MANAGEMENT OF MATERNAL HEALTH DATA AND STIMULATION OF EARLY DETECTION AND INTERVENTION GROWING WITH AN ANDROID-BASED INFORMATION SYSTEM

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ABSTRACT

Management of maternal and child health data that uses manual systems will cause problems in recording the results of inspection and reporting data. Data differences occur if the data recapitulation is done manually. If data analysis comes from invalid and reliable data, the program may not be on target. It is necessary to develop maternal health information systems and stimulation of detection and early intervention of child development based on Android with the aim of getting data on child growth and facilitating access to information for parents. Qualitative research methods with respondents 4 health office data managers, 3 health center locus data managers, 3 locus midwives and 30 parents of children from 3 stunting intervention villages with the FAST method showed that the growth information system is feasible to develop. Quantitative stages with respondents 4 health office data managers, 3 health center data locus managers, 3 midwives. Quantitative data evaluation using the usability method using the PSSUQ measurement component overalls 77.50%, so that the child's growth and development information system falls into the "Eligible" category to be developed because the results of the trials show satisfaction to the user.

KEYWORDS: maternal health, stimulation, early detection, intervention growing, android

INTRODUCTION

Children's health is one of the efforts to create a generation that is healthy, intelligent and qualified. Based on profile data of the Brebes District Health Office, and nutritional status monitoring data from the Family and Nutrition Health Section, the prevalence of stunting in Brebes Regency is still below the tolerance limit for stunting established by WHO, which is 20% of children under five, but Brebes Regency is included in 10 priority districts stunting intervention even though data on stunting prevalence from 2013 - 2017 tended to be static. (Poverty, 2017, Indonesia, 2018) Data for 2013 amounted to 11,494 (10.62%) in 2014 amounting to 11,604 (10.88%), 2015 amounting to 2,647 (14 , 07), 2016 amounted to 3,751 (10.46%), 2017 amounting to 2,653 (10.41%). Brebes Regency for three consecutive years from 2013 - 2017 was in the highest position in the case of malnourished toddlers in Central Java. In 2013 there were 76 cases, in 2014 there were 300 cases, in 2015 there were 82 cases, in 2016 as many as 92 cases, and in 2017 there were 140 cases of toddlers with malnutrition. (Central Java Province, 2013, 2014, 2015, 2016, 2017) From the profile data of the Brebes District Health Office neonatal, infant and toddler mortality rates reported in 2014 amounted to 12.46 with the number of 417 cases, 2015 amounting to 12.13 with the number of cases was 404,

2016 was 16 with 548 cases, and 2017 was 14 with 483 cases. The mortality rate for neonates, infants and toddlers in Brebes Regency experienced an upward trend during 2013 - 2017. Number of neonatal, infant and toddler deaths in Brebes Regency 2017 occupies the highest position in Central Java, but for neonatal, infant and under-five mortality rates is still below the SDGs indicator target, namely for neonatal mortality rate less than 12 per 1000 live births, infant mortality rate 25 per 1000 live births.(Kartini, 2017) Report early growth and detection stimulation program in Brebes Regency in December 2018, there were 7.89% (3 health centre) that did not send monthly reports, 13.16% (5 health centre) there are no data reports. From the program report, it can be seen data on child development deviations for the developmental pre screening questionnaire indicator, there are abnormal results of 0.33%, abnormal hearing power test of 0.0046%, and abnormal see power test of 0.5474%.

Stunting, malnutrition, neonatal mortality rate, infant mortality rate, under five mortality rate a problem that must be solved together through comprehensive programs. (Kabupaten Brebes, 2014, 2015, 2016)

Preventive efforts to improve public health are to provide services for monitoring maternal and child health. Differences and data differences are very possible if the recapitulation of data is done manually. The difference in the results of this data recapitulation will affect the results of data analysis. If the results of data analysis come from invalid and reliable data, the program that will be carried out may not be on target.

Stimulation of detection of early childhood intervention growth is one of the guidelines for monitoring child growth and development. The first five years of life are times that are very sensitive to the environment and this period lasts very short and cannot be repeated. The toddler's period is called the "golden period" ("golden period"), "window of opportunity" (window of opportunity) and "critical period" (critical period). (Ministry of Health of the Republic of Indonesia, 2016)

Children aged 0 to 6 years are a direct target of detection stimulation and early developmental intervention activities, while the indirect targets are implementing health personnel, detection stimulation and early developmental intervention implementing puskesmas heads and managers of family health programs at the District / City and Provincial Health Offices.

The general objective of detection stimulation and early developmental intervention activities is for detection stimulation and early developmental intervention services to be obtained optimally by all toddlers aged 0 - 5 years and preschoolers aged 5-6 years according to their potential. Detection stimulation and early developmental intervention activities have specific objectives such as the availability of references / guidelines, implementation support resources, implementation of activities, availability and implementation of networks and flow of referral for child growth,

implementation of monitoring evaluation and development of detection stimulation and early developmental intervention activities.(Ministry of Health of the Republic of Indonesia, 2016)

Fostering development of toddlers and preschoolers is done to see deviations that occur in growth, development, hearing and vision disorders and mental emotional deviations.

Early detection of growth irregularities is done by examining the nutritional status of children based on the body weight index according to the length of body or weight according to body height for children age 0 - 60 months detection stimulation and early developmental intervention, measurement of children's nutritional status based on mass index body by age (BMI / U) for children 60 - 72 months, examining children's nutritional status based on body length / height index according to children age 0 - 60 months, checking head circumference for children aged 0–72 months.

Early detection of developmental deviations carried out using the pre-development screening questionnaire algorithm is done by giving questions to parents / caregivers by carrying out child checks according to the instructions on the developmental pre screening questionnaire instrument in accordance with the manual. Early detection of mental emotional deviations, is an attempt to detect mental emotional problems, autism and impaired concentration and hyperactivity.

One of the child growth and development monitoring programs that seeks to obtain more valid and reliable data is by managing maternal health information and stimulating detection and early intervention in child development. Therefore, it is necessary to develop the information system with an android-based child growth and development information system that provides information about stimulation detection data and early child development interventions that are integrated with the child's maternal health system in hopes of facilitating information access for parents to obtain information on the growth and development of their children and complete information about child growth data for the health department, so that the data is more valid so that the program to be implemented is more targeted.

METHOD

This research is a qualitative and quantitative study. Qualitative stages are carried out by digging data from informants to see the existing problems, conditions and opportunities regarding the system of recording and reporting maternal health and detection stimulation and early developmental intervention. Quantitative stages were carried out to evaluate the quality of information systems using the usability method with measurements of the PSSUQ system trial (Post study system usability questionnaire).

This type of research uses Action research by monitoring child growth and development data in accordance with his age based on research steps by identifying problems, data collection, design, and application development. This study uses a cross sectional time approach. (Jonathan Sarwono, 2006)

The cross sectional approach is an approach to gathering all types of data at the same time, namely the development of the monitoring the local area information system that has been implemented, complemented by information on detection stimulation and early developmental intervention. Data collection methods used are questionnaires, observations and interviews. The object of the research is an Android-based child growth and development information system and the research subjects are all people involved with the information system of stimulation detection and early child development intervention in the Brebes District Health Office, namely 4 (four) maternal and child health (MCH) book and detection stimulation and early developmental intervention data managers at the Brebes District Health Office , 3 (three) midwives, 3 (three) health center data managers, and 30 (thirty) mothers who came from 3 (three) priority village stunting interventions in Brebes Regency. (Sugiyono, 2011)

Detection stimulation and early developmental intervention data can be obtained from the variable deviation and growth data in the form of body weight (height / weight), measurement of the child's head circumference. Developmental deviation data with child development screening / examination using the Pre-screening Screening Questionnaire consisting of developmental pre screening questionnaire infants aged 3 months, 6 months, 9 months, 12 months, 15 months, 18 months, 21 months, 24 months, 30 months, 36 months, 42 months, 48 months, 54 months, 60 months, 66 months, and 72 months. Data on hearing loss is data on hearing test and visual impairment data are data on power view test.

Data on mental emotional deviations by finding early on the existence of mental emotional problems, autism and impaired concentration and hyperactivity in children, so that intervention can be done immediately. (Ministry of Health of the Republic of Indonesia, 2016)

RESULTS

The development of an Android-based child growth and development information system was developed with the creation of a business process, context diagram or usually referred to as Flow Data Diagram (DFD) 0 (Zero), and Flow Data Diagram (DFD) Level 1.(Studi et al., 2016)

Business processes for the development of an android-based child development information system include 8 screening stimulation detection and early intervention interventions questionnaires, namely examination of body weight / head height, head circumference, developmental pre-screening questionnaire, hearing power test, power test see, questionnaire mental emotional problems, authism for toddler checklist, and attention deficit and hyperactivity disorders

Data Flow Diagrams (DFD) is a diagram that uses notations to describe the flow of system data, whose use is very helpful for understanding systems logically, structured and clear. describes a large circle that can represent all processes contained in a system.

Context diagram is the highest level in DFD and is usually given a number 0 (zero). All external entities are shown in the context diagram following the main data streams leading to and from the system. This diagram does not contain data storage at all and looks simple to create. (Kadir, 2011)(Gupta, 2006) Context diagram of android-based child development information system is as follows:
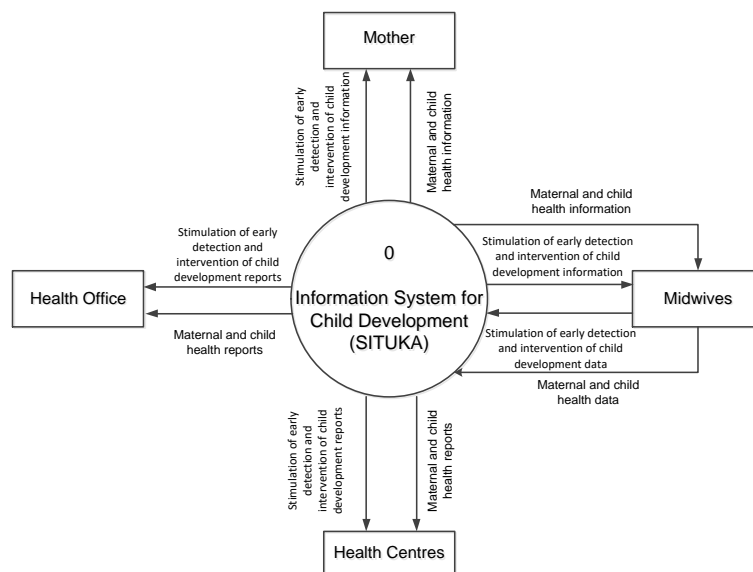
Figure 1. Context Diagram of Child Development Information System Based on Android

Midwives entities in the context diagram carry out data collection in accordance with the criteria for stimulation instruments for early detection of child development interventions, then entry into the system. Midwives have the right to fill in child growth data and see the status of data collection in their area.

Maternal entity on context diagram receiving information on the results of pregnancy examinations, neonatal examination results, body weight / body height charts, immunization notification information, detection stimulation and early developmental intervention examination results. Eligible for access to MCH data and obtaining information on stimulation of growth and development only for their children.

Health centre entities in the context diagram receive detection stimulation and early developmental intervention and MCH reports in their area. Eligible to access MCH and detection stimulation and early developmental intervention information in the region.
The health service entity in the context receives detection stimulation and early developmental intervention and MCH reports. Eligible to access information on detection stimulation and early developmental intervention and MCH in all puskesmas in the region.

Level 1 flow data diagram is a large circle representing small circles inside. Is a solution from the context diagram to the zero diagram. In this diagram it contains data storage. Level 1 flow data diagram android-based child development information system is as follows:
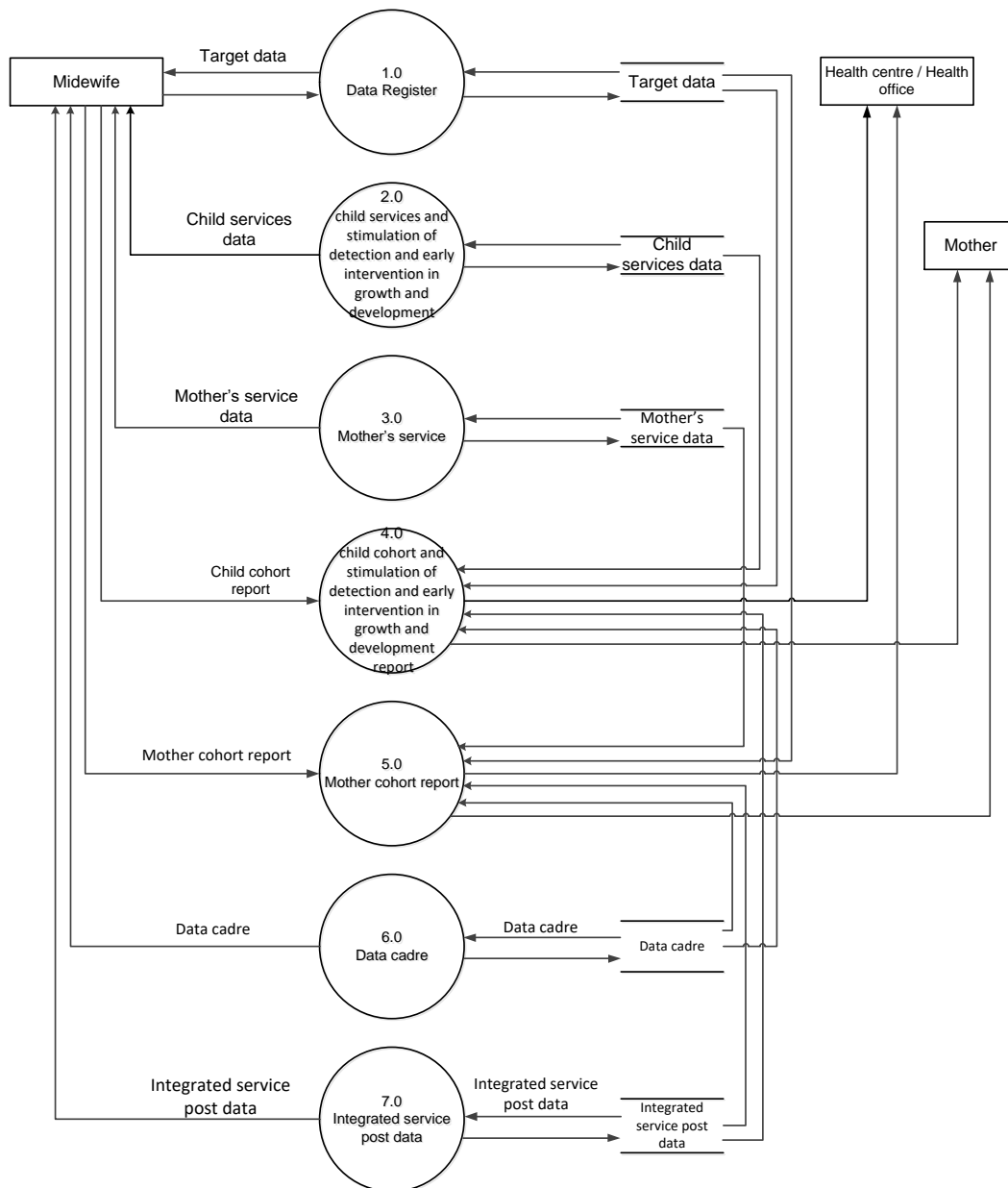
Figure 2. Level 1 Flow Data Diagram of Child Development Information System Based on Android

DFD Level 1 is the result of solving the DFD Level 0 chart or Context diagram. The DFD Level 1 process starts from the target data register process where the midwife fills in the data for wus, pregnant women, toddlers and the results of data reports can be seen by the health centre, and the health office.

Midwives input toddler examination data which includes immunization, neonatal toddlers, examinations. The results of the toddler data report can be seen by the health centre, and the health office. The service process for the midwife's mother fills in the data on maternal care including family planning acceptors, diseases, risk factors, complications, chronic diseases, maternal deaths, causes of maternal death, postpartum visits, complications, maternity services. The results of the prenatal data report can be seen by the mother in question, the health center, and the health office.

In the Child Cohort Report and detection stimulation and early developmental intervention the Puskesmas data manager fills in the contents of the table in the child cohort and detection stimulation and early developmental intervention reports which include baby cohort reports, child cohort reports, detection stimulation and early developmental intervention reports, and card to health charts. The results of the report can be seen by the health centre, and the health office.

In the maternal cohort report health centre data manager fills in the table in the maternal cohort report which includes maternal cohorts, delivery summaries, MCH services, MCH Recap, reports on risk factors for pregnant women, early detection of high risk of pregnant women. The results of the report can be seen by the health centre, and the health office.

Midwives fill in cadre data which includes name, telephone number, name of intergrated services post, kelurahan, and status. The results of cadre data recapitulation can be seen by the health center, and the health office.

Midwives fill in the integrated service post data which includes the name of the intergrated services post, contact person, telephone, address. The results of the integrated service post data recapitulation can be seen by the health center, and the health office.

Interface design or interface is a media in the interaction between users and systems that are built. The design of the user interface aims to create an effective communication medium between humans and computers. A software engineer designs the user interface by implementing a process that refers to predetermined design principles. Interface design of a software is very important if the software that is built is difficult to use, then the presence of a software interface will facilitate users in terms of usage.(Cresswell, 2012)

The login page is the initial display form of the android-based child development information system application. To run this application, please log in by entering your username and password first.

There are 4 types of users in this information system, the first is the type of service, the health center, midwife and mother. The appearance of the login page can be seen in the picture below.
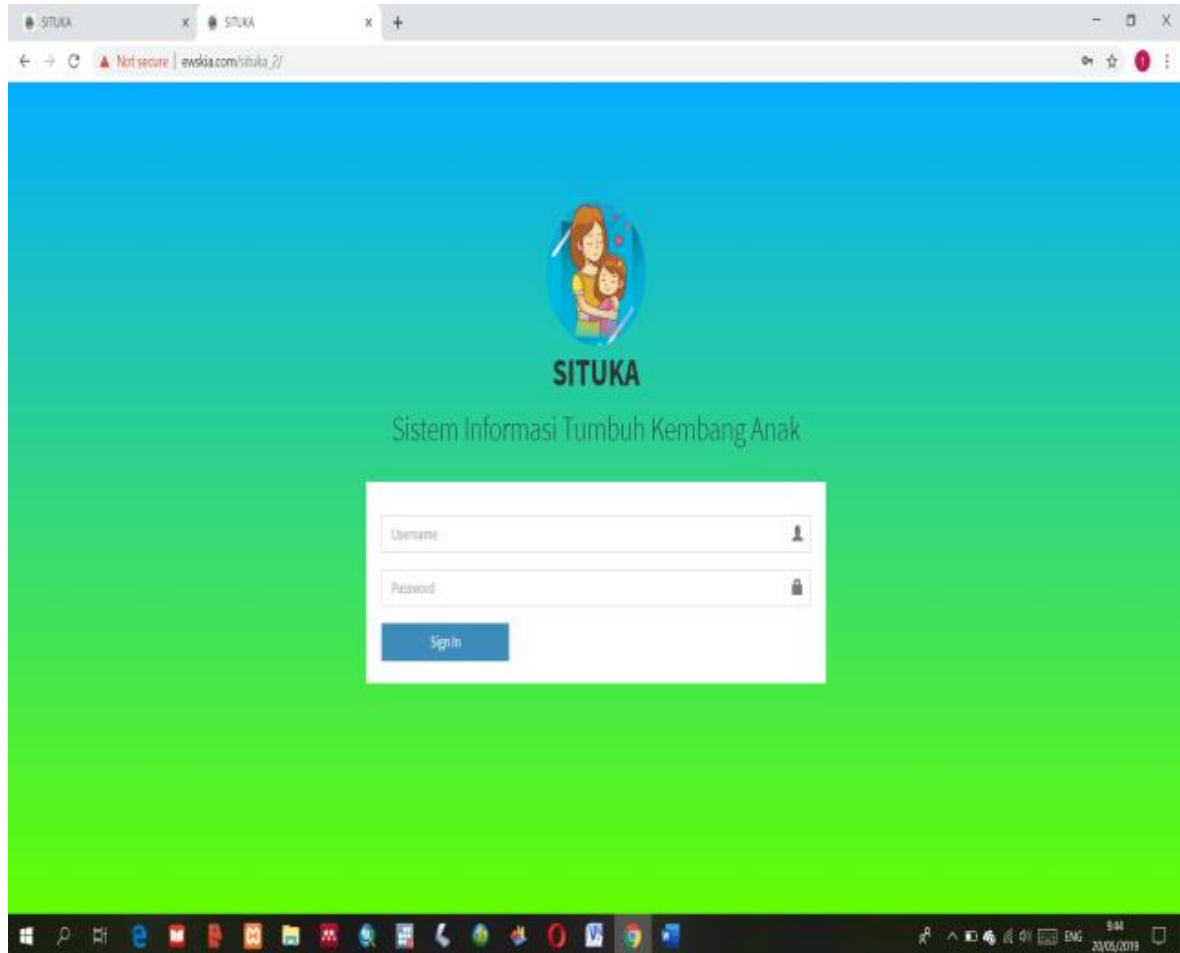
Figure 3. Login page

The next page after the login is successfully processed is the main page. This page has a menu beside, and a dashboard (information) including information about women of childbearing age, pregnant women, maternal deaths, toddlers, stimulation of detection and early developmental intervention, and infant mortality. Menus that can be accessed include data registers, child services and stimulation of early growth and development detection and intervention, maternal services, children's cohort reports, maternal cohort reports, cadre data and integrated service post data. The main page display can be seen below:
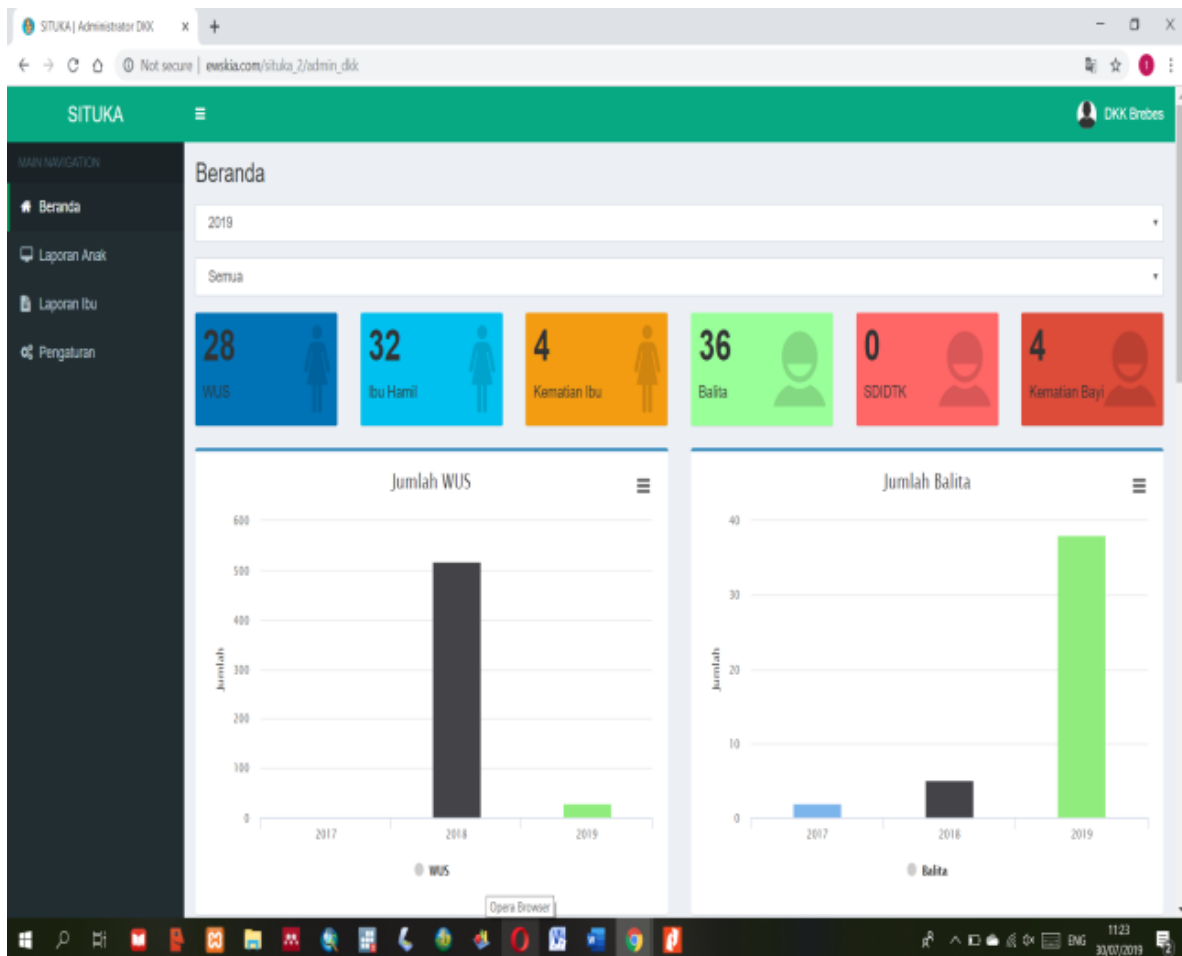
Figure 4. Main page

The first menu is a data register; there are 3 submenus, namely a register of women of childbearing age, pregnant women register, and Toddler register.

The women of childbearing age submenu is a page to display the registration of women of childbearing age which contains data on names, Reg IDs, population numbers, telephone number, addresses, actions and added data. Add data in the form of name, nickname, name, date of birth, marital status, education, occupation, religion, blood type, telephone number, domicile address. The appearance of this submenu can be seen in the picture below:
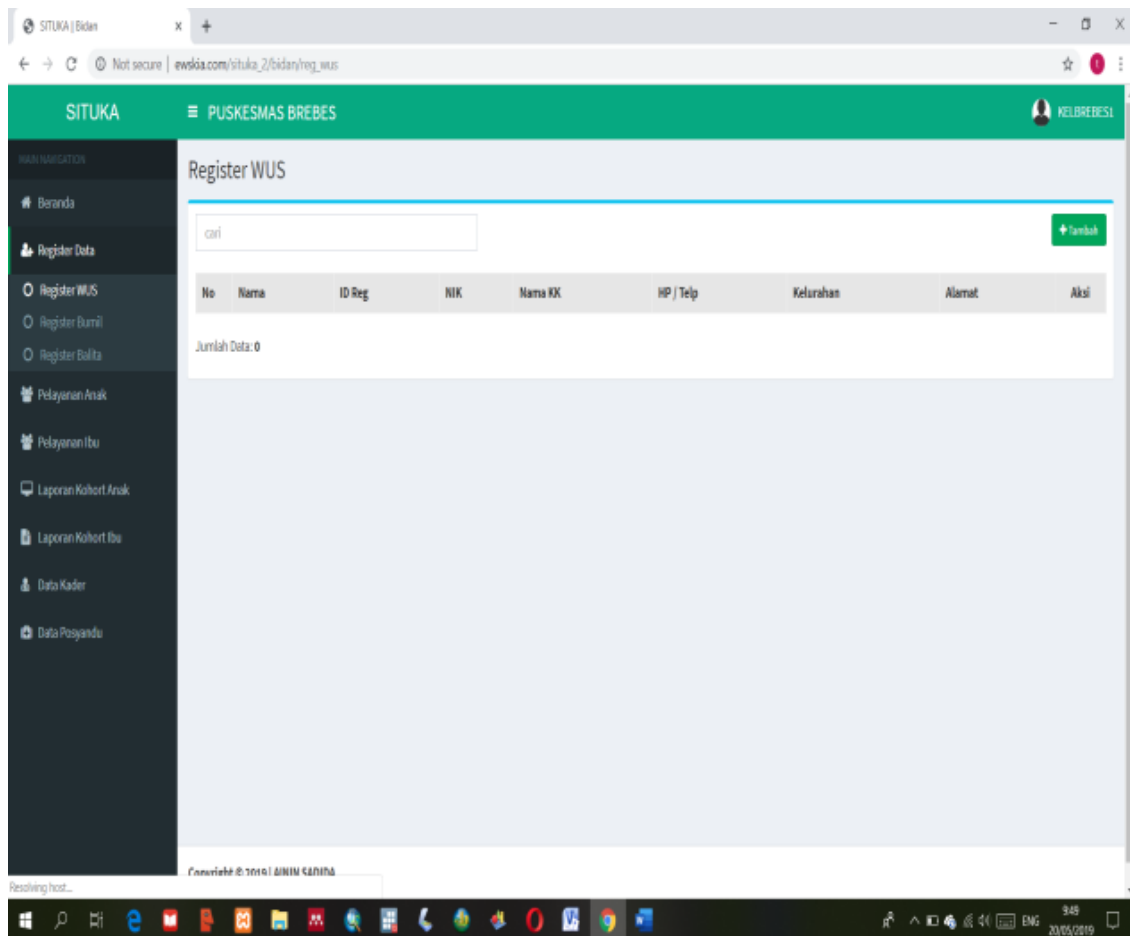
**Figure 5. Submenu Register women of childbearing age**

The Pregnant Women Register submenu can display data on women of childbearing age who have been filled and women of childbearing age are pregnant, so the self-identity data for women of childbearing age will immediately appear in the pregnant women register if the midwife fills in pregnancy data during the examination visit. The first appearance of the pregnant women register submenu consists of numbers, names, parent numbers, age, households, address, estimated days of birth, high risk, actions and added data. Add data in this sub-menu in the form of integrated service post, cadres, names of childbirth helper, gpa, first-time risk detectors, pregnancy risk factors, previous family planning, upper arm circumference, height, weight, past labor, body weight before pregnancy, past pregnancy distance , living children, number of stillbirths, complications of pregnancy, chronic and allergic diseases, health cards / maternal and child health books, health insurance, health insurance numbers, first menstrual day, estimated birth date, place, prospective companion, transportation, and prospective blood donors. The menu display can be seen in the picture below:
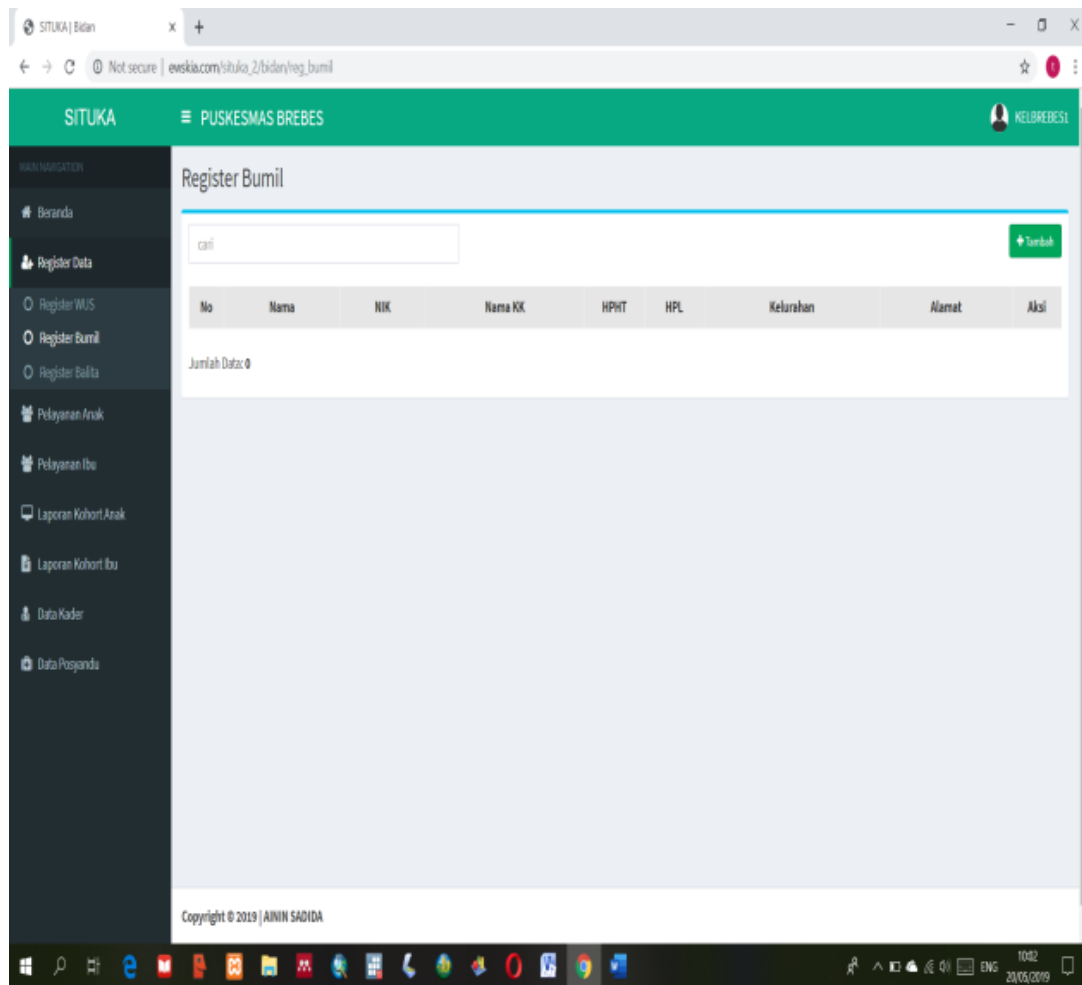
Figure 7. Submenu Register Toddler

The second menu is the children's service menu, in this menu there are three sub menus, namely examination of toddlers and children, neonatal toddlers, and deaths of toddlers.

The toddler examination sub-menu and detection stimulation and early developmental intervention contain information about toddler data, in the form of no, name, population number, family head name, gender, age, number of examinations, actions. On the action icon there will be an added data icon containing the visit data in the form of an examination date, age, weight, height, up, down the red line / below the yellow line, growth and action. In this view, an additional data icon will appear which contains examination data in the form of visit date, weight, height, upper head circumference and stimulation detection questionnaire and early growth and development questionnaire consisting of developmental prescription screening questionnaire, hearing power test, viewing power test , questionnaires on mental emotional problems, and concentration problems and hyperactivity that will appear according to the age of the child being examined.
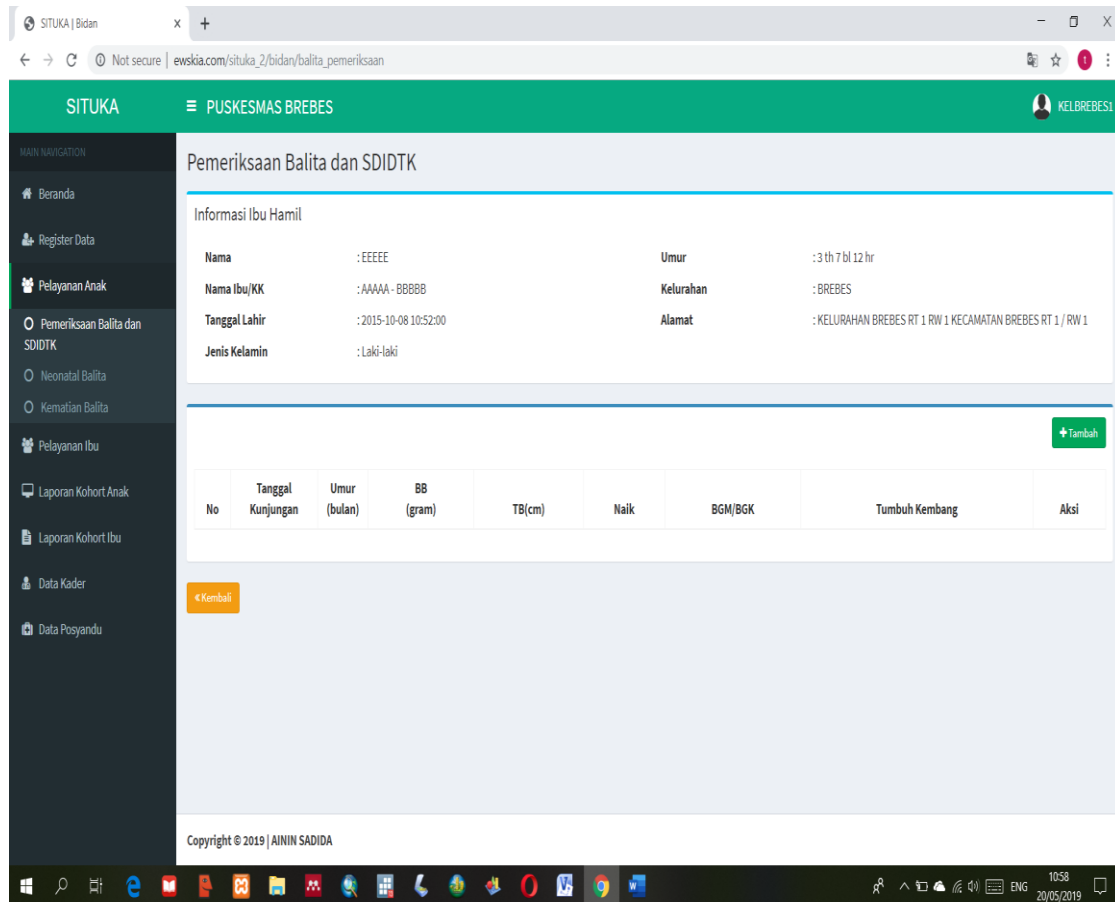
Figure 8. Sub-menu of Toddler Examination and stimulation of detection and early developmental intervention

The under-five neonatal submenu consisted of numbers, names, population numbers, names of family heads, gender, age, number of visits, and actions. In the action icon an added data icon will appear, which when pressed will display the date of visit, examiner, place of examiner, and results.

The toddler death submenu contains information on numbers, names, names of parents, age, house number, kelurahan, date of death and action. In the action icon there will be an added icon in the form of the name of the toddler, the date of death, the place of death and the cause of death.

The maternal service menu consists of submenu pregnant women, blood pressure monitoring, labor, postpartum visits, death of mothers and family planning acceptors.

The initial appearance of the submenu for pregnant women is in the form of data on pregnant women containing numbers, names, family names, age, households, address, estimated days of birth, number of visits, and actions. On the action icon, if pressed, a number, date, gestational age, weight, tension, fetal heart rate, uterine fundus, Fe, immunization, action and added icons will appear when pressed

contains a register of pregnant women performing the examination. The examination included maternal examinations, fetal examinations, laboratory examinations, integration of PMTCT / Malaria / TB programs, ANC services, and other data (first-time risk detectors, pregnancy risk factors, pregnancy complications, and chronic and allergic diseases), referrals, and delivery planning.

The sub-menu of labor at the beginning displays data on maternal labor consisting of numbers, names, names of heads of households, ages, addresses, estimated days of birth, actions and icons added. If the added icon is pressed, it will appear as the initial appearance of the submenu. After we press the action icon, you will see a data entry in the active time, second time, the time the baby was born, the birth placenta, the number of babies born, the presentation containing the baby's position, IV bleeding 2 hours postpartum, active management in IV, delivery date , mode of delivery, delivery helper, place of delivery, address of delivery, service, program integration, risk factors, complications, referral, place of reference, condition of arrival referred to, condition of return referred, death, date of death, place of death, referral, comorbidity , because of death.

The postpartum visit submenu contains data on maternity in the form of numbers, names, family names, age, address, date of delivery, number of visits and actions.

The initial appearance of the maternal death submenu shows the maternal mortality data containing information on the number, name, family name, age, household, address, date of death, action and added icon. If the added icon is pressed, it will display data if the action icon is pressed, data will appear, which contains the date of death, type of death, place of death, referral, comorbidities, and cause of death.

The initial appearance of the family planning acceptor submenu is in the form of data on women of childbearing age consisting of names, names of heads of households, age, address, number of visits and actions. If the Action icon is pressed, information will be displayed for women of childbearing age and added icons which, when pressed, will display data on participant status, date of visit, return visit, distole, diastole, weight, last menstruation, number of living children, age of last child, method and type of equipment used, duration, breastfeeding, pregnancy, history of previous illness, position of the uterus, signs of inflammation, signs of malignancy, side effects, complications, reasons for dropping out.

The children's report menu display from the account of midwives, health centers and health offices consists of submenu of baby cohort reports, submenu of child cohort reports, submenu of card charts to health.

The baby cohort report can be seen from the accounts of midwives, health centers and health services according to the authority in their area. Contains reports on parent data, and neonatal baby data, data on infant visits, immunization data and post neonatal mortality data.

The submenu display of children's cohort reports consisted of maternal data reports, child data, MCH books, preschool toddler services and death. Child cohort reports can be seen from the accounts of midwives, health centers and health offices according to the authority in their area.

The healthy card heading submenu displays toddler data in the form of names, population numbers, mother's name, gender, date of birth, number of visits and action icons which when pressed on one of the data that already exists will appear a card graph towards health. A health card chart can be seen from the account of midwives, health centers and health services according to the authority in their area.

The submenu of baby health reports can only be seen from the account of the health center and the health department. This submenu contains data on village names, number of target children under five (m / f), number of children under five have MCH books, weight, number of children (m / f), number of low birth weight babies integrated management of healthy toddlers, number of integrated management coverage babies die, (neonatal death in integrated management of deceased infants, integrated neonatal management deaths of referenced infants), the number of integrated management coverage of deceased infants, number of early detection and intervention of growth and development coverage (contact visits, early detection of growth, infant visitation, referral baby visits).

The sub-menu for pre-school and pre-school health reports can only be seen from the accounts of the puskesmas and health services. This submenu contains information about village names, number of targets (m/f), number of MCH books, number of integrated management coverage of healthy babies, number of coverage for early growth and development (contacts 1 and 2 early detection of growth, not referenced), number of deaths with cause.

Baby health recapitulation submenu can be seen from the health service account. The menu display is in the form of recapitulation of data from the health centre baby report menu in one district. The sub-menu for preschool and preschool health recapitulation can only be seen from the health service account. The menu display is in the form of recapitulation of health report data for toddlers and preschool health centers in one district.

The Maternal Reports menu consists of a submenu of maternal cohorts, maternal outreach, MCH services, local area monitoring records for maternal and child health, reports on risk factors for pregnant women, early detection of high risk (pregnancy) for pregnant women. The maternal cohort menu can be accessed from the midwife, health center, and health service account with access in accordance with the duties and authorities in each work area.

The maternal cohort report submenu contains information on identity, history of pregnancy, risk factors, information on high risk, detection of risk factors, immunization, maternal visits, birth attendants, final pregnancy outcomes, maternal conditions, and Vit A bufas <42 days.

The maternal report submenu consists of data on pregnant women, a history of pregnancy, the location of the fetus, information about babies, mothers who died <42 days, references, and information.

The MCH service submenu contains reports on midwife services, maternity homes, private practice doctors covering urban data, tetanus toxoid immunization in pregnant women, visit 1, visit 4, high risk pregnant women, new babies, mothers giving birth, low birth weight babies, and stillbirths.

The submenu of the recapitulation of local area maternal and child health consisted of information on target villages, number of visits 1 and visit 4, number of detection of histories, number of visits and number of deliveries by health workers. The report submenu of risk factors for pregnant women shows the risk reports of pregnant women in the form of the number of pregnant women who have risk factors based on the Poedji Rochjati score consisting of 94 risk factors.

The submenu of high risk early detection of pregnant women displays the index number, the identity of the mother, reports the number of pregnant women detected at high risk with a score of the research score in the low, high and very high categories.

The check menu for mother checks and stimulation of detection and early intervention in child development is a menu intended for mothers or parents who want to know the results of the examination, the growth and development of their children.

The cadre data menu is in the form of data on the names of cadres, telephone numbers, village name, integrated service post, status, actions and added icons. Integrated service post data menu, which consists of filling in the name of the integrated service post, contact person, telephone number, address, action and added icons.

DISCUSSION

Quantitative stages are carried out during system testing. The success of information systems or software is measured by usability. Usability measurement aims to assess a system can be used properly according to the purpose of making the system. ISO-9421-11 states that a system has good usability if it has effective, efficient, and satisfaction standards. Users should be results oriented and easy to use, and get satisfaction in using the system. (Lestari, 2014) (Jakob Nielsen, 2012)

The measurement of success in the developed system uses measurements of usability quality levels with the Post Study System Usability Quesionnaire (PSSUQ) questionnaire type. PSSUQ was

developed by IBM as a research tool in usability evaluation. Satisfaction assessment with PSSUQ uses usability aspects with four categories, namely uselfullnes (SYSUSE), information quality (INFOQUAL), and overall satisfaction (OVERALL) systems.

The results of the recapitulation of PSSUQ measurements given to respondents are as follows:

Table 1. Results of PSSUQ Measurement Recapitulation

Question		Scale				Total
		1	2	3	4	
Sysuse		0	0	77	3	
Total Score		0	0	231	12	243
Higest Score		10	8		4	320
Eligible Percentage						**75,94**
Infoqual		0	0	67	3	
Total Score		0	0	201	12	213
Higest Score		10	7		4	280
Eligible Percentage						**76,07**
Interqual		0	6	24	0	
Total Score		0	12	72	0	84
Higest Score		10	3		4	120
Eligible Percentage						**70,00**
Overall		0	0	9	1	
Total Score		0	0	27	4	31
Higest Score		10	1		4	40
Eligible Percentage						**77,50**

In the PSSUQ measurement recapitulation table based on the grouping of questions and scales, it can be seen that the results of the measurement of each question from the calculation of the Likert scale interpretation on the table show that the information system of child development is included in the "Eligible" category because it is appropriate with system development needs.(Studi et al., 2016) Information quality information systems for child development are included in the "Eligible" category to be developed because the quality of information is easy, accurate, and in accordance with the needs and timeliness of data presentation. Interface quality information system for child development is included in the category "Eligible" because it shows the quality of the system interface that is attractive and easy to operate. Overall satisfaction of the child's growth and

development information system is included in the "Eligible" category because the overall assessment of the PSSUQ questionnaire shows satisfaction with the information system manager.

CONCLUSION

The conclusions of the development of this information system are (1) The information system for child development at the Brebes District Health Office uses manual recording and reporting, and uses software with an excel base. (2) Based on observations and interviews with respondents using the theory of FAST development, the design of an Android-based child growth and development information system is created which is expected to support the evaluation of maternal health programs and stimulation of detection and early intervention in growth and development. (3) The information system for child development has features of the veranda, data registers, child services, maternal services, child reports, maternal reports, cadre data, posyandu data, arrangements, results of maternal examinations and stimulation of detection and early developmental intervention. (4) The evaluation method used using the usability evaluation method with the measurement of the PSSUQ trial shows that the "Eligible" child growth and development information system was developed because the results of the trial resulted in the overall information system manager showing satisfaction with the system.

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