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DEVELOPMENT OF THE DOCTOR'S OFFICE QUALITY-INFORMATION TECHNOLOGY (DOQ-IT) IN EFFORT TO INCREASE PATIENT SECURITY

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Abstract. The community has the right to get quality and affordable health services. One effort to realize quality health services is managing of patient data, by utilizing information technology. Doctor's Office Quality-Information Technology (DOQ-IT) application is an electronic medical record application that resides on a doctor's personal computer. This application include clinical decision support system to increasing patient safety. The purpose of this study is to develop a Doctor's Office Quality-Information Technology (DOQ-IT) Application to Improve Patient Safety. Aplication development used waterfall methode. DOQ-IT application has clinical decision support system in the form of Determination of nutritional status, blood pressure, family history of a disease such as Diabetes, stroke and includes the reaction of drug content to the patient's allergic history. So that, the DOQ IT application can improve the quality and safety of patients.

1. Introduction

The community has the right to obtain quality and affordable health services[1]. Quality of health services is a step towards improving health services both for individuals and for the population in accordance with the expected health outcomes for the latest professional knowledge. The provision of health services must reflect the accuracy of the use of knowledge [1], so that the services provided are truly appropriate and can guarantee patient safety.

The use of resources and activities that are very complex in a hospital or clinic, has the potential to cause errors, such as misdiagnosis, over-standard prescription or excessive doses that have serious or fatal consequences for patients[1]. According to the House of Commons Health Committee Patient Safety Sixth Report of Session 2008–09 Volume I stated that in London 10% of patients treated in hospitals suffered enormous damage and that some of these damages could be avoided, tens of thousands of patients suffered enormous losses each year 4. Previous findings of the report IOM (Institute for Medicine's) in 1999, namely deaths due to 'Medical error' reached 98,000 people, losses between $ 17-29 Million and the most Contributor is 'Medical error'[2].

Medical records are records of patients data or records of who, what, why, when, and how the services provided to patients during the treatment period that contain knowledge about the patient and the services it receives and contain enough information to identify patients, justify the diagnosis and treatment and record the results[3]. According to Permenkes no 269 of 2008 concerning medical records states that medical records are files containing records and documents about patient identity, examinations, treatment measures and other services that have been provided to patients[4].

Medical record documents must be filled out by a doctor or dentist. Every medical record must be given the name, time, and signature of the officer who provided the service or action. The contents of the medical record are confidential, the medical record belongs to the doctor, dentist, or health care facility,

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while the contents of the medical record are the property of the patient [5]. The recording of the medical record starts from the time the patient comes to the registration window until the patient returns. A patient will get a system unit of medical record, so that the medical record data are the patient's medical history that are valid for life. Data of deceased patients will be deactivated and will be destroyed based on certain provisions.

Patient data in the hospital are the patient history, especially medical history. Therefore, medical record documents must be complete, timely, available at any time needed so that a good medical record will be very supportive in clinical decisions support system to patients, such as examinations and therapies according to the patient's current condition and not forgetting the previous medical history, which in ultimately better guarantee patient safety. Efforts to support medical records that are complete, timely, and available at all times, it is necessary to help electronic medical records, so as to produce integrated care.

Health service facilities must organize electronic medical records in accordance with Permenkes no 269 of 2008 Chapter II article 2 that: "The organization of medical records using electronic information ptechnology is regulated further by separate regulations" [4]. This is supported by ITE Regulation No. 11 of 2008 concerning information and electronic transactions must be written or original information. Electronic Information and or Electronic Documents are considered valid as long as the information contained therein can be accessed, displayed, guaranteed integrity and can be accounted for so as to explain a situation. Electronic signatures also have legal force and legal consequences as long as they meet the following requirements: Data on making electronic signatures related only to the Signatories, data on making electronic signatures during the electronic signing process are only in the power of the Signers, all changes to signatures electronics that occur after the signing time can be known, any changes to the Electronic Information related to the Electronic Signature after the signing time can be known There are certain ways that are used to identify who the Signer. there are certain ways to show that the Signatory has given approval to the related Electronic Information [4].

Electronic medical records are information systems that have a broader framework and fulfill a set of functions, according to Amatayakul, electronic medical records must meet the following criteria: Integrate data from various sources (Integrated data from multiple sources), collect data at the point of service (Capture data at the point of care), support service providers in decision making (Support caregiver decision making), electronic medical records contained in a system specifically designed to support users with various facilities for the completeness and accuracy of data, giving alert or warning signals, have a system to support clinical decisions and link data with medical knowledge and other aids. Clinical decision support system is a computer system designed to take clinical decisions for doctors against their patients. This system aims to reduce medical errors [6]. The main correlating factors for successful CDSS implementation are: Automatically giving reminders/ reminders as part of the workflow, giving advice on the time and location where the decision being carried out, providing follow-up recommendations and computerizing the entire service process.

Some things that need to be considered in the design of CDSS implementation, namely the health service workflow, so that the system will be made in accordance with the workflow, the data that will be input in the CDSS system such as patient history data in electronic medical records, so that it can be integrated in the system and can be used as a guideline for the assessment or enforcement of diagnoses and therapies, the presence of reminder / alert built in the system, so that the CDSS is more effective in increasing patient safety, reminder as a sign of being alert to drug interactions that can cause allergic reactions to patients or conflict with history previous patients also had duplicate examinations.

2. **Research Methodology**

Aplication development used waterfall methode. Analysis system by interview 2 doctors at clinal education at Politeknik Negeri Jember. System design, coding and system functionality testing was carried out in the computer laboratory of the Department of Health, Politeknik Negeri Jember. The method used waterfall.

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Collecting data. Primary data in this study by brainstorming with 2 doctors. The data collected included qualitative data on the DOQ-IT application needs.
Secondary data in this study is the DOQ-IT menu of references and databases Laboratories, Radiologies and their threshold values.

Data processing and analysis ware performed to determine user needs in the design of DOQ-IT applications. It also analyzed the suitability of user needs by reference. The system design was in the form of drawing a flowchart system, context diagram or DFD level 0, DFD level 1 and ERD used Microsoft Visio and power designers.

3. **Results And Discussion**

The medical records currently used in most hospitals are paper medical records, so that if there are deficiency in filling or missing data, it will be difficult for doctors to provide therapeutic decisions and follow-up in treatment. The current medical record cannot be used as a clinical decision support and also cannot be used to predict a risk of disease. The usage of CDSS in clinical and healthcare settings is increasing. It has been shown that the incorporation of CDSS can significantly improve health outcome indices. However, authorities shall establish standards and quality control systems to evaluate and integrate development and implementation procedures of CDSS[7].

Respondents 1 and 2 want an electronic medical record to be developed that has an interface design that makes it easy for users. The application needed is an integrated application that is accompanied by a clinical decision support system in the form of worning of risk. This means that the DOQ-IT application that will be developed can support clinical decisions in accordance with the concept of CDSS (Decision Support System), namely by inputting clinical symptoms and signs as well as laboratory and other supporting results, data input into computer machines in the CDSS program, then computers based on knowledge derived from patient data bases in electronic medical records as well as previous diagnosis and therapy data bases provide inference mechanisms, so that decisions on diagnosis, therapy and recommendations for patients are obtained. CDSS has the ability to make conclusions. Therefore it is very important to build knowledge in the system so that it can produce the right clinical decisions patient or contrary to the previous patient's history also duplicate the examination. DFD is a modeling tool that allows professional systems to describe the system as a network of functional processes that are connected to each other with data flow either manually or computerized [8].

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Data Flow Diagram

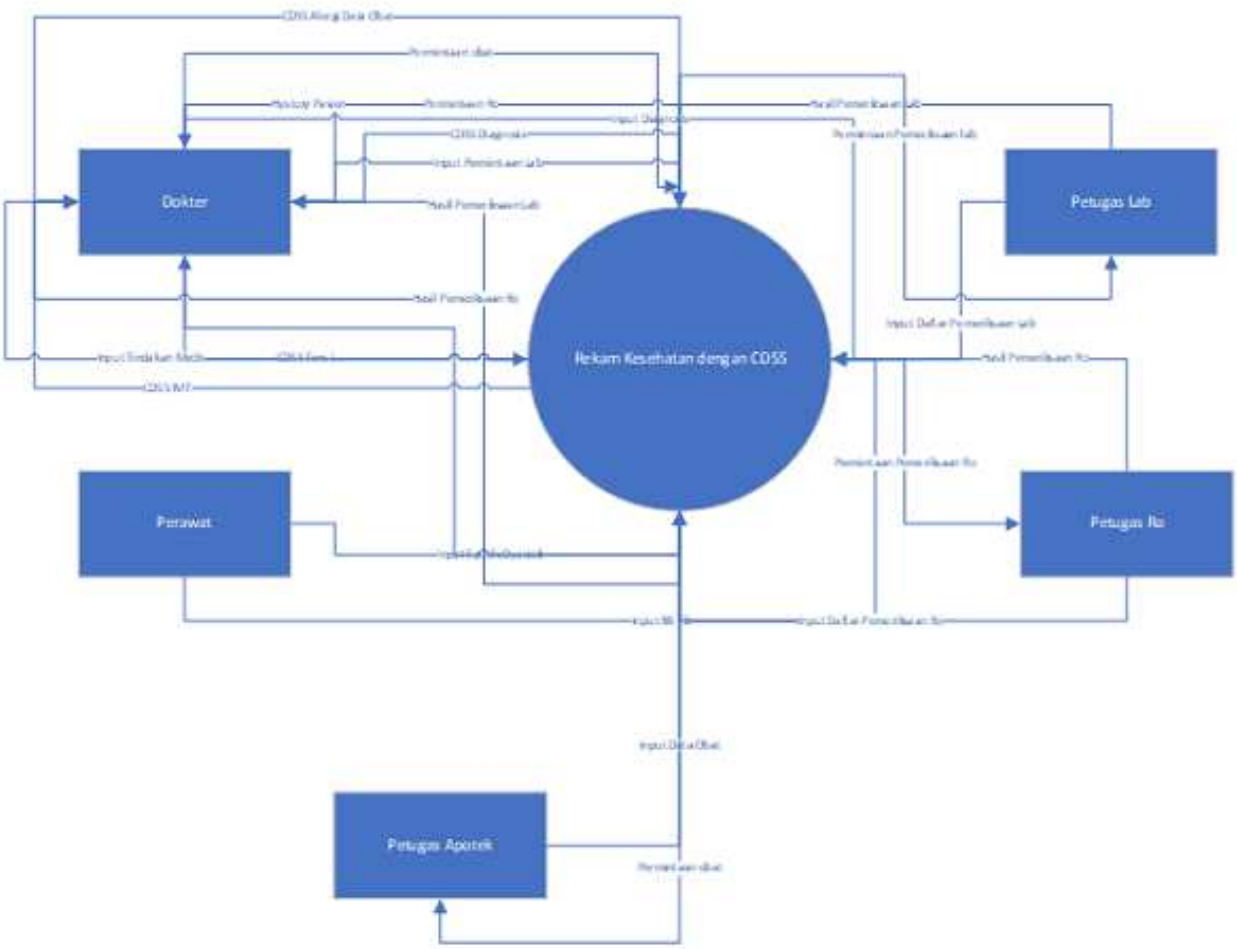

Figure 1. Level 1 DFD DOQ-IT Aplication

Sound on Fig 1. , it can be concluded that there are 5 entities in the DOQ-IT application, namely doctors, nurses, pharmacy officers, laboratory officers and radiology officers. Nurses input history and physical examination results in the form of Weight, Height, Systolic Diastole. The doctor can input diagnosis data from the results of clinical examinations and physical examinations that have been done before. The doctor can also provide an introduction for investigations to the laboratory and radiology. Laboratory and radiology officers receive examination requests from doctors. The doctor can directly obtain the results of the examination from the laboratory and radiology, and the system will automatically provide a conclusion to the results of the examination, that the patient is at risk or not to a disease. The doctor can also input the drugs needed by the patient. But if there is a drug content that turns out to cause an allergic reaction, the application will display worning in the form of red writing on the inputted drug. the pharmacy officer will give the medicine according to the request of the medicine that was entered by the doctor.

Entity Relationship Diagram (ERD)

Entity Relationship Diagram (ERD) is familiar diagram which aims to present the database structure in Conceptualized form [9]**.**

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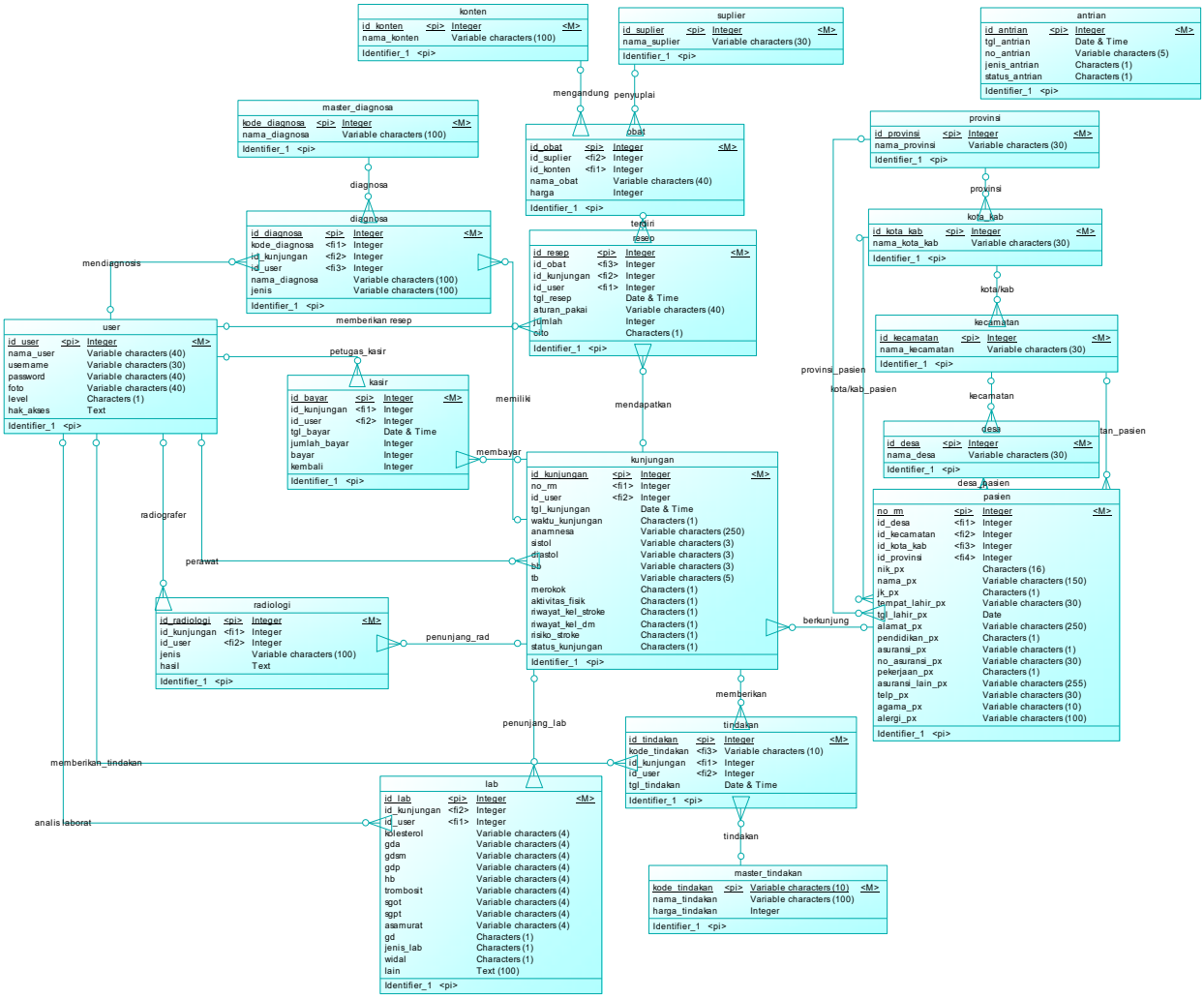

Figure 2. Entity Relationship Diagram (ERD) DOQ-IT Aplication

Sound on Fig 2. Digitalization in health care and benefits for patient safety [9]. there are benefit of DOQ-IT application for patient: Care team identification in DOQ-IT Aplication, it based list during patient rounds and handing over to other health care professionals, Therapy drug monitoring reports in DOQ-IT Aplication, It based interventions and It can prediction of diseases as type 2 Diabetes and Stroke. Besides that, sociotechnical models of EHR use point to complex interactions between technology and other aspects of the environment related to human resources, workflow, policy, and culture, among others [10].

4. Conclusion

DOQ-IT application is an electronic medical record application that has a clinical decision support system in the form of Determination of nutritional status, blood pressure, family history of a disease that are Diabetes, stroke and includes the reaction of drug content to the patient's allergic history. so that the DOQ IT application can improve the quality and safety of patients.

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