Cost Effectiveness Analysis Based Through Nutrition Intake and Nutritional Status in Kidney Failure Patients Who Underwent Hemodialysis and Non Hemodialysis Therapy Productive Age at Makassar City

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Abstract. Background: The high cost of care for patients with kidney failure is a serious problem and requires cost effective planning. Patients undergoing hemodialysis often lack nutritional intake and nutritional status. Factors causing low energy and protein consumption in patients with renal failure are socioeconomic factors such as depression, stress, lack of knowledge and poverty, the patient's own characteristics in the treatment process. Objective: Analyze and assess the magnitude of the costs incurred for patients with renal failure who undergo advanced age hemodialysis therapy through nutritional intake and nutritional status. Material and Method: In this study data were collected simultaneously at RSUP. Dr. Wahidin Sudirohusodo Makassar through cross sectional study. Qualitative and quantitative approach with descriptive comparative analysis and activity based costing method. Results: The results revealed that the leading cause of renal failure was based on the primary diagnoses of the disease, ranging from hypertensive renal disease, and comorbidities such as non insulin dependent diabetes, acute subendocardial myocardial, aneurysm of artery of upper extremity and other acute renal failure. Through calculation method Activity Based Costing (ABC), financing activity is lower, but can not be denied that there is variable cost per patient perceived kidney failure. Conclusion: Nutritional intake and nutritional status showed comparison with the Cost Effectiveness Analysis method that there was a difference between hemodialysis and non-hemodialysis patients of Rp.1.998.000, this means that in non-hemodialysis group more effective than hemodialysis group

1. Introduction
Increasing health costs is a major problem that makes it difficult for people to get the necessary health services. This situation primarily occurs in all self-financing healthcare services in the cash payment system. The effects of long pain, not to mention the complex lifestyle changes as well as the frequent complications that arise as long-term effects of pain affect not only the patient's physical, but also emotional, psychological, and social. For that we need an effective cost analysis approach in the
process of patient care, especially for patients who need a fairly expensive cost one of them is a patient with kidney failure disease.

The cases of kidney failure in the World have increased by more than 50 percent of developed country data such as Australia, Britain and Japan. There has been considerable variation in the incidence and prevalence of renal failure. Incidence ranges from 77-283 / million inhabitants, while the prevalence undergoes hemodialysis between 476-1150 / million inhabitants. Data based on abnormal ureum is currently estimated to be a kidney failure client is 2000 per million inhabitants. In Asia, 26 Studies conducted in China with a number of subjects ranging from 237 to 65,181 earned an average of 7.2% on subjects with age above 30 years and 23.4% -35.8% in subjects over 64 years of age [1,2,3].

Statistics collected by IRR (International Renal Registry), in 2011 in Indonesia there were 15,353 patients with renal failure who undergo hemodialysis therapy and in 2012 there was an increase of 4268 people so that overall data in mid-2013 numbered 19,621 new patients. By the end of 2013, the number of patients with kidney failure in Indonesia reached about 70,000 people and only about 13,000 patients are undergoing hemodialysis therapy. The amount is expected to continue to increase from year to year [2,4,5,6].

Several cases of hospitals in Makassar City one of them RS. Islam Faisal also provides dialysis service facilities increased and increased visits of hemodialysis patients, based on medical record data last 5 (five) years 2010-2015 amounted to 1347 patients. In RSUP. Dr.Wahidin Sudirohusodo in 2014 as many as 12,373 and in 2015 experienced an increase recorded 1.123 visits undergoing hemodialysis therapy. At the hospital. UNHAS recorded in February 2015 there are 123 the number of patients undergoing hemodialysis and did not close this possibility continues to increase. Regarding the determination of tariffs on hospitals and services received by patients. Hospitals in determining the cost of products are still many who use the method of cost accounting is still traditional, where the system is no longer in accordance with the existing financing system today.

Some of the above descriptions become the background to conduct research at the RSUP.Dr.Wahidin Sudirohusodo Makassar with the title Cost Effectiveness Analysis Based Through Nutrition Intake and Nutritional Status in Kidney Failure Patients Who Underwent Hemodialysis and non hemodialysis Therapy Productive Age at Makassar City.

Problem
Based on the description above, then the formulation of the problem in this study are:

1. What factors lead to high prevalence of kidney disease in the productive age?
2. How to assess the magnitude of the costs incurred for patients with renal failure who undergo hemodialysis and non-hemodialysis treatment?
3. How to assess the comparison of Cost Effectiveness Analysis (CEA) in patients with renal failure who underwent hemodialysis and non-hemodialysis through optimal diet management?

2. Methods
This research use comparative study design that is research done by comparing a phenomenon to find or know what factors become the cause and situation how that cause the event. In this study comparisons were performed using analytical survey method ie between groups of patients who undergo hemodialysis and non-hemodialysis treatment through diet management. The method used is through cross sectional study where the measurement of each variable is measured simultaneously at one time. In this study the concept of economic evaluation is applied, it aims to get the best alternative. This research uses cost calculation method Activity Based Costing (ABC) based on resources used in every activity and alternative. The cost calculation in each alternative activity is reviewed from the cost structure that includes investment, maintenance and operational costs that are directly or indirectly related to the activity. After that, the entire cost of the process is added to total cost. The result (output) or effectiveness is calculated by summing and measuring activities that are
related to the group performing hemodialysis and without performing hemodialysis actions on each alternative [7,8].

Population and Sampling
In this study, the population included patients with renal failure who were undergoing HD in the location under study. We used census techniques, also known as saturation sampling, to select the study participants. This technique was used to generate generalizable results with very small error estimates, and the derived data were thus generalizable to all individuals in a given population. Another advantage was that estimates could be obtained with a high level of accuracy and precision. The sample was derived from a population of patients of reproductive age who were suffering from renal failure and undergoing HD. Reproductive age was established by biological age (the level of productivity of a person) [8].

Data Analysis Instrument
The method used to collect data was determined based on the data source, and a data source was defined as anything that could provide information about data relevant to the research study. A combination of the following three data collection techniques, which had been previously been used, was applied: questionnaires, interviews and observations.

3. Results and Discussion
The high prevalence and causal factors of kidney failure among productive age are caused by unhealthy and irregular lifestyle. The results revealed that the leading cause of renal failure was based on the primary diagnoses of the disease, ranging from hypertensive renal disease, and comorbidities such as non insulin dependent diabetes, acute subendocardial myocardial, aneurysm of artery of upper extremity and other acute renal failure.

Cost effectiveness analyses can be used to compare the health outcomes associated with and costs of implementing a programme or intervention with those of other alternatives that may produce the same outcome. A cost analysis can be conducted to identify details regarding the costs incurred and resources used. HD care units provide a service to patients with renal failure, which is quite expensive because the price of medical supplies, drugs and consumables affect the cost of the service, as described in the following figures:

![Figure Chart statement of respondents about Cost Effectiveness Analysis associated with information on standardization of nutrition intake](image)

**Fig.1** : Figure Chart statement of respondents about Cost Effectiveness Analysis associated with information on standardization of nutrition intake

In the HD group, the following results were obtained: 1) most respondents (up to 81.3%) answered “Not” to all but one question; 2) most respondents (up to 36.3%) answered “No” to this question; 3) most respondents (up to 83.3%) answered “Not” to this question; 4) most respondents (up to 85.4%) answered “Yes” to this question; 5) most respondents (up to 83.3%) answered “Yes” to these questions; 6) most respondents (up to 97.9%) answered “Not” to this question; 7) most respondents
(up to 66.7%) answered “Yes” to these questions; 8) most respondents (up to 83.3%) answered “Yes” to these questions; 9) most respondents (up to 64.6%) answered “Yes” to these questions; and 10) most respondents (up to 97.9%) answered “Photo” to this question.

Based on these results, renal failure patients should pay more attention to their food intake. Patients should not drink too much, eat too much salty food, or overeat because these practices can negatively affect the body and cause a variety of complaints [9,10,11,12,13]. In addition, the results of some studies have identified mortality rates as high as 40-70% in malnourished patients with chronic renal failure [14,15]. Although dialysis treatment may temporarily improve kidney function, this therapy should only be continued until the kidneys begin to function normally. In cases of chronic renal failure, the kidneys rarely return to normal functioning and, in most patients, continuous dialysis is required [16,17]. In contrast with kidney stone disease, which can be cured in a variety of ways, kidney disease can only be completely cured via kidney transplantation [9,13,18,19,20]. Ideally, under these conditions, all forms of nutrients obtained from food will be maintained. The overall goals of nutritional management in CKD patients undergoing HD are to improve and maintain optimal nutritional status, prevent the accumulation of excess metabolic waste, regulate the balance of water and electrolytes, and prevent conditions associated with CKD, such as anaemia, hypertension, dyslipidaemia, bone disease, and cardiovascular disease.

4. Conclusion

Nutritional intake and nutritional status showed comparison with the Cost Effectiveness Analysis method that there was a difference between hemodialysis and non-hemodialysis patients of Rp.1,998.000, - this means that in non-hemodialysis group more effective than hemodialysis group. Through the calculation method Activity Based Costing (ABC), the activities of financing is lower, but it can not be denied that there is variable cost per patient perceived renal failure. The prevalence of kidney disease has increased in older adults, especially the elderly. However, over the course of time, kidney disease has also been identified in children. The high number of renal failure patients undergoing HD therapy may be influenced many factors, such as changes in lifestyle, diets high in fat and carbohydrates, and other causes, including genetic diseases, immune disorders and birth defects.

HD is less expensive than kidney transplantation to treat patients with kidney failure, but this type of care has become very expensive because it must be performed continuously. One problem is that numerous patients require dialysis and the number of facilities is limited, which means that many patients have to wait for dialysis. Despite the provision of funds by the government and society, these limitations are difficult to overcome. Therefore, the use of resources, especially financial resources, must be as effective and efficient as possible.

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