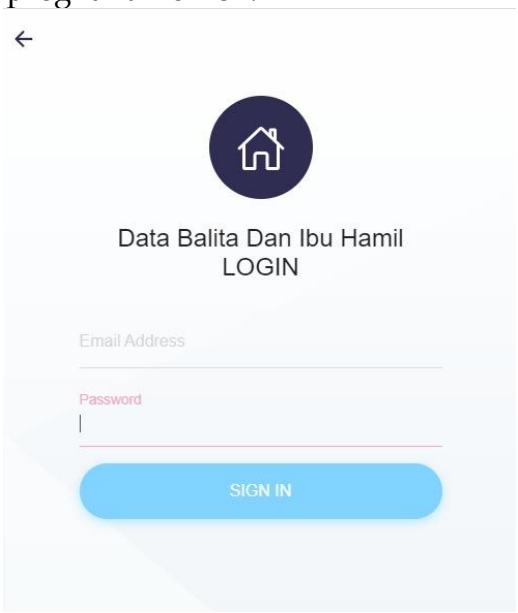


Figure 9. Login Page Display

This page contains data on pregnant women ranging from age, gestational age and health problems.

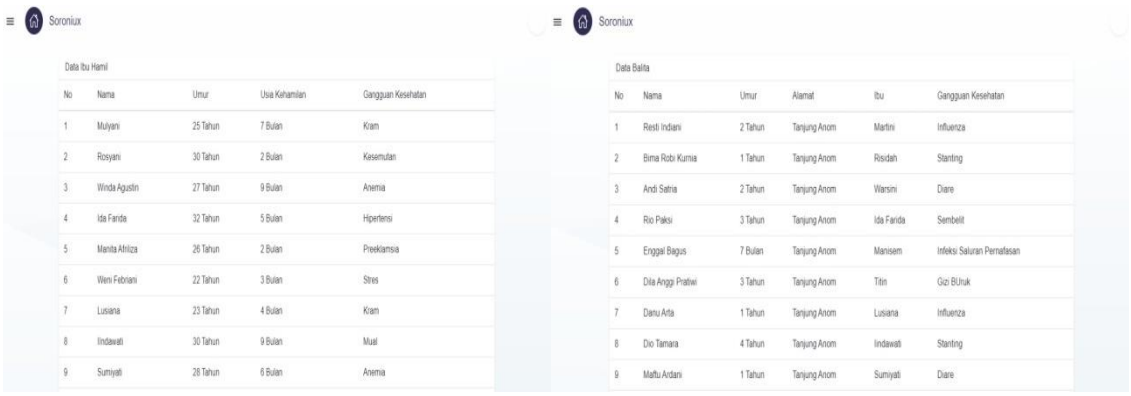


Figure 10. Display of Data Pages for pregnant women and Data Pages for toddlers

This page contains data collection for toddlers and health problems in toddlers

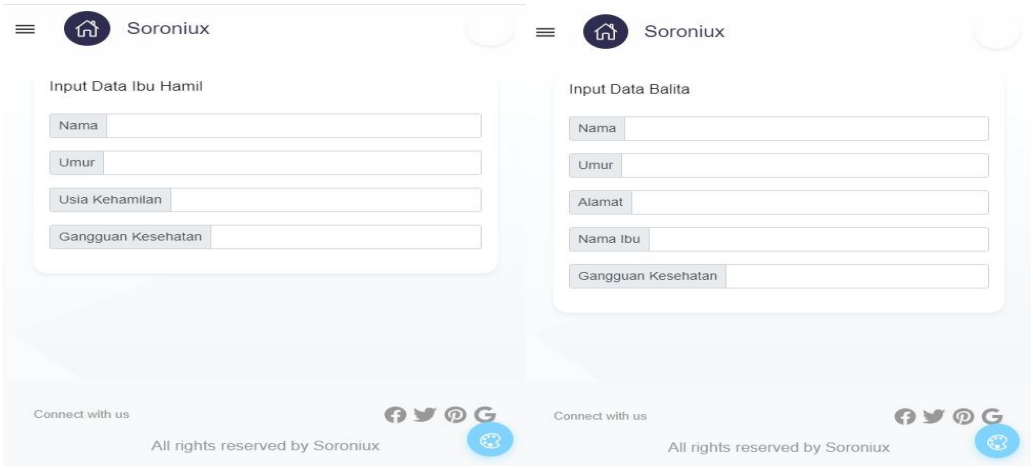


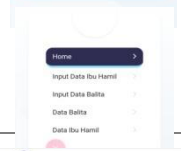
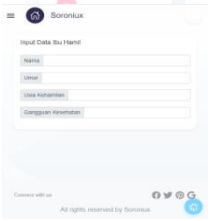
Figure 12. Display of Toddler and Pregnant woman Input Pages

In this research of an android-based information system for data collection of toddlers and pregnant women in Tanjung Anom Village, Kotaagung Timur District, Tanggamus Regency, from several studies which have been described, making this application can improve performance more accurately and practically, so that it can facilitate data collection and make reports. Making this application system is with the database programming language PHP, MySQL, and is supported by a number of related applications in it.

4.3. Analysis of Research Result

Testing the application of the information system for data collection for toddlers and pregnant women is the black box testing method. Black box is a way to make submissions to applications such as the functions which exist in the application so that they are easy to use by general users.

Table 1. Black Box Test Results on Information System Applications for Data Collection Toddlers and Pregnant Women

No	Image	Examiner	Test	Expected result	Test result	Conclusion
1		E-mail and Password are left blank then click the login button	Email: (blank) Password: (blank)	The system refuses and displays "Please fill in your email and password"	In line with expectation	Valid
2		Type your email and password then click the login button	Email: (admin) Password: (admin12345)	The system will respond to login access and display the home page	In line with expectation	Valid
3		All form data fields are emptied, add data, click save	Data input (blank)	The system does not process and the empty column does not display data	In line with expectation	Valid
4		Just enter the data input of pregnant women, name, gestational age, and health problems, click save	Input data name (Mulyani), age (25 years), gestational age (7 months), health problems (cramps)	The system can process and store data	In line with expectation	Valid
5		Fill in all from input data in an empty column, click save	Input data name (Mulyani), age (25 years), gestational age (7 months), disorder (cramps)	The system can process and store data	In line with expectation	Valid
6		Just enter toddler data input, name, age, age, address, mother's name, and health problems, click save	Input data name (Resti Indriyani), age (2 years), address (Tj. Anom), mother (Martini), health problems (influenza)	The system can process and store data	In line with expectation	Valid
7.		Fill in all from input data in an empty column, click save	Input data name (Resti Indriyani), age (2 years), address (Tj. Anom), mother (Martini), health problems (influenza)	The system can process and store data	In line with expectation	Valid
8.		Input data name (Resti Indriyani), age (2 years), address (Tj. Anom), mother (Martini), health problems (influenza)	All data fields on the form are added add data, click save	The system can process and store all data for toddlers and pregnant women	In line with expectation	Valid

The results of trials use black box testing in research on data collection information systems for pregnant women and toddlers as well as handling health problems in toddlers and pregnant women on application functions starting from the login page, main home page, toddler data input page, and data input page for pregnant women. It can be concluded that the application of the data collection system for toddlers and pregnant women in Tanjung Anom Village is feasible to be implemented and developed.

V. CONCLUSION

After the creation of the toddler and pregnant women data collection system application, it can be concluded that the existence of a data collection application for toddlers and pregnant women can solve problems, being able to display data collection results properly and accurately, help handle health problems for toddlers and pregnant women easily by users. This android-based system can be accessed at any time and can be implemented properly, making it easier to generate data collection reports.

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