

# Design of Nutrition Assessment of Hospitalized Patients Based on Web in Hospital of Universitas Sumatera Utara

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**Abstract.** Hospital of Universitas Sumatera Utara has some services which are integrated with hospital management information system, but nutrition service has not been included yet. Actually, the nutrition service activities consist of nutrition assessment as well as diet orders of hospitalized patients which been done manually that could cause error. The aim of the study is to make an application of nutrition assessment and diet orders of hospitalized patients based on web, so it can minimize the error. The name of the application is “E-NRD” made with Waterfall method. The study design was research and development and was done for 8 months. The steps of the study were dieticians and nurses interviews, data collection, application establishment, dieticians and nurses workshops of application, and finally the implementation of the application. Hopefully “E-NRD” as a part of hospital management information system could improve the quality of nutrition service in hospital of Universitas Sumatera Utara.

**Keywords:** nutrition, information system, application

## 1 Introduction

Hospital management information system is a communication information technology system that processes and integrates the entire flow of hospital services in the form of a network of coordination, reporting and administrative procedures to obtain information precisely and accurately, and is part from the health information system [1]. According to Siregar the hospital is a place to hold health efforts, and one of the efforts in health services in hospitals is hospital nutrition service [2]. At the Hospital of Universitas Sumatera Utara itself has used the hospital management information system for activities every day, but there are still some activities that have not been integrated with the hospital management information system, one of which is nutrition service.

Nutrition service at the Hospital of Universitas Sumatera Utara include the process of nutrition assessment by dieticians and ordering food for inpatients by nurses. Nutrition assessment is a process that begins with screening, assessment, diagnosis, intervention, and monitoring and evaluation of nutrition [3]. The process of nutrition service at the Hospital of Universitas Sumatera Utara is done manually, namely the calculation of nutritional status, recording out nutrition assessment lines to be recorded by nutrition officers on paper. The process runs the risk of causing miscalculation, recording, loss of inpatient dietary records, and miscommunication. In the on paper, and the nurses order inpatient food via telephone

scope of health, patient safety must be the number one target, for that the quality of service to patients is always the top priority in various health facilities such as hospitals [1].

Based on the above problems, the Hospital of Universitas Sumatera Utara requires an application in nutrition service to improve the quality of services provided. This web-based application called "E-NRD" aims to improve service, speed, accuracy, integration, efficiency, and ease of reporting.

## 2 Research Method

This research design uses the Research and Development approach. This method is used to produce certain products, and test these products [4]. Testing the resulting product using the Waterfall method. The location of research in the Hospital of Universitas Sumatera Utara from May to September 2019 after obtaining ethical approval from the Research Ethics Committee of the Faculty of Nursing, Universitas Sumatera Utara (letter number 1816/V/SP/2019). The object in this study is information system "E-NRD" which contains a nutrition assessment form and a food order form from the nurses in the inpatient ward. Subjects observed were dietitians, nutrition officers at nutrition installations, and nurses on duty in the inpatient ward.

Data needed to complete this study were the nutrition assessment forms and food ordering forms from patient care who provided information about the presence of inpatients (patients returning, patients returning at their own requests, moving rooms, and dying patients) to the nutrition officers at the nutrition installation of the Hospital of Universitas Sumatera Utara so that the data is well coordinated. The research tools use:

- 1) One or more communication devices such as computers, laptops, smart phones or tablets to open the browser
- 2) One router
- 3) One online hosting
- 4) Interview with nurses on duty inpatients about matters that become obstacles or problems in ordering food for inpatients to or nutrition officers dietitians at nutrition installations
- 5) Interview with dietitians about things that cause obstacles or problems in the assessment of patient
- 6) The research team summarizes the results of the interviews of nurses, dietitians, and nutrition officers
- 7) The research team made the design of the application which adapted to the needs of nurses, dietitians, and nutrition officers in nutrition installation
- 8) The research team discussing determining the name used in the application
- 9) Making the design of nutrition assessment and ordering food application
- 10) Formation of the "E-NRD" web-based application
- 11) Holding the "E-NRD" web-based workshop and trial application
- 12) Application implementation of "E-NRD" web-based in the work accompanied by policies and application guidelines

Identification of this study uses Ishikawa diagram that is to recognize each problem that arises in the use of decomposition and realization of user care diagram further about the components of the system or software, objects, relationships between objects, and so on. So that the activities of the application can be run according to the needs of the existing problems.

### 3 Results and Discussion

This application has 3 users in the form of admin, dietician, and nurse. Enter the e-rnd.com url in the browser, then the main page and login section will appear to enter your username and password (Figure 1).



Fig 1. Main page

Main page of admin and dietician users can access recapitulation of patient nutrition assessment and recapitulation of food ordering from all wards. The initial appearance on the admin and dietician can see the nutrition assessment form and patient data. Nutrition assessment contains anthropometric data, intake analysis data, and list of nutritional problems (Figure 2 and Figure 3).

Fig 2. Anthropometric data

Daftar masalah gizi	
Perubahan asupan makanan 5 hari terakhir	<input type="checkbox"/> Asupan makan oral berkurang lebih dari 60% <input type="checkbox"/> Perubahan jenis/bentuk makanan ke jenis/bentuk diet khusus atau cair oral/enteral /parenteral
Berat Badan (BB)	<input type="checkbox"/> IMT kurang dari 18,5 kg/m2 atau lebih <input type="checkbox"/> BB Menurun lebih dari 10% dalam 3-6 bulan terakhir <input type="checkbox"/> BB menurun lebih dari 5% dalam 3 bulan terakhir
Gangguan gastrointestinal	<input type="checkbox"/> Mual <input type="checkbox"/> Muntah

**Fig 3.** The nutritional problems

The nurse users contain patient data and make inpatient food orders such as food forms and diet types to be sent to a nutrition installation (Figure 4 and Figure 5).

**Fig 4.** The form of pasien diet

**Fig 5.** The type of patient diet

## Discussion

Currently the hospital is required to always improve the quality of service, improve performance, and competitiveness, but not reduce the social mission it carries. Hospital management information system is a computer system that processes and integrates the entire flow of health services business processes in the form of a network of coordination, reporting, and administrative procedures to obtain information quickly, precisely, and accurately. In addition, the Hospital management information system is a very important supporting facility and must be owned by hospitals to support hospital operational management [5].

Minister of Health Regulation No. 741/Menkes/Per/VIII/2008 concerning minimum service standards for hospitals to determine nutrition service as a medical support service within the organizational structure of the hospital [6]. Nutrition service is service provided and adjusted to the patient's situation based on clinical conditions, nutritional status, and metabolic status of the body. Nutritional conditions are very influential in the process of healing the disease, on the contrary the process of disease can affect the nutritional status. Nutrition therapy is part of the treatment of diseases or clinical conditions that must be considered so that nutrition does not exceed the body's ability to carry out metabolic functions. The patient's nutrition must be evaluated and improved according to the patient's clinical condition and the results of the laboratory examination. Hospital nutrition service activities include outpatient nutrition care, inpatient nutrition care, food service, and research and development [3].

Nutrition service in the Hospital of Universitas Sumatera Utara still done manually and not yet part of the hospital management information system. This can cause service to be slow, data storage and management are not integrated, error in recording, calculation error, loss of diet records for inpatients, and miscommunication [5]. Therefore, nutrition service must be part of the hospital management information system.

The method used to create a web-based "E-NRD" application is the Waterfall method which describes a systematic and sequential approach to software development, starting with the specification of user needs and then through planning, modeling, construction, and deployment, which ends with support for the complete software produced. In its development the Waterfall method has several sequential stages, namely requirements analysis, system design, implementation, integration and testing, and operation and maintenance [7].

The "E-NRD" application has 3 users, namely admin, dietician, and nurse, where admin and dietician has access to nutrition assessment and patient data, while nurses have access to patient data and a list of patient diets. Nutrition assessment contains anthropometric data, intake analysis, list of nutritional problems, and conclusions whether the patient needs to be consulted to the Nutrition Therapy Team. If the nutrition assessment is done manually, it will take a long time and miscalculation. One function is carried out nutrition assessment is to detect patients who are at risk of malnutrition or malnutrition to prevent malnutrition in the hospital. If there is malnutrition in patients, it will increase morbidity, mortality, duration of hospitalization, and hospital costs [8]. For nurse users, access is given in the form of patient data and food ordering, such as food forms and diet types. If done manually such as recording on paper or by telephone to the nutrition installation, there can be a risk of losing the patient's dietary records, error recording, and miscommunication. The accuracy of dieting is one of the quality indicators in the nutrition installation of the Hospital of Universitas Sumatera Utara.

The hospital management information system in the form of an „E-NRD“ application can minimize error in nutrition assessment and inpatient food ordering, so as to improve the quality of nutrition service at the Hospital of Universitas Sumatera Utara.

## 5 Conclusion

The design of a nutritional assessment and food ordering application for inpatients based on the web at the Hospital of Universitas Sumatera Utara and workshops have been completed. This application is expected to prevent error in nutrition assessment by dieticians and inpatient food ordering by nurses.

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