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Recording and reporting information system model integrated from midwife practices to public health center

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ABSTRACT

Introduction: Maternal and child health problems (MCH) are still a health problem in Indonesia. The high rate of maternal and child mortality requires intensive intervention and monitoring by the health department through health facilities available in the community. The recording and reporting of the MCH program at the Jagir and Wonokromo Health Centers has not been well documented because most of the MCH program recording and reporting is done manually. The purpose of this research is to produce a model of recording and reporting information system that is useful in handling the recording and reporting process of the integrated MCH program from the Independent Midwife Practice to the Puskesmas.
Method: The method used in the development of this software is the Scrum Management Framework. The result of this research is the SISKIA (Maternal and Child Health Information and Surveillance System) software application which is integrated from the Independent Midwife Practice to the Puskesmas which can be used to manage maternal and child health data.
Results: The SISKIA software application makes it easier to map Maternal and Child Health data, including in high-risk cases, in order to get health services according to the schedule determined by the midwife. SISKIA can directly assess the condition of mothers and children reported by the midwife and can be accurately displayed on the map included in SISKIA installed at the Jagir and Wonokromo Health Centers. Mobilization of the entire community in reducing MMR and IMR in the Jagir and Wonokromo Health Centers can be carried out by monitoring maternal health conditions in the surrounding environment by using this software application.
Conclusion: The Maternal and Child Health Information and Surveillance System (SISKIA) has proven useful for obtaining regular and up-to-date maternal and child health data.

Keywords: recording, reporting, maternal,child, information systems.
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INTRODUCTION

Health is one of the keys to successful development. This can be seen from the state of health of human resources who carry out the development of a nation. The health of human resources must be considered since the beginning of their pregnancy. The beginning of a good life can be seen during a mother's pregnancy.[1]

Reducing maternal mortality (MMR) and infant mortality (IMR) is one of the targets of the Millennium Development Goals (MDGs). There are eight goals in the MDGs, two of which are related to improving maternal health and reducing infant mortality. Meanwhile, in the health sector, the emphasis is on reducing maternal and infant mortality caused by pregnancy and childbirth.[2]

In the 2015-2019 National Medium-Term Development Plan, the government's target is to reduce the MMR from its initial status of 346 per 100,000 live births to 306 per 100,000 live births. The Infant Mortality Rate (IMR) shows the number of deaths of infants aged 0 years out of every 1000 live births in a given year or it can also be said as the probability of a baby dying before reaching the age of one year expressed as per 1000 live births. The infant mortality rate is an important indicator to reflect the state of health status in a society, because newborns are very sensitive to the environmental conditions where their parents live. The government's target in the 2015-2019 National Medium-Term Development Plan, the government is targeting a reduction in the IMR from 32 per 1000 live births to 24 per 1000 live births.[2]

During the last 3 years (2017-2019) the maternal and infant mortality rates in East Java province tended to decline. Although the MMR achievement has met the target of the strategic plan and the Inter-Census Population Survey, which is 89.81 per 100,000 live births, efforts must still be made to reduce the MMR. Likewise, the IMR in East Java province is at 23 per 1000 live births, already below the national target but efforts must still be made to reduce it.[3]

Based on this, efforts are needed to anticipate maternal and infant mortality by developing a model recording and reporting system to map risk factors including the maternal and infant cohorts. The development of science and technology, especially information technology which is increasingly rapidly in all fields, is inevitable. Information technology is a tool to simplify, speed up and tidy up work, apart from that information technology can also allow information to be accessed in real time without being limited by space and time.

Advances in information and communication technology must also be able to be utilized by any institution to improve the ability to obtain, process, manage and distribute information and public services.[4] Two main factors that affect the competence of an institution are information technology and human resources. Therefore, in each institution in any field currently competing in the sector of information technology excellence for reasons of efficiency and development of product and service capabilities.[5] To develop a recording and reporting system by utilizing advances in information and communication technology, the health center must carry out a transformation process by developing and improving the quality of public services effectively and efficiently based on electronics.[6]

The transformation strategy to change conventional public services into electronic-based public services is carried out by following a framework called e-framework which includes the telematics implementation cycle (e-cycle) and the scope of telematics implementation (e-scope). The stages of the e-cycle cycle include: e-transform (change the mindset of management and employees), build (build an information system that suits the needs on a limited scale), run (operate the information system that has been built), and leverage (take valuable experience). to support transformation on a larger scale).[7]

The purpose of this study is to develop a model of recording and reporting system that can simultaneously map risk factors and cohorts of mothers and infants based on continue of care as an effort to reduce maternal and infant mortality. As well as to provide access and convenience for all elements involved in efforts to reduce maternal and infant mortality in a more structured and measurable manner

METHOD

General Background of Research

This research consists of two stages. The first is the research phase using a qualitative research design. With the interview and observation method to describe the system of recording and reporting maternal and child health activities from the Midwife who owns the Independent Midwife Practice to the Community Health Center. The study was conducted in March-June 2021.

Sample of Research

The population and sample in this study were the midwives who owned the independent practice of midwives and the midwife in charge of the MCH program at the Jagir and Wonokromo Health Centers.

Instrument and Procedures

The instruments used were a list of questions used in interviews, a checklist of observation documents for recording and reporting of MCH activities, the number of deliveries, the number of abnormal deliveries, the number of live births, the number of mothers referred along with their abnormalities, the number of pregnant women, childbirth, postpartum, infants and couples of childbearing age served and types of services provided.

Data Analysis

The second stage of this research is the step of developing a model for recording and reporting information systems. Overall in the development of this system, the methodology that will be used is the Scrum Management Framework. Scrum is a simple framework, one of the software engineering methods using the principles of the AGILE approach, which relies on the power of team collaboration, incremental products and iterative processes to realize the final result. This recording and reporting information system model will be made web and android based which can be accessed in real time by several users. Each user can access and fill in from their respective computers and mobile phones and download the results of report management in a predetermined format.

RESULTS

1. Overview of the Recording of Maternal and Child Health Activities at the Jagir and Wonokromo Health Centers
   Maternal and child health efforts have been well structured and have been accompanied by good recording methods. but there is one weakness of the various systems for recording and reporting maternal and child health activities that exist so far is that there is no integrated recording of maternal and child health in one complete format. For this reason, it is important to develop an information system that is able to accommodate the need for recording and reporting comprehensive maternal and child health activities in order to facilitate the management of maternal and child services so as to reduce the occurrence of complications and reduce maternal and child mortality.
   Recording and reporting are activities that cannot be separated from service activities. Data generated from the process of providing health services. The principle is that recording and reporting must be easy to do, no duplication, no overlap, not too burdensome for service providers so that validity and reliability are maintained.
2. Analysis of the System for Recording and Reporting Maternal and Child Health Activities at the Jagir and Wonokromo Health Centers
   The system analysis activity is intended to describe the current information system for recording and reporting maternal and child health activities. System analysis is the first step that must be done in developing an information system. Through system analysis, the strengths and weaknesses of the current system can be identified, so it can be concluded about the need to develop a new information system, especially a recording and reporting system on maternal and child health.
3. The existing system for recording and reporting maternal and child health activities at the Jagir and Wonokromo Health Centers

The maternal and child health program at the health center is implemented as one with the maternal and child health program at the Maternal and Child Health polyclinic. Briefly the service can be described as follows:

Based on the results of the Focus Group Discussion (FGD) at the Jagir and Wonokromo Health Centers, information was obtained that the recording and reporting system related to maternal and child health services is currently running as follows:

a. Mother and Baby Register
   A register is a sheet of paper or a book that is printed and designed to contain individual data values. The register is used to record selected data that will be processed into reports. So registers do not replace existing program records.
b. Mother and Baby Cohort
   The cohort design is the same as the register, the difference is in terms of the timing of data recording and data utilization. Cohorts are used to record events that occur in episodes of pregnancy and infancy. It is easier for the cohort to monitor the progress of a pregnant mother and baby, making it easier to analyze, compile reports and follow-up plans.
c. Mother and Baby Card
   This card is in the form of a note sheet for babies at the health center. This card is filled out every time the baby makes a visit. Data is filled in based on the results of the baby's examination since the baby's first visit at the health center or integrated service post.
d. Recapitulation of mother and baby service activities
   Recapitulation is an intermediate record to facilitate data verification and facilitate report generation. The recapitulation can be used to: verify the register or cohort, cross-review the results of the recapitulation with the recording media, evaluate whether the recording procedure is in accordance with the implementation instructions and as a source of data for compiling reports.

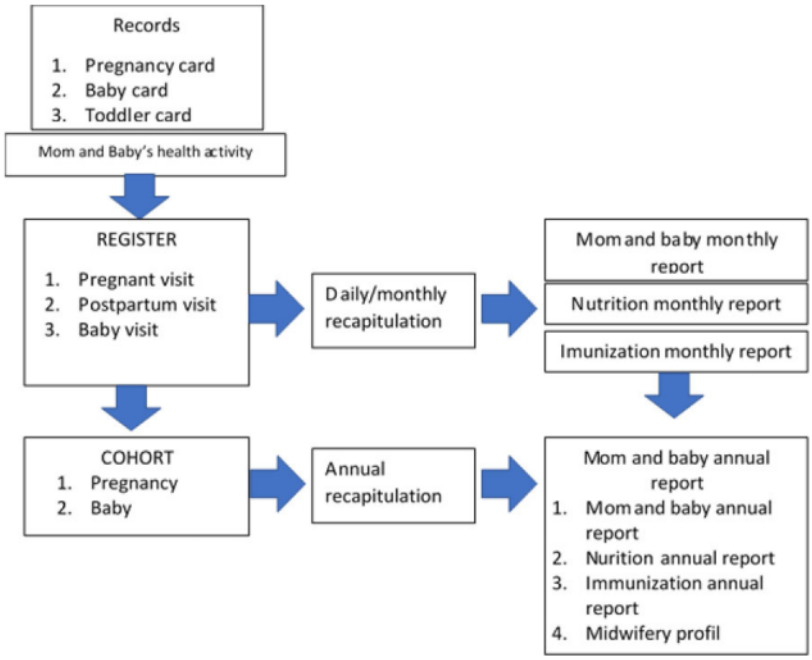

Figure 1. Maternal and Child Health Services at the Health Center Jagir and Wonokromo.

e. Mother and baby activity report
   Reports contain standard forms according to their needs, which can be in the form of daily, weekly, monthly, quarterly, semester and annual reports. Sources of data for reports are registers/cohorts and their recapitulation results. One recapitulation result can produce more than one report. Likewise, on the other hand, reports can also use data sourced from more than one recapitulation result.
   The system for recording and reporting maternal and child health activities has been able to provide several types of data needed for monitoring maternal and child health. To achieve sustainability, the effort that needs to be done is to create a data link between data on mothers, babies, toddlers, school children and adolescents. This link is needed so that tracking health conditions becomes easier and the service process for everyone can be carried out in a complete way

4. Design of the Maternal and Infant Cohort Information System Model Based on Continue of Care at the Jagir and Wonokromo Health Centers

The system designed is a sustainable system based on a continue of care model. Recording is done since the baby is born and continues until the baby is 12 months old. Recording is done every month when the baby visits the health center or independent practice midwife. With a web-based system, it is hoped that this system will facilitate the performance of officers in recording and also facilitate data processing so as to produce the required information. However, it takes a high commitment from program holders and field officers so that the program can run optimally.

The system design stage is carried out after conducting a system analysis. At this stage, the system design includes what variables will be included in the system design system, the flow of data into information, how to input variables, and so on. So it is necessary to prepare a Data Flow Diagram (DFD) that is appropriate and includes all the variables needed to develop an information system.

Based on the results of the preparation of the DFD, an assessment is carried out whether the prepared DFD

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is in accordance with the system requirements and can be carried out in the field. In addition, improvements were also made regarding the entities contained in the DFD, whether they already cover all the things needed or there are several more entities that need to be added.

The results of the assessment will later be developed again into the next stage of DFD which can show the flow of data in the system. The flow describes how data is processed starting from the input stage, processing data, to producing information. The stages in the process are explained in detail so that there are no errors when developing the system

5. A brief overview of the SISKIA software

SISKIA software is software that functions as a tool that can be used to record pregnant women at the Jagir and Wonokromo Health Centers. SISKIA software can be applied to android smartphone devices so that it can make it easier for users, in this case midwives, to record pregnant women and babies in their working area. The front view of SISKIA will show the same format as the complete form of the mother and baby cohort along with instructions for filling it out. In data input, options are given as facilities that make it easier for the user, so there is no need to write a lot, just choose one or several available options, there is also an extra box form to add other information that is not available in the selection box earlier.

For the convenience of the user, filling in the recording and reporting can be done at any time which can then be stored temporarily which, when finished, can be saved and uploaded. The report format that has been saved and uploaded can be viewed and downloaded by the Midwife who is in the Health Center

DISCUSSION

This research was conducted in several stages, namely data collection and system development stages. At the stage of data collection the researchers used the interview method, document review and direct observation. The system development carried out is a stage of the preparation of an existing system into a new system in order to improve the performance of the system and the quality of the information produced.[7]

At the system development stage, the researcher uses a software application in the form of the SISKIA software application. Not all of the application development can run automatically, some data processing still requires data input accuracy before being processed automatically such as determining K1 and K4.

1. Analysis of recording and reporting of data on maternal and child health activities at the Jagir and Wonokromo Health Centers

   The recording and reporting activities carried out by the Midwife who owns the Independent Midwifery Practice to the Jagir and Wonokromo Health Centers are carried out in a simple system, namely that health workers record the results of services on the mother's card and transfer them to the cohort at the end of last month and recapitulate in a report format to be submitted to the Puskesmas at the end of the month. Then the midwife recapitulates the data from the clinic/midwife in her working area manually on the register. The presentation of the resulting data is only in the form of numbers. The presentation of data in the form of graphs is made only when needed.

   The problem in data management is the verification of reports from the Clinic or Midwife so that they are not efficient at work. In terms of data calculation, midwives must carefully select patients who are in their area so that it can affect the quality of information. These problems can affect the quality of the information produced. Insufficient quality of information can also influence decisions to intervene in the program.

2. SISKIA software application (Maternal and Child Health Information and Surveillance System)

   In general, SISKIA software or Maternal and Child Health Information and Surveillance System is a web and mobile-based computer software designed and developed as an integrated system solution. This information system is a three-layered architectural application. The system application interface is translated (rendered) to the user's computer as a web page so that what the user (end user) needs is only the user's computer that has a web browser installed (eg: Mozilla Firefox, Chrome, etc.). This interface was developed with HTML (Hypertext Markup Language) and JavaScript. The application logic is placed on a server side script.

   The system and infrastructure needed is a computer or workstation that is used by users to access the features and functionality of the information system. SISKIA is an application developed by combining a web application and a mobile application based on Android OS (operating system). For a web application, it basically only requires a web browser and a computer that is connected to a web server either through a Local Area Network (LAN) or a Wide Area Network (WAN). For the mobile application, a smartphone based on Android OS is required.[8]

   SISKIA can be implemented on a computer as a single server as well as a single client. All necessary software is installed in one machine. To be able to be used in a LAN environment, this system requires a computer network has been installed and each computer is connected to the network. This system can also be deployed in a WAN such as the internet. For this type of deployment, the web server where the application is placed (hosting) must be accessible via the internet.

   It is recommended that users access the program from a separate client computer from the server to perform transactions. The client computer is connected to the server computer via a LAN network or the internet. This aims to reduce data damage due to viruses and so on.

   SISKIA applications that are implemented in general must meet several needs which include the following:

   a. Computer network (LAN or Intranet)
   b. Database servers, application servers and workstation computers

that function as application entry points are connected to one computer network via LAN, WAN or the internet

c. Real time data, where every data change/data transfer is done in real time/directly
d. Security: can handle security issues by: Unique UserID/password) that distinguishes access rights from users, access control (multilevel management and access rights), data integrity, non-repudiation (logbook)
e. User profile: the number of users is not limited by software but is limited by the specifications of the hardware used, each user can have a unique userID and password with different authorities according to their duties and responsibilities.
f. User interface: in general must meet the requirements: effective and efficient in describing and presenting processes or data, user friendly and easy to use based on graphics.

CONCLUSIONS

The SISKIA software application makes it easier to map Maternal and Child Health data, including in high-risk cases, in order to get health services according to the schedule determined by the midwife. SISKIA can directly assess the condition of mothers and children reported by the midwife and can be accurately displayed on the map included in SISKIA installed at the Jagir and Wonokromo Health Centers. Mobilization of the entire community in reducing MMR and IMR in the Jagir and Wonokromo Health Centers can be carried out by monitoring maternal health conditions in the surrounding environment by using this software application. With the increasing number of Android smartphone users, the dissemination of information contained in the SISKIA software will be easier, more practical, faster and up-to-dateTherefore, further research is needed to find out other factors that affect the use of SISKIA software application to map Maternal and Child Health data.

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AUTHOR CONTRIBUTION

All authors contributed to this study's conception and design, data analysis and interpretation, article drafting, critical revision of the article, final approval of the article, and data collection.

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CONFLICT OF INTEREST

There is no conflict of interest in this manuscript.

ETHICAL CONSIDERATION

This study has been declared ethical by the Ethical Commission for Health Research of the Universitas Nahdlatul Ulama Surabaya.

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