Society-Based Hospital System Improvement: Model Finding with Technology Perspective

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Abstract---Health problems faced by people in developing countries, especially pregnant women, have their own dynamics. The government as the party that has the authority in terms of alleviating problems related to the future of this nation is certainly always trying to make various strategic steps in anticipating existing problems with various policies. One of the policies carried out by the Cirebon local government related to issues related to the high maternal mortality rate, one of which was to initiate a society-based hospital policy. The implementation of the policy is expected to be accelerated with appropriate and targeted technology. The selection of appropriate and targeted technology and in accordance with business processes developed from existing policies is expected to solve problems better.

Keywords---Pregnant woman, High maternal mortality, Society-based hospital.

I. INTRODUCTION

The Society-based Hospital Policy [1] is a breakthrough in the field of health which has been perceived as a barrier in anticipating the high rate of maternal mortality. The implementation of this policy has created a new paradigm in health services. In general, health services in Indonesia are served in stages from the Puskesmas to the referred hospital if the equipment or medical personnel are inadequate to take action on patients.

This mechanism was less successful when applied to pregnant women. Various suggestions from medical personnel at the Puskesmas to see a specialist doctor at the referral hospital regarding the patient's condition did not get a positive response. The arrival of referral patients from the puskesmas will certainly add to the burden of the Hospital in serving patients which sometimes only requires consultation with a specialist doctor not to perform medical actions that require special equipment that is only available in the Hospital.

The application of the Society-based Hospital policy in Cirebon Regency / City has changed the flow in serving patients, especially pregnant women. Every patient who comes to the puskesmas will be examined either by a doctor or midwife at the puskesmas. Inspection results will be stored in a cohort book that is stored at the Puskesmas. The book will be analyzed periodically to see indications of pregnant women who have a high risk of pregnancy. If there is indeed a high risk of predisposition to the patient, the officer at the Puskesmas will make a schedule of doctor specialist visits according to the field and cluster of the referral hospital.

After obtaining an agreement on the schedule of the visit with the relevant specialist doctor, the information regarding the schedule of the visit will be distributed to the patient. Dissemination of this information is done by directly visiting the patient or by text message or by posyandu cadres in the patient's environment. Consultation between pregnant women and specialist doctors will be carried out at the puskesmas where pregnant

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women usually check the contents. The Consultation was carried out referring to the examination data of pregnant women written in a cohort book during routine visits to the puskesmas.

I.I. Objectives

In a previous study [2], it was found that the possibility of applying the RSBM policy by integrating technology without having to violate applicable rules. The research that will be carried out will look for an integration model that will be used in implementing the system to support the main functions of the system, including 1) Input and ease of access to data by the rightful parties in accordance with their access rights, 2) Dissemination of information from specialist doctor visits to mothers pregnant who needs further consultation with a specialist doctor.

II. LITERATURE REVIEW

II.I. Electronic Health Records (EHR)

The scope of the research carried out basically utilizes some of the features of Electronic Health Records which have various advantages [3] when compared to manual recording (Fig.1), including:

- Improved Data Accessibility

  Utilization of information systems allows the opening of access to data for parties concerned in a system. Granting access rights that are in accordance with the rights and interests of the stack holders will provide adequate privacy for the data. The function of the system is adjusted to the need to achieve the objectives to be achieved in the application of Society-Based Hospital policies. The level of access rights of the system will also refer to the specific interests of each stack holder and refer to the job description they have. But the principle of effectiveness and efficiency in the application of the system remains a major concern.

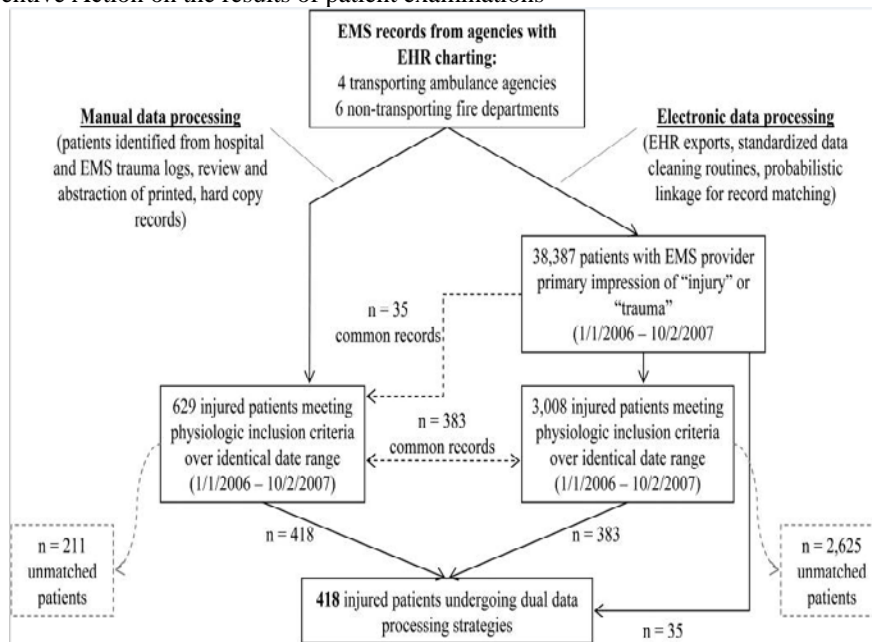- Perform Preventive Action on the results of patient examinations

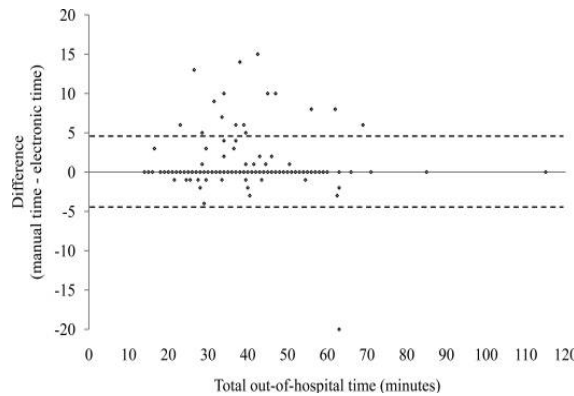**Figure 1:***Patients data processing schematic .[3]*

Figure 2:*Hospital time interval (in minutes) [3]*

Data storage carried out at the health center on the results of patient examinations will be stored in cohort book. This book will be used as a reference during further examinations either by a doctor at the health center or during a specialist doctor's visit. There are things that are very risky for monitoring the development of pregnant women health. Data related to the results of periodic checks, stored in a different record. To track how the development of pregnant women, the puskesmas will trace the patient's record. The search carried out certainly requires a lot of time and effort. Storing the examination data in the electronic data store will give a chance to interested parties to access easier (Sulianta, 2019). With minimum effort, more data can be reviewed either by the health center or when visiting a specialist doctor. This certainly will be able to produce maximum preventive action towards patients.

- Entry and verification of patient examination data
  Every pregnant woman who does a periodic examination will be recorded in a cohort book. The process of recording patient visit data in a cohort book requires accuracy and carefulness in using terms that can be understood by those who will later also search the data in the book. Besides that, neatness in carrying out disability must also be a necessity in recording data (Fig.2). Utilization of Electronic Health Records will provide convenience in data entry. Data in each attribute can be displayed specifically, so as to avoid the use of terms that are not in place. This will certainly be able to maintain the validity of data stored in the system and avoid storing data that is useless or meaningless.

In addition to the various advantages of Electronic Health Records, there are also various things that need attention from the application of this technology, including:

- High system investment costs
  The system of recording data on visits of pregnant women in the cohort book is still a mainstay of health centers in Indonesia. Recording this book is considered the easiest to use by health workers in puskesmas. In addition to the easy utilization of records in cohort books, cohort books can also be obtained at a low cost. But behind the convenience offered by this cohort book, there are various obstacles in making quick access to information needed related to the patient's condition. Searches related to patient information must be seen per record when the patient visits the puskesmas. The use of computer technology will certainly be able to help accelerate access to information on patients so that various preventive measures can be taken to avoid undesirable things happening to pregnant women. Inventory to implement technology to support the implementation of society-based hospital policy certainly requires no small cost. But if the application of this technology can be integrated and used by various related institutions that need it, of course, this can be felt cheaper. The results obtained from the application of this system can certainly achieve the goal of implementing a society-based hospital policy, which is to reduce the high maternal mortality rate.

- Requires time for user training
  Filling in data on visits of pregnant women to the puskesmas is routine work and has been studied by medical staff at school. This is certainly not a difficult one, but sometimes there is a human error sometimes simple things can also experience errors when filling in the cohort book. The use of technology can provide information related to data that should be filled in certain attributes and provide brief information related to the

meaning of the data entered into the system. The amount of lecture material that is solid to meet the competency criteria of medical personnel becomes an obstacle when establishing the system. This is caused by the competence being ignored, for example, competency in the use of computer-based systems. So that in the application of society-based hospital systems will require additional time to provide additional competence to be able to use the system properly. But of course, this is comparable to the benefits gained in the future.

II.II. Internet and Cellular Network

Utilization of network technology in connecting various types of equipment has now become a necessity. The development of technology is very rapid, pushing the government and service provider vendors competing to provide the best service to users.
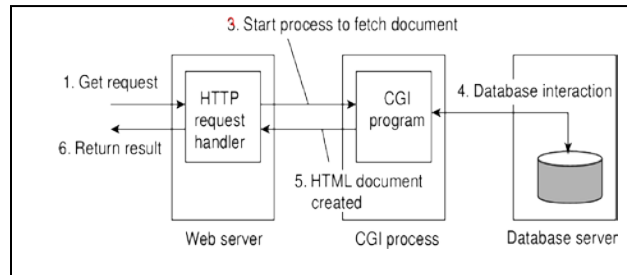

Figure 3:*The principle of using server-side CGI programs. [4]*

II.III. Internet Network

Utilization of the internet (it becomes a necessity to be able to increase the ease of accessing information contained in the system (Fig.3). Open access to data contained in the system [5], the stack holder that requires information in the system, it will be easier to get information. Various efforts in carrying out various preventive actions can be carried out with the youthful access to the system.

The system developed today is very full power with the ease of integration. Although the system was developed by different vendors, it is possible that the system can be integrated. The development of a society-based hospital system really requires service from the vendor of the SMS server gateway. This is to facilitate the dissemination of information to pregnant women who have problems related to specialist doctor consultation visits that have been scheduled by the puskesmas.

The existence of an API service provider for SMS gateway has been able to cut the development time and complex integration with various vendors (Fig. 4). Information dissemination services supported by good infrastructure have accelerated the dissemination of information needed by pregnant women.

According to data obtained from the government [5], access to the internet has been very good in the island area with 92.4% for access via mobile broadband and 13.5% through fixed broadband (Fig.5). The existence of these facts, will further pave the way for the development and application of policies related to society-based hospitals that are integrated with technology.

II. IV. Cellular Network

Massive and rapid dissemination of information must consider the availability of technology found in certain areas and basically, cellular devices generally have this technology feature [6]. This consideration will make it easier to disseminate information without fear of platform unavailability. These days, the mobile cellular network in Indonesia in general still serves from 2G-4G and varies greatly in availability in certain regions.
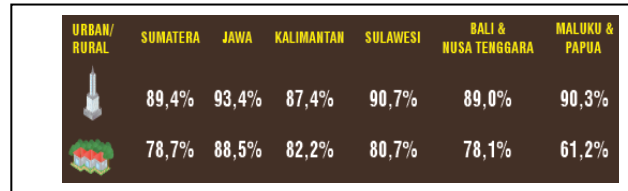
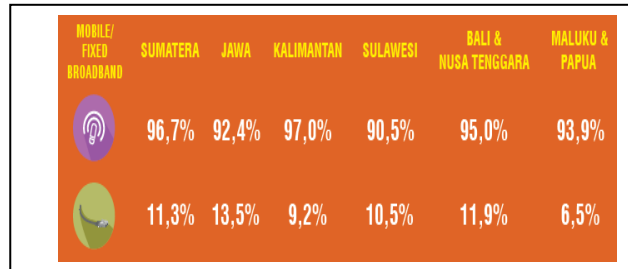**Figure 1:***Cellular Access by Island in Indonesia . [5]*

Figure 1:*Types of Internet Service by Island in Indonesia . [5]*

Utilization of information dissemination that is used in a society-based hospital system will only use the most basic technology that is currently provided by cellular service provider vendors, namely 2G. This is with the consideration that all current mobile devices can be sure that all of them support technology with the 2G platform (Fig.5).
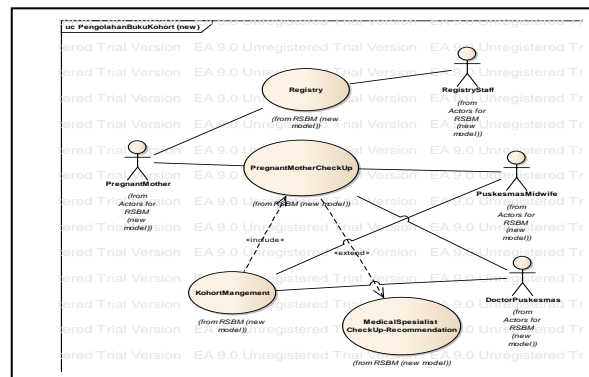

Figure 1: *Pregnant Woman Data Entry*

III. METHODOLOGY

Based on the results of previous studies [2], the research activities will use qualitative methods with a case study approach. The current subject of research is not only at the Kesuean puskesmas, but also has involved the Public Prosecutor's Puskesmas which is also found in Cirebon City.

Observations and interviews with stack holders in the field
Conduct discussions and verification of the model developed

III.I. Society-Based Hospital Improvement Model
The implementation of society-based hospital policies and the main functions that will be part of the system becomes important to achieve the goals of the system. Model development will also pay attention to the availability of

existing technology, and will be considered for the successful implementation of the system. The discussion will be divided into several sections so that it can provide a fairly detailed picture related to the flow of the system.

III.II. Pregnant Woman Data Entry

In the pregnant woman data entry function (Fig.6), pregnant woman actors will be divided into 2 groups, namely groups that have been previously registered and groups that have never been registered in the system. For groups that are not yet registered, it is expected to fill in various data related to partners and support conditions. This mechanism also applies if there is data to be updated.

After the registration process is complete, pregnant women can do the inspection at the appointed time. Field or clinic doctors will conduct an examination of pregnant women. The results of the sprinkling are then entered into the system. The stored data is not local but is placed in cloud computing for easy access and integration.
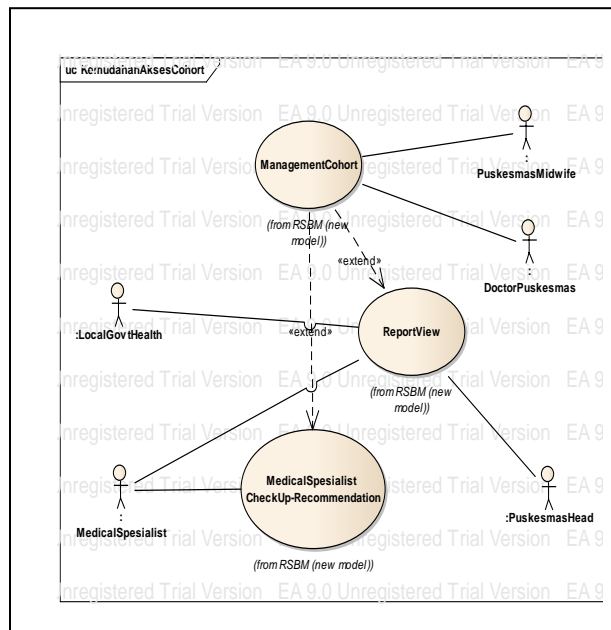

Figure 1: *Easy Access of Information*

III.III. Easy Access

Periodic inspection of pregnant women by midwives and doctors at the puskesmas then the data will be entered into the system. The information is then displayed according to the needs of the stack holder who wants to learn it (Fig.7).

In addition to the cohort data entry and view process that can be performed in this function, other important In addition to the cohort data entry and view process that can be performed in this function, other important functions are related to the results of examinations performed by specialist doctors. This function will record recommendations from specialist doctors regarding further actions taken against pregnant women if needed. This is expected to be a preventive measure against the continuing problems faced by pregnant women.

III.IV. Dissemination of Specialist Doctor Visit Information

Utilization of technology in the application of society-based hospital policies will provide a new facility for interested parties to always be able to monitor the latest condition information from pregnant women as a result of routine visits to the puskesmas (Fig.8).

Any need related to the need for consultation for pregnant women based on the results of the examination, it will be scheduled in the system. There will be coordination with specialist doctors from cluster hospitals that have specific competencies related to problems faced by pregnant women at the puskesmas. After obtaining an agreement on the visiting schedule, the schedule was considered to have been verified. In order to avoid miss communication with the hospital of the cluster hospital where the specialist doctor is assigned, the hospital is also given access to view the visit schedule earlier.

The agreed schedule will then be distributed through a system that automatically distributes the schedule of specialist doctor visits to the puskesmas. This mechanism utilizes API technology with paid SMS gateway service providers.
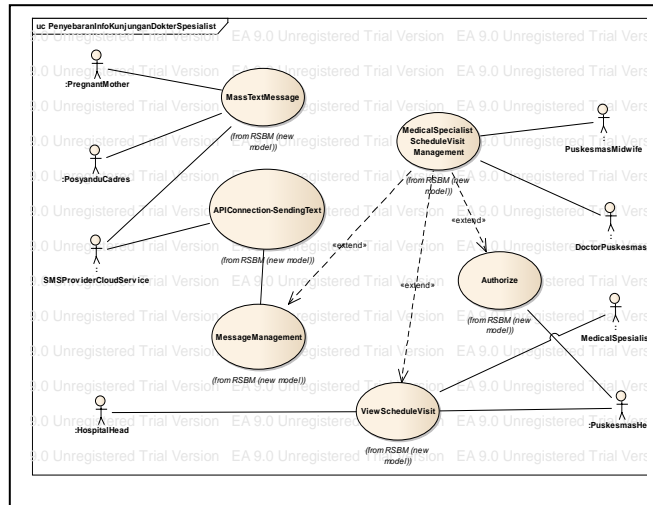

Figure 1:*Dissemination of Specialist Doctor Visit Information*

Information on this visit was not only obtained by pregnant women but also obtained by Posyandu Cadre. This is to anticipate the information that was not received to the mother concerned.

IV. CONCLUSION AND SUGGESTION
This study provides an overview of the system model that will be developed by integrating technology to support the application of society-based hospital policies.

IV.I. Conclusion
The design of a system model basically refers to supporting all the main functions needed for policy implementation.

I.1.1 The system model supports the entry and view functions in accordance with the access rights of the stack holder. This is expected to be able to divide tasks and responsibilities between operational, managerial and strategic levels.

I.1.2 The system model has provided a flow of functions to schedule specialist doctor visits and disseminate information to pregnant women who need consultation. This is expected to be a process of anticipation and solution to problems faced by pregnant women [8].

IV.II. Suggestion
The results of this research will be a reference for the next research, including:
Development of a Prototype Society-Based Hospital System.
Test the Developed Model and Prototype.

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