

# INFORMATION SYSTEM MODEL OF DISCHARGE PLANNING BASED ON ANDROID IN HOSPITAL

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# INFORMATION SYSTEM MODEL OF DISCHARGE PLANNING BASED ON ANDROID IN HOSPITAL

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## ABSTRACT

Problems of post-treatment from hospitals in Indonesia are the lack of adherence to control, this is due to the implementation of low discharge planning. The purpose of the study analyzed the need of Information System Model of Discharge Planning - based Electronic, and designed Information System Model of Discharge Planning - based Electronic. The method used the FAST method (framework for the Application of System Technique). The data collecting and system need analysis were done by interviewing the PIECES framework (performance, information, economic, control, efficiency and service). The subjects were patients treated and post-treatment in hospitals in Surabaya of Indonesia. The results showed that the Discharge Planning - based Electronic was very important and feasible to be developed as a nurse and patient information system that could improve the time process of nursing care services. Based on system design, input design and output design, the information system model of discharge planning design got the criteria, therefore it could be implemented in the health information system at the hospital.

**Keyword:** Information System, Health, Nursing, Discharge Planning

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## 1. INTRODUCTION

Health problems are very complex problems that can be experienced by every human being, the problem is always related to other problems. One health problem that is commonly experienced by everyone is ignorance of the symptoms of the disease and delays in asking for help in health services, this is due to lack of knowledge and behavior. This condition can be experienced by post-hospitalized patients, because of the ineffectiveness of discharge planning. The problem is that there are still many implementations of discharge planning in hospitals in Indonesia with sufficient categories (83.24%)[1].

One of the effects of implementing ineffective discharge planning is that it causes low levels of adherence to control to hospitals. This, according to Suryadi's study stated that 70.6% of patients who were disobedient were caused by the role of nurses as educators in discharged discharge planning [2]. The problem of ineffectiveness in discharge planning is also very much related to information and communication with patients including information systems in hospitals as well as not running optimally.

The efforts to overcome these problems can be done in various ways, including Hariyati's study stating that the model of applying discharge planning with information technology media could increase nurses' knowledge of discharge planning ( $p = 0,000$ ), and the model of applying discharge planning with information technology media could also improve nurse practice about discharge planning [3].

Thus the use of information technology media is very effective for the implementation of discharge planning for nurses, but from the study that the use of information systems has not been developed from the patient's perspective. For this reason, this study would develop a patient health information system model for the discharge planning based - Android that could be utilized by patients at the hospital and after being hospitalized. The purpose analyzed the needs of a discharge planning information system in hospitals in Surabaya, Indonesia and to design a discharge planning information system design model that is suitable for hospitals in Indonesia.

## 2. METHODS

The method used in preparing the health information system model used the FAST method (Framework for the Application of System Technique), with the following steps: preliminary study, problem analysis, decision analysis, design, building a new system and implementation. The data retrieval of system needs analysis conducted the interviews with the PIECES framework (performance, information, economic, control, efficiency and service), after obtaining a system needs analysis then making a system design using context diagrams, data flow diagrams (DFD) and entity relationship data (ERD )

The sample criteria in this study were discharge planning documents. This study was analyzed descriptive qualitative design. The subjects were nurses, heads of rooms, and patients treated and post-treatment in hospitals in Surabaya of Indonesia.

### 2.1. Research Instruments

Research Instruments/Measuring instruments were interview guidelines with the PIECES framework and data collection sheets. The materials used included discharge planning data at hospitals in Surabaya of Indonesia.

### 3. RESULTS AND DISCUSSION

#### 3.1. Description of information systems for discharge planning at hospitals in Surabaya of Indonesia

The discharge planning information system in hospitals in Surabaya of Indonesia that was currently still using manual (conventional). Based on observations on nurses, patients and hospital leaders, the activities carried out at this time, especially in the discharge planning that had not carried out the process as the stages of discharge planning including patient selection, assessment, planning, community resources, implementation and evaluation. In addition to the process steps that had not been carried out, the format or report was also done manually (conventional). In general, discharge planning was carried out directly in the implementation phase by using discharge planning records without selecting patients.

#### 3.2. Problems with Discharge Planning Information Systems at Hospitals in Surabaya of Indonesia

The discharge planning information system at hospitals in Surabaya of Indonesia which currently run that have various weaknesses, including: the evaluation was not carried out routinely and structured because the incomplete data, the collecting process, the tabulation and the report that were still manual therefore it required a long time. More information about the Discharge planning information system could be presented in table 1.

**Table 1** Problems with the Discharge Planning information system at Hospitals in Surabaya of Indonesia

No	Problem	The Problem Cause
1	Completeness	Incomplete data collection
2	Suitableness	The report or information produced is not in accordance with what is needed by the head of the room or the head of the hospital, patient and nurse
3	Accurateness	Data processing and evaluation implementation of discharge planning
4	Timeliness	The process of data collection, data processing, data reporting.

Based on problem analysis, the system constraints include problems of completeness, suitability, accuracy and timeliness.

### 4. NEED IDENTIFICATION OF THE DISCHARGE PLANNING INFORMATION SYSTEM

Need identification result of the discharge planning information system consisted of functional needs and non-functional needs. The functional needs that must exist in the system that would be made are as follows 1) the system must be able to provide information about the patient's discharge planning report, 2) the existence of patient discharge planning data integration for all reports and data stored in the database so that the calling and processing of data becomes easier, 3) development of information systems that provided data suitability information facilities for assessment, planning, implementation and evaluation of discharge planning to facilitate patients and nurses in following up on nursing actions.

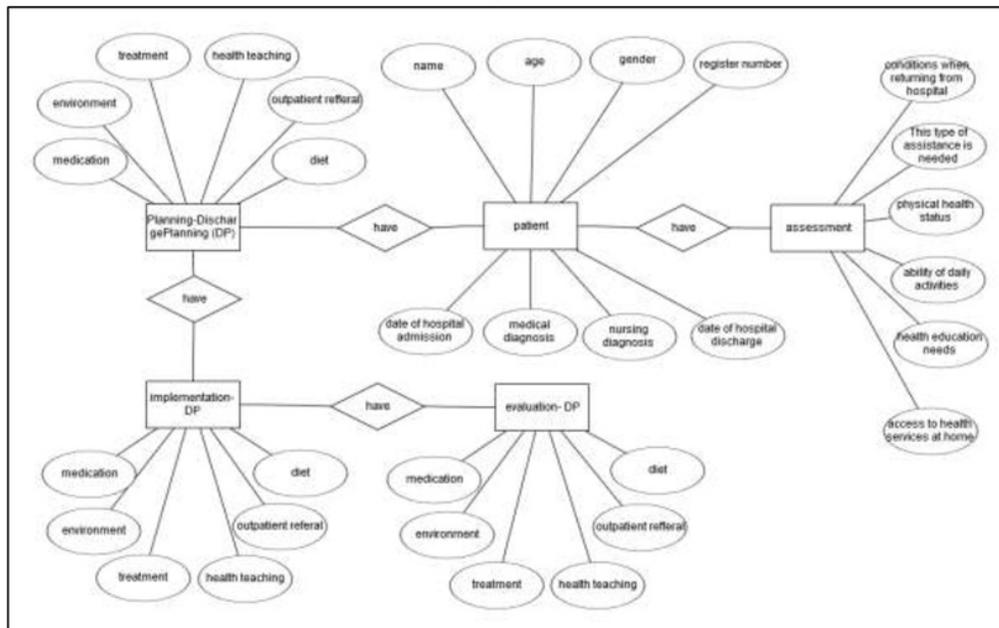
Furthermore, non-functional needs analysis categorized based on PIECES framework could be presented in table 2.

**Table 2** Analysis of non-functional needs based on PIECES

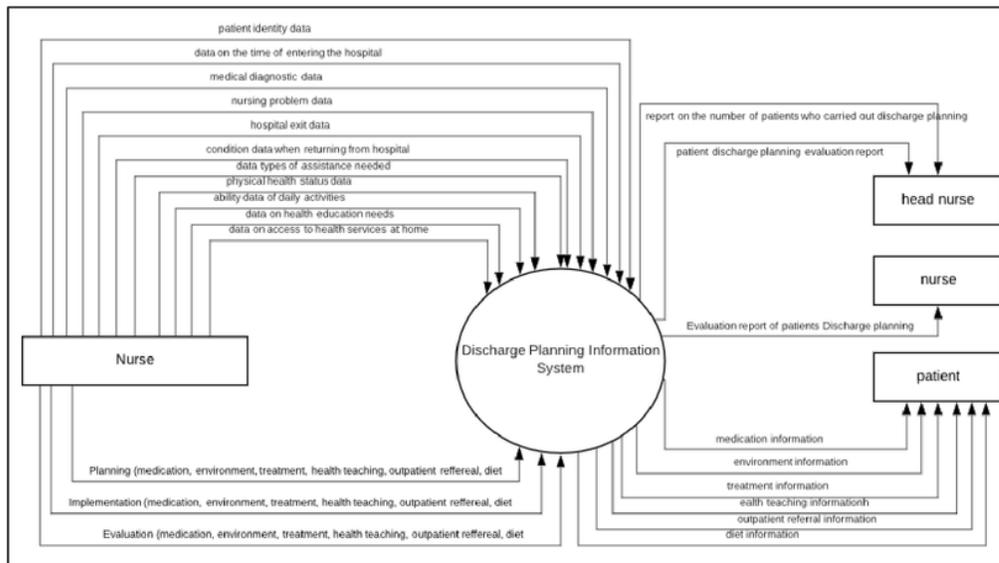
Non functional requirements	Explanation
Performance	The system was expected to shorten the time to complete the processing of patient's discharge planning report data processing (starting from selection, assessment, planning, implementation and evaluation)
Information	There was data integration for all patient discharge reports and data was stored in the database so that the calling and processing of patient discharge planning data became easier
Economic	The new system was expected to reduce operational costs such as the use of paper in report printing
Control	The system was expected to have access rights by each user in this case the patient, nurse, head of the room and the head of the hospital, so that not everyone had the right to manage all data and used it freely
Efficiency	The system was expected to be able to create reports automatically
Service	The system was expected to provide a display that was more easily understood by ordinary people, making it easier for users to use this system

## 5. DEVELOPMENT RESULTS OF DISCHARGE PLANNING INFORMATION SYSTEM

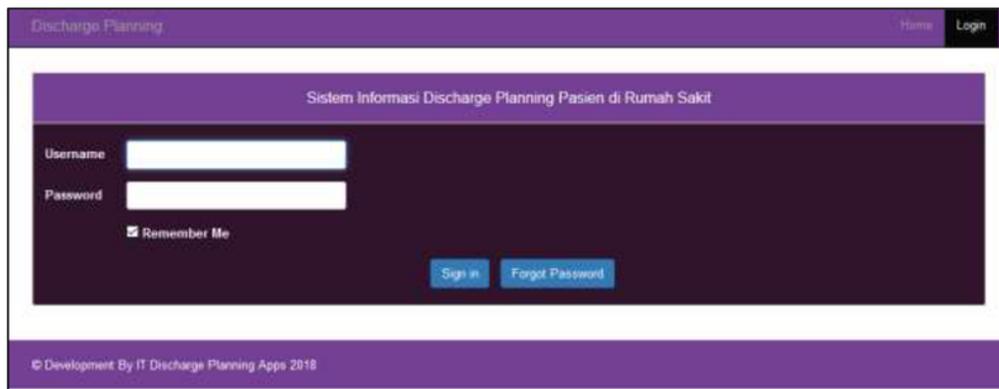
Development results of discharge planning information system could be described through data modeling, and process modeling. The data modeling through a flat entity relationship (ERD) was presented in Picture 1, while process modeling could be described through the context diagram presented in Picture 2.



**Figure 1** Picture of Modeling for Entity Relationship Data (ERD) New System



**Figure 2** Picture of a new system context diagram



**Figure 3** Picture of login interface for the discharge planning information system

According to Slevin, the discharge planning process was carried out through 5 stages: patient selection, assessment, planning, implementation and evaluation [4]. Patient selection phase, was a stage to identify patients who needed discharge planning, all patients needed services, but giving priority to discharge planning for patients who had a higher risk of having special services. Slevin [4] described the characteristics of patients who required discharge planning and referral to health services were patients who lacked knowledge about treatment plans, social isolation, new diagnosis of chronic disease, major surgery, and extension of the healing period of major surgery or disease, mental or emotional instability, management of complex home care, financial difficulties, inability to use referral sources, as well as sick patients at the terminal stage.

Whereas according to Cawthorn [5], the priority of clients who needed discharge planning was over 70 years of age, multiple diagnoses and high risk of death, limited physical

mobility, limited ability to care for themselves, decreased cognition status, risk of injury, homelessness and poverty, suffering from chronic diseases, anticipating long-term care in stroke, patients with new diabetes mellitus, pulmonary TB, substance / drug abuse disorders, history of frequent use of emergency facilities such as asthma, allergies. Discharge planning was also indicated for patients in special care such as nursing homes or rehabilitation centers. In addition, it was also necessary to consider the socio-economic conditions and the environment of the patient such as the ability of family members to care for and environmental facilities that were appropriate to the patient's condition [6]

The second stage was the discharge planning assessment phase which focused on 4 areas, namely physical and psychosocial assessment, functional status, health education needs and counseling. Zwicker and Picariello [6] suggested that the principles in the assessment were 1) Assessment was carried out when the patient entered and continued during treatment, 2) Assessment focused on adult patients who were at high risk of not achieving discharge results, and 3) Assessment included physical health, range of active motion, range of passive motion, necessary assistive devices, functional status (ability in daily activities and function of independence), health education needs, counseling needs, and access to service after returning home.

In assessing the health education needs of patients, nurses must consider various things, according to Rankin [7], namely: information needed by patients and families, behaviors that needed evaluation, skills needed by patients to demonstrate healthy behavior and environmental factors that could be changed to show the desired behavior. The study in the discharge planning process must be carried out comprehensively and considered the criteria for patients who needed discharge planning both for the patients themselves and families who would continue treatment after discharge from the hospital. In order for the goal of continuity of care to be achieved, patients and families must be able to adapt to health conditions and the family burden could be minimized [4]. Hoeman [8] mentions the criteria for patients who were ready to be assessed for their health needs were shown in the following 3 categories: a) Physically, patients were able to participate in the assessment process such as vital signs that had been controlled, anxiety decreases, b) The purpose of the assessment process was understandable by the patient and according to the needs of the patient and family, c) Assessment must also consider the emotional status of the patient and family so that they could actively participate in expressing their needs.

In the planning phase, this stage required the collaboration with other health teams, discussions with family and the provision of penkes according to the assessment. An interprofessional approach could improve patient satisfaction and the quality of health education [9]. The approach used in discharge planning that was focused on 6 important areas of health education provision known as "METHOD" and adjusted to the policies of each hospital [10] M: Medication. Patients were expected to know about: the name of the drug, the dose to be consumed, the time of administration, the purpose of the drug, the effects of the drug, symptoms that might deviate from the effects of the drug and other specific things that needed to be reported. E: Environment. Patients would be guaranteed about: adequate instruction regarding important skills needed at home, investigation and correction of various hazards in the home environment, adequate emotional support, investigation of sources of economic support, investigation of transportation to be used by the client. T: Treatment. Patients and families could: know the goals of care that would be continued at home, and be able to demonstrate how to care properly. H: Health Teaching. Patients would be able to: describe how the disease or its conditions were related to bodily functions, describe the important meanings to maintain health status, or achieve a higher level of health. O:

Outpatient Referral. The patient could: know the time and place for health control, know where and who could be contacted to help with treatment and treatment. D: Diet. Patients were expected to be able to: describe the purpose of dieting, plan the types of menus that fit their diet.

The implementation and evaluation phases according to Zwicker and Picariello [6], explained that in implementing discharge planning there were several things that need to be considered, namely a) Discharge planning must focus on the needs of patients and families, b) the results of the assessment serve as guidelines for implementation strategies, c) the assessment results would determine the health education needs needed after the patient returns from the hospital, d) assessment data could predict the patient's outcome after discharge from the hospital, e) discharge planning began when the patient entered the goal to shorten treatment days. Besides that, a strategy to ensure continuity of patient care, according to Zwicker and Picariello [6], there were four, including Communication, Coordination, Collaboration and Continual Reassessment. Communication, was carried out in a multidisciplinary manner involving the patient and family when the patient was first admitted to the hospital, during the treatment period and when the patient was going home. Communication could be done in writing and the documentation is an assessment of patient care needs in the form of a summary of the patient in the hospital. Verbal communication was carried out regarding health status carried out on patients, families, other professionals and health services for referrals after returning from the hospital. Coordination, in the discharge planning process must coordinate with a multidisciplinary team and with the referral service unit after the patient returns from the hospital. Communication must be clear and able to ensure that patients and families understand everything that was communicated, Collaboration, carried out by nurses with all teams involved in patient care, besides collaboration between nurses and families by providing information about the patient's past medical history, biopsychosocial needs and things that had the potential to hinder the process of continuity of care, and Continual Reassessment, the discharge planning process was dynamic, so that the patient's health status would change according to the assessment carried out continuously and accurately. The focus on this implementation phase was to provide health education and documentation.

In the evaluation phase the discharge planning implementation of the nurse asks again the health education that had been given. Evaluation could be done by asking the patient and family members to explain about the education that had been taught including: diseases, physical signs and symptoms that must be reported, asking patients to demonstrate every treatment that would be continued at home, asking patients to pay attention to the condition of the house, identifying dangerous dangers for patients. Ibrahim, Buick [11] explained that in evaluating the effectiveness of a discharge planning, there were 2 assessment indicators that needed to be considered, namely the process criteria and measurable results criteria such as an increase in functional status, day of care or repeat visits due uncontrolled risk factors. In evaluating the effectiveness of the discharge planning process it was necessary to follow-up after the patient returns from the hospital which could be done by telephone or contact with family and health services that participated in providing care to patients.

## 6. CONCLUSION

Health information systems related to going home planning in hospitals in Indonesia which currently had a variety of problems, including 1) data input (specifically patient data about selection to be given a planning fee was still incomplete), needs assessment data of discharge planning that included health physical, functional status, health education needs, and

counseling needs were not available. The planning data of Discharge planing which included 6 components including medication, enviroment, treatment, health teaching, ocupatient referrals, and some diets were still missing. Identification of community resources was incomplete. 2) Data processing (data management was still done manually and not using an electronic-based information system), 3) output (report / information in the form of reports on the implementation of discharge planing and evaluation manually and not specific).

Information to support evaluation of services needed by management, namely 1) evaluation report on patient discharge planning implementation; 2) Report on the number of patients receiving discharge planning and success, 3) Reports of outpatient patient visits. Database of discharge planning information systems to support service evaluations developed were directors, heads of care, heads of rooms, primary / supervisor nurses, nurses implementing, doctors, diseases, nursing diagnoses, examinations / assessments, planning, implementation and evaluation

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