Analysis And Design Of Inpatient Daily Census Information System In Bhayangkara Bengkulu Hospital

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ABSTRACT

Background: Progressing technology in the world need to fast and accurate information in the hospital agencies as the basis for appropriate making decision. The inpatient daily census reporting of system Bhayangkara Hospital Bengkulu don't have utilized the Inpatient Daily census system electronically and still uses a manual system, so that the processing of report data is less than optimal. There are still a lot of inputting errors, inaccurate data, and inefficient time and energy. This study to aim design system information inpatient daily census reporting application at the Bhayangkara hospital to existing problems solving.

Methods: The method used in designing and making this application is by utilizing software development methods, namely the waterfall method which includes identification, analysis, design or design, implementation and maintenance of the system.

Results: The results this study is creation of an application to facilitys the processing of data into an inpatient daily census report that is needed and to overcome the problems that arise because of the report processing system manually. Design and Creation of Inpatient Daily Census Applications with Visual Basic 6.0 Programming at Bhayangkara Bengkulu Hospital have been made with the results of an analysis of existing systems and according to the method used, and the design of the forms that have been made in accordance with the manual form or home party needs sick and can simplify filling out forms and processing the data.

Conclusions: At Bhayangkara Bengkulu Hospital still uses a manual inpatient daily census system, and not on time for reporting daily cencus patient data. The data structure contained in the ledger consists of patient identity, patient diagnosis, and others. There are three processes in the stage of analyzing the needs of the inpatient daily census system, namely the data input process, data processing and data output processes. ledger, patient data consisting of patient identity, doctor's name, patient diagnosis, treatment room, and treatment class. In designing the daily inpatient census system at Bhayangkara Bengkulu Hospit consists of patient data forms, incoming patients, outgoing patients, and patients moving. The implementation of the daily inpatient census system at the Bhayangkara Bengkulu Hospital has carried out socialization and discussions about the user interface design to officers or users of the electronic daily census system. And the maintenance of the daily inpatient census system is carried out in several stages (1) corrective, by correcting design and errors in the program, (2) adaptive, by modifying the system according to user needs, (3) perfective, namely processing census data computerized.

Keywords: Analysis, System design, Electronic Medical Record, Hospital.

INTRODUCTION

Many works related to the integration and interoperability of systems, especially within the healthcare services, had been conducted in Indonesia. Hospital is a health service institution that provides complete individual health services that provide inpatient, outpatient and emergency care. The task of the hospital is to carry out efficient and effective, harmonious and integrated health efforts with efforts to improve and prevent and carry out referrals. The function
of the hospital is to provide medical services, support services, repair services, rehabilitation services, and disease prevention services. Hospital is an institution that is multi-product, capital-intensive, laboratory-intensive, and technology-intensive, so it must be good management and services.¹

To carry out the function of the hospital as a place to provide health services and hospital service activities in the form of outpatient services, inpatient services and emergency services which include medical services and medical support. Therefore, in supporting medical activities, the hospital is obliged to organize medical records. Medical records are files that contain notes and documents about the patient's identity, examination, treatment, actions and other services that have been provided to the patient. Organized medical records is an activity process that begins when the patient is admitted to the hospital, continues recording patient medical data as long as the patient receives medical services at the hospital, and continues with the handling of medical record files which includes storage arrangements to serve requests from patients or medical records. For this reason, the medical record services provided must be of high quality and in accordance with existing service standards.¹

Quality of medical record services are reflected in friendly, fast, and customer feel comfortable. So that it produces a use value, evidence in court for a criminal or civil case, used as a basis for research in the field of health, as educational material for a disease, as documentation of services provided, as accountability, and as material for making reports on hospital service indicators. Utilization of information technology using a good system is the right solution in an effort to improve service quality, coordination, efficiency, responsibility, supervision and provision of information quickly, precisely, and accurately. The need for an information system at the hospital has even been established as an obligation, where each hospital is required to record and report all hospital operations in the form of a hospital management information system.¹

Availability of Hospital Management Information System as a support can improve performance and services and improve hospital key performance index (KPI). One of the uses of information technology (IT) in the health sector that is becoming a trend in health services globally is electronic medical records. Inpatient daily census is an activity to cencus or count inpatients which is carried out every day in an inpatient room. The daily inpatient census contains transfers of patients in and out for 24 hours starting from 00.00 to 24.00. To aim find out information on all patients who enter and leave the hospital for 24 hours.²

Based on the results of pre-research at Bhayangkara Bengkulu Hospital, it was found that Bhayangkara Bengkulu Hospital haven’t utilized computer-based information systems to process daily census data, where in processing daily inpatient census data was still done manually by recording data. Based on the results of interviews with medical records officers, it is known that recording activities are also not carried out every day only recordings are carried out when requested by the hospital service quality department. So that the data provided is not accurate because the daily census data has not been recorded completely. This manual inpatient daily census system still has weaknesses such as frequent errors in recording, long data searches, loss of data/books, data duplication, data storage that is not well coordinated, data processing is less effective and efficient, and data is not consistent. Problems in processing daily inpatient census data are very influential in the activities of making internal reports at the Bhayangkara Hospital of the Bengkulu Police. For this reason, a daily inpatient census data processing design is needed that can produce the information needed quickly, precisely and accurately in submitting reports to the leadership. The purpose of designing the daily inpatient census system is to analyze and design the daily inpatient census system at Bhayangkara Bengkulu Hospital

METHODS

The design used in this research is descriptive correlation with a cross sectional approach. Descriptive correlation is a research method that aims to see the relationship between two or more variables. Meanwhile, Cross Sectional is a way of collecting data at once with the aim of
seeing the relationship between nurses' knowledge of medical records and completeness of filling in nursing care documents. The method in this research is a qualitative descriptive method, which is a series of activities or processes to reveal information processed in enforcing solutions that are used as the basis for designing information systems by applying the stages in the SDLC to stage 5, that is:
1) Preliminary studies;
2) problem analysis;
3) Needs analysis;
4) Design analysis;
5) Design.

RESULTS

1. Identifying, Selection, and Planning the Daily Inpatient Census System at Bhayangkara Bengkulu Hospital

The results from the interviews with staff data processing officers at Bhayangkara Bengkulu Hospital regarding the processing of inpatient daily census data, it is known that the daily inpatient census data processing is still done manually, where the daily census is written in a ledger, the daily census recapitulation form is not yet available. Hospitalization daily census of inpatients is often late and sometimes not filled in so that information about the daily census data is often inaccurate and no on time.

Inaccurate and not on time in the processing daily inpatient census data of patient data entering and leaving the hospital, patient data moving and being transferred consisting of patient identity data items, patient diagnoses. Therefore, it is necessary to plan for the development of an inpatient daily census information system. The planning in designing the daily inpatient census information system at Bhayangkara Hospital includes several planning needs, including:

   a. Software requirements

      In designing information systems, several supporting software are needed including:
      1. Microsoft Windows 7 Ultimate Operating System
      2. Case studio to create Context Diagram, DFD and ERD.
      3. Microsoft access 2007 as database.
      4. Microsoft Visio 2007 to create Document Flow and System Flow.
      5. Visual Basic 6.0 to create an information system interface design

   b. Supporting Hardware

      The hardware used to be supporting software in designed daily census information system at Bhayangkara Hospital includes:
      1. Personal computer (Laptop) with intel "pentium" processor T4300
      2. 1,800 MHz FSB
      3. VGA 32MB bit
      4. 1GB Memory
      5. 14.0 inch HD LED
      6. 250GB Harddisk

   c. User

      Design of the information system created will be used by:
      1. Inpatient Room Officer at Bhayangkara Bengkulu Hospital as a supported in carrying out daily work in making daily inpatient census.
      2. Medical record officer at Bhayangkara Bengkulu Hospital as a supported in making inpatient daily census recapitulation.
      3. Programmers as reference material in making daily census applications for inpatients
at Bhayangkara Bengkulu Hospital.

d. Information system user need

The information needs for both the medical records as the manager of information and reports. To The medical records as recipients of information as well as other parts involved is information related to the implementation of examinations and making reports that are able to display information faster and issue reports more accurately

e. Information system constraints

Information give on data processing in the ward and medical records is still being processed manually. So that the requirements needed in the management process such as the daily inpatient census and the daily inpatient census recapitulation require a relatively long time. The constraints in question are:

1) Data (data stored in a format that has been determined by the hospital) are not connected to one another, making it difficult for employees to verify and validate data when making daily census recapitulation reports.
2) Physical documents are stored manually with a separate storage system.
3) Limited employees who sometimes forget to input data.

f. Feasibility of information system

1) Feasibility of facilities and infrastructure as follows: The medical record unit already has 4 computers, it is necessary to add 9 computers to be placed in each ward that can support the use of the information system that will be made.
2) Feasibility of human resources

In the medical record and recapitulation unit, there are staff officer who are used to operating computers. To expedite the system to be run, a minimum of 9 medical record graduates will be placed in each ward, to operate the information system and 5 medical record graduates in the medical record unit.
3) Legal feasibility This information system was built legally because it does not harm any party

2. Analysis of the Daily Inpatient Census System at Bhayangkara Bengkulu Hospital

In this part of the analysis, the researcher will analyze the old system of Bhayangkara Bengkulu Hospital. The system design consists of the old system design then after the analysis a new system design (alternative) will be formed which basically has the same old system design and alternative system design as listed in the data flow diagram image below:

a) Old System Design

Figure 1 Old system flow
In the manual inpatient daily census data processing system at Bhayangkara Bengkulu Hospital, there are several problems that arise from processing inpatient daily census data that are recorded and recapitulated in the ledger including:

1) Often delayed in recording census data
2) Often occurrence of loss or error in writing census data
3) Unavailability of forms to record census data in each treatment room. The impact of the manual processing of daily inpatient census data is that the preparation of internal reports at the Bhayangkara Bengkulu Hospital is not well coordinated, data processing is less effective and efficient, and the data is inconsistent.

To reduce the occurrence of problems that arise from the old system, it is necessary to develop a new system so that the information produced becomes more efficient, accurate, can increase effectiveness in processing daily inpatient census data.

b) Daily Census Alternative Design

From the analysis of the identification of problems in the daily inpatient census at Bhayangkara Bengkulu Hospital, the researchers proposed the development of a computerized system. Where the flow of the inpatient daily census data processing process is still the same as the current process flow, this alternative design starts from making a census form for the treatment room. The process of making reports on alternative designs already uses a computerized system. The following is an alternative design that the author discusses and the flowchart explanation is as follows:

Figure 2. New system flow

c) Analysis of the data input process

The daily census data of inpatients at Bhayangkra Bengkulu Hospital were obtained from patient data who had received services (inpatients, transferred patients and discharged patients) which were then written in a ledger, patient data consisting of patient identity, doctor's name, patient diagnosis, treatment room, and treatment class, which is explained in the context diagram below:
From the analysis of the computerized daily inpatient census system, the user interface design of the inpatient daily census system at Bhayangkara Bengkulu Hospital aimed to streamline the process of daily inpatient census recapitulation, which will be given to the hospital director. Each room should also have a file for the daily inpatient census report.

d) Analysis of the processing of daily inpatient census data at Bhayangkara Bengkulu Hospital

Census data processing is carried out by medical records officers by inputting data on incoming patients, outgoing patients, moving patients which are processed to be used as inpatient daily census reports. The data processing process is described in the Data Flow Diagram below:

Figure 3. Diagram context

The weakness in the computerized daily inpatient census data input process is that incomplete inpatient daily census data cannot be input into the inpatient daily census data processing system, resulting in delays in reporting, therefore it is necessary to develop an integrated system.

e) Process Analysis of Inpatient Daily Census output

The output of the daily inpatient census data processing is the report on the daily inpatient census recapitulation, which will be given to the hospital director. Each room should also have a file for the daily inpatient census report.

Figure 4. Data Flow Diagram

In computerized processing of daily inpatient census data, there are weaknesses in system maintenance where if an error occurs in the system, the officer cannot immediately solve the problem but must be an IT officer who can solve it and takes an indeterminate time.

3. Design of Inpatient Daily Census System at Bhayangkara Bengkulu Hospital

From the analysis of the computerized daily inpatient census system, the user interface design for the inpatient daily census system is as follows:

1) Design of patient data form
2) Transfer Patient Form Design

![Figure 5. Patient data form input](image)

![Figure 6. Transfer patient form design](image)

3) Design of patient admission and discharge patient forms

![Figure 7. Design of patient admission and discharge patient forms](image)

4. **Implementation of the Daily Inpatient Census System at Bhayangkara Bengkulu Hospital**

Based on the design of the daily inpatient census system at the Bhayangkara Bengkulu Hospital, the researchers conducted socialization of the results of the user interface to officers or users of the inpatient daily census system.

a) Login Form
The login form is used to access the daily inpatient census system provided that you enter the username and password that have been registered and stored in the system. If there is an error in inputting the username and password, the officer cannot access the system directly. This login form is also used for security in accessing the system so that it is not misused by unauthorized parties.

b) Main menu form

The main menu form is the initial display on the daily inpatient census system that presents menus for inputting data, printing reports and setting user data. This form can be accessed if the officer or user has used the login form.

c) Patient Data Form
Patient data form is a form used to input patient data which can be stored into the database and if an error occurs in the input, it can be corrected by clicking the edit button, if you want to delete it, you can click the delete button. The patient data form is used to input patient identity data starting from the patient's medical record number, patient name, gender and date of birth of the patient to be input into the incoming patient data form, outgoing patient form and patient transfer form.

d) Patient Data Registration In and Out Form Patient

Incoming patient data form and outgoing patient data form is a form that is used to input patient data in and out which can be stored into the database and if an error occurs in inputting it can be corrected by clicking the edit button, if you want to delete you can click the delete button.
e) Transfer Patient Form

Transfer patient data form is a form used to input patient data which can be stored in the database and if there is an error in inputting it can be corrected, if you want to delete you can click the delete button and if the data is valid then click the save button.

f) Inpatient Daily Census Data

The daily inpatient census data form is used to input data on incoming patients, transferred patients and outgoing patients and is recapitulated to find out the total number of patients as a whole.
5. Maintenance of the Daily Inpatient Census System at Bhayangkara Bengkulu Hospital

Based on the results of discussions and socialization with medical record officers which was carried out on July 16, 2019, the maintenance of the inpatient daily census system was carried out in several stages:

a. corrective by improving the design and errors in the program,

b. adaptive, by modifying the system according to the user needs,

c. perfective, namely computerized processing of census data.

DISCUSSION

1. Identifying, Selection, and Planning the Daily Inpatient Census System at Bhayangkara Bengkulu Hospital

To design an information system, it is necessary to identify problems in the current system, where the daily inpatient census at the Bhayangkara Bengkulu Hospital is written in a ledger, the inpatient daily census recapitulation form is not yet available, the daily inpatient census is often late and sometimes often not filled in so that information on daily census data is often inaccurate and not on time.3

It is necessary to plan for the development of a daily inpatient census system from a manual one to a computerized system. In order to be able helped the officers.

The advantages of the computerized daily inpatient census system are:

a. Can improve the quality of service in hospitals

b. Increase efficiency and effectiveness in managing the daily inpatient census system.

c. Develop and improve the existing system so as to provide an added value for hospital management.

d. Facilitate the processing of daily inpatient census data in hospitals

e. Maintain data consistency.

f. Provides convenience in making daily inpatient census reports quickly and accurately.

2. Analysis of the Daily Inpatient Census System at Bhayangkara Bengkulu Hospital

a. Old system design

This old system design represents the system currently in use. The parties involved in this matter are the patient registration officer (TPP), Ward officer (nurse) and medical record officer.4 Data retrieval on the staff on the ward starts from data per day of patients entering
and leaving each room per day, per month, and yearly. Development can mean compiling a new system to replace the old system as a whole or improve the existing system on the grounds that system development includes:

1. Problems that arise from the old system
2. Organizational growth
3. The existence of technological developments
4. And the existence of instructions from the leadership. Therefore, in the daily inpatient census at Bhayangkara Bengkulu Hospital, it is necessary to develop a computerized data processing system.

b. Daily Census Alternative Design

Based on the flow of processing the daily inpatient census data proposed (new) above, the procedure for processing the daily inpatient census can be described as follows:

1. Ward officers enter daily patient census data per day into the census form based on the treatment room which is then submitted to the medical record section.
2. The medical record officer in the reporting section will input data into the patient data system entering, moving patients, and leaving patients and producing a daily census recapitulation which will then be submitted to the director and others in need.
3. Making daily census and recapitulation obtained from patient data in and out and data that have been stored in the database.
4. All data from the results of daily inspections are recapitulated and made a report to the Director.

With the existence of computerized data processing, it can make it easier for officers to process census data (patients enter, patients move and patients leave) reduce the occurrence of errors in data input, improve officer performance, and avoid data redundancy. The development of the new system, it is hoped that there will be an increase in performance, information, economy, control, efficiency, and service in a computerized system. The development of computer-based information systems is a complex task that requires a lot of resources and can take a long time to complete. The system development process goes through several stages starting from system planning to the system being implemented, operated and maintained. If the information system that has been developed still arises critical problems and cannot be overcome in system maintenance, it is necessary to redevelop a system to overcome them.

3. Design of Inpatient Daily Census System at Bhayangkara Bengkulu Hospital

To obtain a computerized inpatient daily census information system, it is necessary to design a system based on the needs and problems of the current system. In the design of the daily inpatient census system at the Bhayangkara Bengkulu Hospital, the Microsoft Visio 2007 application was used to obtain the results of the overall system design. The purpose of this system design is to meet the needs of system users and provide a clear and complete picture to computer programming and other technical experts involved. Another goal of designing a daily inpatient census system is to meet the needs of system users (users) and to provide a clear picture and produce a complete design for computer programmers and other technical experts involved in the development or manufacture of the system.

4. Implementation of the Daily Inpatient Census System at Bhayangkara Bengkulu Hospital

The implementation of the daily inpatient census system is the application of a system that has been designed to be applied to the data processing unit to assist officers in processing the daily inpatient census system, this implementation uses visual basic 6.0 programming. In this implementation there are still some obstacles where the occurrence of debugging and must be fixed. In the implementation of the daily inpatient census system, it
takes a long time in accordance with the design needs of the user or users and the needs in the management of inpatient daily census data processing.9

The purpose of implementing the inpatient daily census system is to create a system that is in accordance with the design results, then carry out testing and also documenting the necessary procedures and programs, completing the approved system design, and calculating the system that has been designed. Something to the user needs. The system that has been implemented can be used to assist users in processing daily inpatient census data. This implementation is only used for one user, namely in the data processing section and is desktop-based.10

5. Maintenance of the Daily Inpatient Census System at Bhayangkara Bengkulu Hospital

Maintenance of the inpatient daily census system is a combination of actions taken to keep a system in, or improve it to, an acceptable condition. The system needs to be maintained because the system has errors that have not been detected before, so system errors need to be corrected, the system undergoes changes due to new requests from system users, the system undergoes changes due to changes in the external environment (business changes), the system is infected with active malware, the system file is corrupt, and Hardware is weak. 7

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