



Impact Hemodialysis Treatment Therapy for Patients with Renal Failure Based on Cost Effectiveness Analysis

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Abstract

Although the treatment of patients with renal failure using hemodialysis services is not as expensive as kidney transplant, but because it has to be done continuously the cost of this treatment becomes very expensive. Cost analysis is required to know all the details of the costs to be incurred and used. Hemodialysis service unit is one of the services that is quite expensive, because it is influenced the price of medical supplies, drugs and consumables. Meanwhile, along with the increasing number of patients with kidney failure, the number of dialysis patients more and more. The problem that occurs today is when the number of patients and facilities are limited, so many patients who have to queue for dialysis. Because these limitations are difficult to overcome by the ability of government and community funding, the use of resources should be as efficient as possible. This study to determine the impact of treatment therapy patients who experience kidney failure hemodialysis based on cost effectiveness analysis approach. This study is an analytical study to see the therapy of patients undergoing hemodialysis with body mass index of patients with renal failure. This research has been done in unit hemodialysis RSWS UNHAS Makassar, by using sampling technique consecutive sampling counted 60 respondents. Variables in this study were age, sex, frequency of hemodialysis, body mass index and long undergoing hemodialysis. Through CEA financing handling for patients with renal failure who perform hemodialysis actions can effectively have a positive impact. This is because cost-effectiveness analysis or CEA is a method designed to compare health outcomes and costs used to implement programs or interventions with other alternatives that produce the same outcomes.

Keywords: Kidney Failure; Hemodialysis; Cost Effectiveness Analysis.

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1. Introduction

Mortality in patients with chronic kidney disease (CKD), especially those undergoing hemodialysis is very high. The death of CKD patients can be caused by a variety of things: excess fluid volume (overload volume), metabolic acidosis, electrolyte balance disorder especially hyperkalemia as well as infection (sepsis), but 40-45% of deaths are caused by cardiovascular complications¹. Kidney disease is a problem of the field of nephrology with the incidence rate is still quite high, the etiology is broad and complex, often begins without complaints or clinical symptoms unless it has reached the terminal stage (terminal renal failure) [2].

In the United States, in 2008 the incidence of kidney failure reached 547,982 patients, and this number continues to increase every year³. In other developing countries, the incidence is estimated to be around 40-60 cases per million people per year. The 2010 data show that 59% of deaths in Indonesia are caused by non-communicable diseases, which require enormous medical expenses, one of which is renal failure [4]. Indonesia is a country with high rates of renal failure. The increase of this disease patient in Indonesia reached 20% [2,5,6].

Kidney failure is now the concern of the health world for several reasons [12-13], namely the rapid increase of prevalence, the high cost of the treatment process, the iceberg phenomenon that covers the veiled disease, and plays an important role in increasing the risk of other diseases and the discovery of effective measures To prevent disease progression [7,8,10]. The direct effect of the cost of kidney failure is also reported that there has been an increase in total cost as much as 38% to higher with the largest cost component being the cost of care and medicine [11,12,13].

The kidneys have a role and function to regulate the fluid balance in the body, regulate the concentration of salt in the blood, the acid base balance in the blood and the excretion of waste materials such as urea and other nitrogen trash in the blood [13-15]. When the kidneys are not able to work properly then there will be health problems that will be associated with kidney failure [16,17,18]. Kidney Failure consists of two forms of Acute Renal Failure (GGA) and Chronic Kidney Failure (GGK) [19,20,21]. It is said Acute if the disease develops very quickly, occurring within hours or within days²²⁻²³. While Chronic occurs and develops slowly for several years²⁴. ARF is a sudden decrease in renal function with the loss of the kidney's ability to maintain body homeostasis [25-26]. ARF is also a syndrome that is marked by a sudden decline in kidney function with the result of augmenting metabolic compounds of nitrogen such as urea and creatinine [27-30]

In Indonesia alone, there are two options for undergoing renal replacement therapy, namely hemodialysis (HD) and peritoneal dialysis (DP) [31,32,33]. However, constraints on peritoneal dialysis programs in Indonesia such as (1) peritoneal dialysis cost per month are still more expensive than hemodialysis and (2) environmental sanitation and educational levels for most patients are factors that do not support this program, making hemodialysis as a replacement therapy choice program Main kidney^{34,35,36}. Hemodialysis patients get special attention from the government because most of the hemodialysis patients are productive patients aged between 20-60 years [37,38,39]. With a decrease in kidney function, or even failure, not only decreased quality of life, lifelong treatment also cost [40-41].

One way or action taken in cost-effective utilization in patients undergoing hemodialysis therapy from the point of utilization of economic value through Cost Effectiveness Analysis by means of reuse is used in more than 80% dialysis centers in the United States [42,43,44]. The process of repeating dialyzer for patients is proven safe and clearance characteristics of analyzed reuse does not change if the dialyzer cleaning process is implemented correctly [45,46,47]. Reuse in addition to cost saving, can also increase biocompatibility and reduce the frequency of first use syndrome in hemodialysis patients [48,49,50]. However, in the implementation of cost effectiveness in the health financing process, especially concerning the financing of renal failure therapy and hemodialysis has its own handling process of each action performed 50-54. The process of hemodialysis is a complicated process of health services that require special nurses to carry out this service [55-57]. In addition, hemodialysis service (dialysis) is one of the services that are quite expensive, because it is influenced by the price of medical supplies, drugs and consumables that are heavily influenced by the current monetary crisis 58-61. Indonesia's health financing system that is still out of pocket and has not accumulated insurance thoroughly, causing patients with kidney failure, especially the poor in Indonesia becomes increasingly powerless [62-65].

Therefore, it is necessary to control the cost of health services (*cost containment*) which is changed from the form of fee for service to the form of Prospective Payment System (PPS) [66-70]. Research in several European countries especially relating to patients with kidney failure that is expressing the model of payment through Cost Effectiveness Model with system of Diagnosis Related Group (DRG) including one of payment system of prospective payment system that is a payment system at health service provider, either hospital or doctor, In the amount prescribed prior to the medical service is provided in accordance with the diagnosis of the disease, whatever will be done to the patient concerned including duration of hospital care [71-73].

Hospitals that grow and develop must be managed efficiently and effectively, it is necessary to face the tough competition in the world of health [74-76]. Hospitals can survive in the existing competitions, of course, the hospital must recalculate the existing hospital rates, namely to minimize the calculation of tariffs are so high by using a competitive tariff calculation model, although with low tariffs but still uphold a quality To be able to run the vision and mission of a hospital, so that the hospital does not suffer losses in terms of rates and customer [77-79]. This is done to draw interest back old patients and new patients in utilizing existing services 80-85. Cost effectiveness from the demand side is to impose cost contributions [86-87]. The motivation behind the application of fee fees is the assumption that high demand for health services is a major cause of the high cost of health [88-89].

In connection with the above, effective payment system mechanism through Cost Effectiveness Analysis approach in the process of handling patients with kidney failure and hemodialysis 90-93 treatment, where the payment system will encourage health providers including doctors and hospitals to make efficient health facilities And selection of appropriate therapeutic guidelines so as to lower the length of stay (LOS) [95-97]. In addition, it also helps clinicians in improving services, assisting in understanding resource use and creating a more equitable allocation of resources, improving efficiency in serving patients and providing comparative information between hospitals [98-102].

Based on the above phenomenon, and some studies that have been done to describe patients with kidney failure

experienced many changes in his life, especially concerning the issue of financing. To answer and address the phenomenon, the authors are interested to raise the topic of further research on the impact of hemodialysis treatment therapy for patients with renal failure based on Cost Effectiveness Analysis. Cost effectiveness analysis is an evaluation considering the cost and consequence aspects of an alternative problem solving. It is a decision-making tool designed for decision makers to know with certainty the most efficient solving option [14,43,60]. It is further disclosed that cost effectiveness is a model used to assess the most appropriate decision alternatives by comparing such alternatives in relation to the finances to be sacrificed [68,71,73]. In the First Principles of Cost Effectiveness Analysis in Health, the CEA is a method for determining which programs can accomplish a particular goal at a minimum cost [43, 64, 65].

Cost Effectiveness Analysis or CEA is a method designed to compare the health outcome and the costs used to implement the program or interventions with other alternatives that produce the same outcomes [92,96,98]. Health outcomes are expressed in objective and measurable terms such as number of treated cases, decreased blood pressure expressed in mmHg, and others and not in monetary terminology [60,91,92].

Cost effectiveness analysis is one way to select and rate the best program when there are several different programs with the same goals available to choose [99,100]. Which criteria of the assessment will be chosen based on the discounted unit cost of each alternative program so that the program has the lowest discounted unit cost that will be chosen by the analysis / decision maker [93,99,101]. Based on the above reviews, Cost Effectiveness Analysis is one form of economic evaluation of health programs to determine which programs are more efficient, both in terms of the achievement of the objectives and in terms of costs [42,43,102]. Kidney failure is basically a condition in which kidney function decreases so that it can no longer do the filtration of the body's remaining metabolism and maintain electrolyte fluid balance such as sodium and potassium in the blood or urine [1,8,12]. This disease continues to grow slowly until the kidney function gets worse until the kidney loses its function [32,40,89]. Kidney failure occurs when sudden renal function decreases 40. The most important function of the kidneys is to remove electrolytes and excess water in the filtered blood every 40.106 seconds. Liquids and electrolytes, acidic and alkaline substances present in the blood should always be in a balanced state [81,101]. Kidney tasks one of them that at all times maintain that balance [37,40,106]. Replacement therapy that can be performed in patients with end-stage renal failure is with hemodialysis, peritoneal dialysis and renal transplant [32,106]. Renal transplantation has been a worldwide hemodialysis therapy [25,31,37]. The benefits of transplant have clearly proven to be better than hemodialysis especially in terms of improving patient's quality of life [106]. This therapy is the most ideal therapy, because it overcomes all types of decline in kidney function, On the other hand hemodialysis and peritoneal dialysis just overcome the effects of some types of kidney function decline so that patients have a high degree of dependence on this action [25,40,106].

2. Materials and Method

This research is an analytic research to see the impact of therapy of patients undergoing hemodialysis with body mass index of patients with chronic renal failure in RSWS UNHAS Makassar 2016. This research has been done in unit hemodialysis RSWS UNHAS Makassar, using sampling technique consecutive sampling as much as 60

respondents [118- 119]. Variables in this study were age, sex, frequency of hemodialysis, body mass index and long undergoing hemodialysis.

3. Results

The impact of hemodialysis therapy, clients with long-term hemodialysis often feel worried about unpredictable illness conditions and disruptions in life. They usually face financial problems, difficulties in keeping jobs, disappearing sexual urges and impotence, depression caused by chronic pain and fear of death. Young clients, they fear their marriages, their children and the burden they inflict on their families. The lifestyle of hemodialysis clients and restrictions on food intake and fluids often deprive the life span of the client and his family. This is as a stressor for the client. Based on this, restrictions on food and fluid intake can be explained as the following figure:

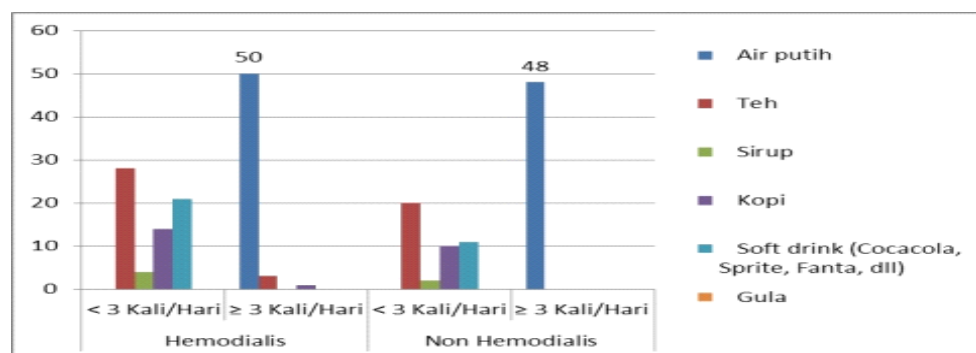


Figure 1. The comparison between hemodialysis and non hemodialysis patient water intake

Patients with renal failure both before and after hemodialysis therapy tend to experience fluid volume fluctuations. In some studies it has been suggested that routine hemodialysis patients, fluctuations or excess fluid are caused by decreased renal function in fluid expression and lack of patient adherence in limiting patient fluid intake. Although patients with chronic renal failure early in HD have been given health counseling to reduce fluid intake during the day, but in the next HD therapy is still often the case patients who do not follow the advice given.

The success of hemodialysis depends on patient compliance. Various researches on patient compliance with chronic renal failure who received hemodialysis therapy obtained varying results. In general, non-adherence of dialysis patients included 4 (four) aspects of non-compliance following hemodialysis program (0% -2.3%), non-compliance in treatment program (1.2% -81%), non-compliance with fluid restriction (3.4% -74%) and non-adherence following the diet (1.2% -82.4%). Reportedly more than 50% of patients undergoing hemodialysis therapy are not adherent in the restriction of fluid intake primarily in the pattern of daily habits by drinking soft drinks, tea and coffee.

With the duration of therapy, and performed routinely every week resulting in patients in their daily lives disrupted so that the problem becomes accumulate. Stacking the problem causes the patient to experience depression/stress. Depression/stress is a feeling of sadness experienced by all people and can affect the activity,

diet, sleep, concentration and even have ideas for suicide.

Table1. List of questions relate to hemodialysis patient period of treatment condition

No	Question	Hemodialysis		
		Yes	No	Total
1	Do you undergo hemodialysis more than 1 year?	20	30	50
		40,0%	60,0%	100,0%
2	Do you regularly undergo HD 2x-3x every week?	30	20	50
		60,0%	40,0%	100,0%
3	Do you undergo hemodialysis within the specified time?	36	14	50
		72,0%	28,0%	100,0%
4	Do you need a long time to adapt to your current condition?	30	20	50
		60,0%	40,0%	100,0%
5	Can you adapt to your current condition within 1 year?	31	19	50
		62,0%	38,0%	100,0%

In the Hemodialysis group, the 1st question is answered No by most respondents is 60.0%; Question 2 answered Yes by most respondents that is as much as 60.0%; Question 3 answered Yes by most respondents that is as much as 72.0%; Question 4 answered Yes by most respondents that is as much as 60.0%; Question 5 answered Yes by most respondents that is as much as 62.0%. Hemodialysis procedure is very beneficial for patients with renal failure, but it does not mean not risky and has no side effects. Various problems and complications can occur in patients undergoing hemodialysis hence required an adaptation process for patients in hemodialysis therapy. Hemodialysis complications can cause feelings of discomfort, increase stress and affect the quality of life of patients. Hemodialysis measures significantly affect or affect the quality of life of patients such as physical health, psychological, spiritual, socioeconomic status and family dynamics.

Patients who experience automatic renal failure experience a decline in body function that causes the patient to feel useless that emotionally affects the interaction process with family, relatives, and others. This patient becomes disturbed, the patient becomes irritable and often closes himself in interacting. These conditions indicate that the patient has been depressed or stress.

Hemodialysis patients have limited role in their life in the family and in the community. Hemodialysis therapy will reduce the patient's activity time, so as to cause conflicts in the patient's self or the role of the patient in social reduced. Most patients complain of routine hemodialysis activities interfere with work and daily activities. Researchers argue that social skills are felt to be severe by patients undergoing hemodialysis therapy, influenced by aspects of limitations including physical capacity, which can interfere with the work and activities of patients in the community. Conditions experienced by hemodialysis patients greatly affect the patient's economic conditions as can be explained in the following table:

Table 2. List of questions relate to the hemodialysis and non hemodialysis patients period of treatment condition

No	Question	Hemodialysis			Non Hemodialysis		
		Yes	Non	Total	Yes	Non	Total
1	Do you agree with the cost of dialysis at this time	15	35	50	9	39	48
		30,0%	70,0%	100,0%	18,8%	81,3%	100,0%
2	Do you feel comfortable in the treatment process	20	30	50	21	27	48
		40,0%	60,0%	100,0%	43,8%	56,3%	100,0%
3	Are you given a healing alternative by the Doctor in the treatment process	7	43	50	8	40	48
		14,0%	86,0%	100,0%	16,7%	83,3%	100,0%
4	Whether with the low-protein diet is cheaper than hemodialysis	47	3	50	41	7	48
		94,0%	6,0%	100,0%	85,4%	14,6%	100,0%
5	With a low protein diet system is more effective than hemodialysis and peritoneal dialysis	43	7	50	40	8	48
		86,0%	14,0%	100,0%	83,3%	16,7%	100,0%
6	Are you able and agree with the cost in the kidney transplant program	1	49	50	1	47	48
		2,0%	98,0%	100,0%	2,1%	97,9%	100,0%
7	Is appropriate to the service you received during the treatment process	39	11	50	32	16	48
		78,0%	22,0%	100,0%	66,7%	33,3%	100,0%
8	Do you get accurate cost information related to hemodialysis services	40	10	50	40	8	48
		80,0%	20,0%	100,0%	83,3%	16,7%	100,0%
9	Have you been carrying out food intake according to the standards for patients undergoing treatment	29	21	50	31	17	48
		58,0%	42,0%	100,0%	64,6%	35,4%	100,0%
10	Do you feel any objection to the low protein diet program?	4	46	50	1	47	48
		8,0%	92,0%	100,0%	2,1%	97,9%	100,0%

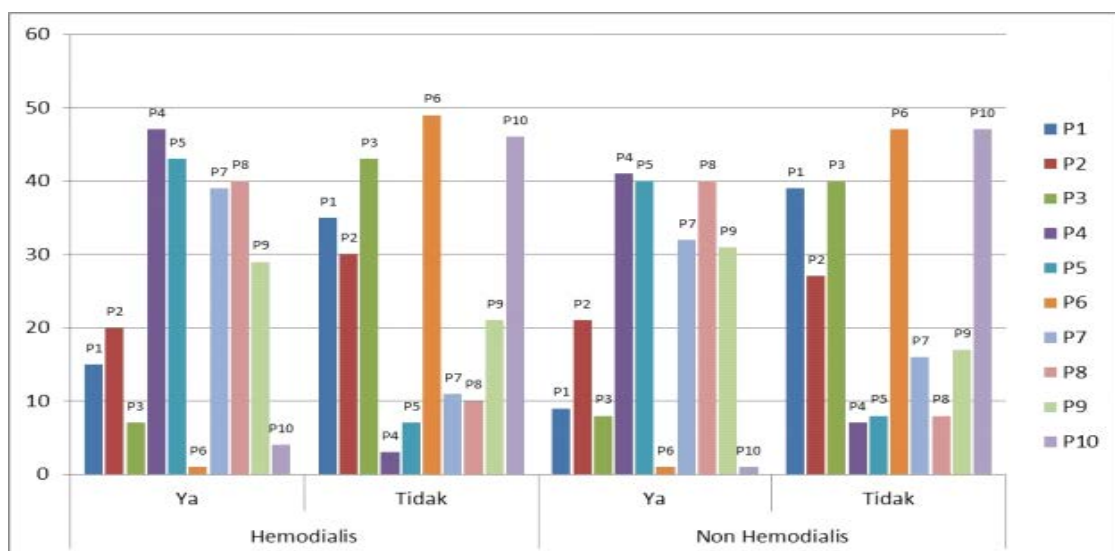


Figure: 2, Results relate to the hemodialysis patient period of treatment condition

In the Hemodialis group, the 1st question is answered No by most respondents is 70.0%; Question 2 answered No by most respondents that is as much as 60.0%; The 3rd question answered Not by most respondents that as much as 86.0%; Question 4 answered Yes by most respondents that is as much as 94.0%; Question 5 answered Yes by most respondents that is as much as 86.0%; Question 6 answered No by most respondents that is as much as 98.0%; Question 7 answered Yes by most respondents that is as much as 78.0%; Question 8 answered Yes by most respondents that is as much as 80.0%; Question 9 answered Yes by most respondents that is as much as 58.0%; And the 10th question answered No by most respondents that is as much as 92.0%.

In the Non Hemodialis group, the 1st question is answered Not by the majority of respondents ie 81.3%; Question 2 answered No by most respondents that is as much as 56.3%; 3rd question answered No by most respondents that is as much as 83.3%; Question 4 answered Yes by most respondents that is as much as 85.4%; Question 5 answered Yes by most respondents that is as much as 83.3%; Question 6 answered No by most respondents that is as much as 97.9%; Question 7 answered Yes by most respondents that is as much as 66.7%; Question 8 answered Yes by most respondents that is as much as 83.3%; Question 9 answered Yes by most respondents that is as much as 64.6 %%; And the 10th question answered No by most respondents that is as much as 97.9%. In the application of cost effectiveness analysis (CEA), estimates all cost information during hemodialysis treatment. The CEA here estimates the magnitude of useful information for decision makers with the alternatives of each of the health services it obtains

Patients with renal failure who undergo hemodialis, require 12-15 hours for dialysis each week, or at least 3-4 hours per treatment. This activity will last forever throughout his life. This is what takes the time and energy for patients with chronic renal failure who undergo hemodialysis therapy, so that there was a change, especially changes in the appearance of the role. The state of dependence on a lifetime dialysis machine as well as adjustment to sickness conditions result in changes in the patient's life. Changes in life is one of the triggers of stress. The change can be a variable identified as a stressor.

Changes in life is one of the triggers of stress. The change can be a variable identified as a stressor. Patients usually face financial problems, difficulties in maintaining work or role appearances, disappearing sexual urges and impotence, worrying about marriage and fear of death. The occurrence of stress because of the perceived and perceived stressor of an individual, is a threat that can cause anxiety. Changes experienced in hemodialysis patients, also felt by the family such as role change appearance. Family and friends view the patient as a person who has limitations in his life, because hemodialisa will take time that can reduce the patient in social activities, and can lead to conflict, frustration, and guilt in the family. This limitation causes the hemodialysis patient to be susceptible to stress. That stress begins with an imbalance between individual claims and resources. The higher the gap occurs the higher the level of stress experienced by the individual. The state of stress can lead to physiological, psychological, and behavioral changes in the individual resulting in the development of an illness.

4. Conclusion

Cost Effectiveness Analysis (CEA) is a method designed to compare health outcomes and costs used to implement programs or interventions with other alternatives that result in the same outcomes. Cost analysis is

required to know all the details of the costs to be incurred and used. Hemodialysis service unit one of the services are quite expensive in patients with kidney failure, because it affected the price of medical supplies, drugs and consumables. Kidney failure is more common in adults, especially in the elderly. However, over time, kidney failure is also found in early childhood. The cause of high rates of kidney failure who undergo hemodialysis therapy in many factors affecting lifestyle changes, high-fat diet and carbohydrates, as well as other causes such as genetic diseases that are immune abnormalities and birth defects.

Treatment of patients with renal failure with hemodialysis services is not as expensive as kidney transplant but because it has to be done continuously the cost of this treatment becomes very expensive. The problem that occurs today is when the number of patients and facilities are limited, so many patients who have to queue for dialysis. Because these limitations are difficult to overcome by the ability of government and community funding, the use of resources, especially the cost must be as effective and efficient as possible

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