

Quality of Life in Patients with Renal Failure Undergoing Hemodialysis

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ABSTRACT

A good quality of life is one of the many indicators that determine the success of hemodialysis (HD) therapy. Factors that significantly affect the quality of life of patients with renal failure who undergo HD include sociodemographic condition, mental state (depression), severity of kidney disease, accompanying disorders, HD duration, non-adherence towards prescribed medication and nutritional problems. Among said factors, the metabolic and nutritional disorder commonly known as protein energy wasting (PEW), plays an important role in the clinical course of renal failure patients. The aim of nutrition management in patients with renal failure is to slow down the progression of kidney disease, improve quality of life, and reduce cardiovascular morbidity and mortality.

Keywords: *Quality of Life, Renal Failure, Hemodialysis.*

INTRODUCTION

The rising prevalence of chronic kidney disease (CKD) has led to an increase in the number of patients requiring hemodialysis (HD). The Global Burden of Disease data in 2010 reported that CKD rose from the 27th leading cause of death globally in the year 1990 to become the 18th in 2010.¹ Renal failure is a clinical condition characterized by an irreversible reduction of renal function, resulting in the inability to maintain biochemical homeostasis and accumulation of body fluids and waste products if one only relies on the help of conservative treatments. Hence, this condition requires renal replacement therapy (RRT) in the form of either dialysis or kidney transplantation.² Based on the 2016 Indonesian Renal Registry

(IRR), 98% of renal failure patients undergo HD therapy and 2% undergo Peritoneal Dialysis (PD) therapy.¹

Hemodialysis can be defined as a process of exchanging the composition of blood solutes using a solution of dialysate (dialysis fluid). It can also be described as a process of separating, filtering, or cleaning of blood through a semipermeable membrane which is performed on patients with both acute and chronic impaired renal function.² The frequency of HD varies depending on the remaining kidney function, although on average a patient undergoes HD three times a week, with a duration of three to four hours per treatment. Besides the time intensive nature, HD also poses physiological, psychological, and socioeconomic issues that

impacts not only the patient but also the caregiver and society in general. Collectively, these effects will impact the quality of life of renal failure patients undergoing HD.^{2,3}

THE CONCEPT OF QUALITY OF LIFE

Definition

The quality of life of an individual cannot be determined for certain due to its subjectivity, and only the person in question will be able to assess it.⁴ The World Health Organization Quality of Life (WHOQOL) group states that quality of life is an individual's perception of their position in life, in the cultural context and value system in which the individual lives, and in correlation with personal goals, expectations, standards and desires. This is a concept, which coalesces with the various ways one can reach adequate levels of physical and psychological state, functional independence, social relations, and bond with the surrounding environment.^{4,5}

There are two basic components of quality of life, namely subjectivity and multidimensionality. Subjectivity means that the quality of life can only be determined from the point of view of the individual, and hence can only be known by direct query towards said individual. Meanwhile, the multidimensionality of quality of life refers to the way that it is viewed from multiple aspects within an individual's life, including biological/physical, social, and environmental. Polinsky (2000) concluded that a person's quality of life is measured by considering the physical, psychological, social and the disease state or condition.⁴

The scope of quality of life

Based on a questionnaire developed by the WHO, there are five general areas of assessment used in the measurement of quality of life, which includes physical health, psychological health, degree of independence, social relationships and the individual's relationship with the environment. These five quality of life indicators are described in detail below.⁴

1. Physical health: general health, protein energy malnutrition (PEM), pain, energy

and vitality, sexual activity, sleep and rest.

2. Psychological health: ways of thinking, learning, memory and concentration.
3. Level of independence: mobility, daily activities, communication, work ability.
4. Social relationship: social relations, social support.
5. Environment: security, home environment, job satisfaction.

RENAL FAILURE PATIENTS RESPONSE TO HEMODIALYSIS

Chronic kidney disease (CKD) negatively affects the physical and biopsychosocial aspects of the lives of individuals with the disease, thereby affecting the quality of life (QOL) of patients and their families.⁶

Since chronic diseases have an impact on health-related quality of life (HRQOL), this has become a key outcome measure in disease management. Patients with end stage renal disease (ESRD) require RRT in the form of dialysis or a kidney transplant. Kidney transplantation may offer a nearly normal life and is considered the optimum treatment for eligible patients. Alternative dialysis modalities are HD and PD.⁷ The initial response towards HD is generally favorable because the patient deems the intervention as something that can help overcome disease. However, varying response was reported among patients with acute kidney disease who received HD as part of emergency care.⁸

When the onset of renal failure is in the adaptive phase, several studies reported that there are 3 stages of adaptation to dialysis, which includes:⁸

1. The Honeymoon period.

This phase is the initial response towards HD, starting from for the first few weeks until the next 6 months. Usually during this phase, improvement in physical and psychological conditions appear followed by the emergence of hope and confidence to achieve recovery. During the honeymoon period, patients tend to respond positively to the healthcare providers involved.

2. Disenchantment and discouragement period

This period is marked by a decrease in self-confidence and hope for recovery. This

period lasts for 3 - 12 months. This phase arises due to boredom from the the inability to carry out everyday activities and the necessity to periodically undergo HD. During this time, the patient will experience prolonged sadness and hopelessness.

3. Long-term adaptation period

During this period, patients become more accepting of their own limitations as well as the complications they experience while undergoing HD. Although patients may still experience occasional depressive episodes, they are eventually able to adapt especially with support from their surrounding environment.

In reality, not all patients will experience these three phases, and it is common for each individual to go through different experiences. Other psychological issues that may arise among patients undergoing HD include depression, dementia or delirium, anxiety, sexual function disorders and socioeconomic problems.⁹

FACTORS THAT INFLUENCE THE QUALITY OF LIFE OF PATIENTS WITH RENAL FAILURE WHO UNDERGO HEMODIALYSIS

Sociodemographic Factors

Several studies have shown that social demographic factors such as age, gender, ethnicity, economic status, marital status, and employment status are related to a person's quality of life. In general, the physical domain of quality of life will deteriorate as the patient gets older. Differences in treatment outcome expectations and the ability to accept or adapt towards deteriorating health status can also explain the differences in quality of life between older and younger patients. Older patients tend to be more accepting of their health condition and consider it a consequence of aging.¹⁰

Race also affects the quality of life of patients who undergo HD. Some studies report that European patient groups report better physical and mental health compared to Asian patients. African-American patients who undergo HD report better quality of life compared to Caucasian, Hispanic and Asian patients.¹⁰

Several studies have reported that lower socioeconomic and education status are

associated with lower quality of life among HD patients, wherein employed patients have been shown to have a better quality of life.^{11,12}

Female patients with renal failure who undergo HD have a lower quality of life. Likewise, married patients report higher quality of life compared to patients those who are not married.^{11,12}

Clinical Factors

Several studies on HD patients have identified clinical and biochemical markers related to the quality of life of patients, particularly towards the physical dimension.^{10,11}

1. Hemoglobin: as a marker of anemia that often accompanies renal disease, hemoglobin level is strongly related to the physical function and well-being of the patient. Increased hemoglobin levels after treatment and erythropoietin therapy have been known to improve energy, stamina and patient participation in everyday activities.
2. Protein Energy Malnutrition (PEM): the prevalence of renal failure patients receiving HD therapy is increasing. Various attempts have been made to inhibit the progression of CKD. One of the factors that can hinder CKD progression is to implement a therapeutic diet during the pre-dialysis stage. On the other hand, CKD patients often suffer from nutritional disorders, which are a common comorbidity in renal disease. Among the multiple risk factors found in CKD, metabolic and nutritional disorders commonly known as PEM plays an important role in the course of CKD patients. The pathogenesis of PEM in CKD is multifactorial.
3. Comorbidity of HD patients: increase in the number of comorbid conditions (e.g., cardiovascular disease, peripheral vascular disease, hypertension and diabetes) exerts a negative influence on the physical quality of life domain of and may also affect the emotional domain of quality of life.

Psychosocial Factors

Psychological factors are related to the quality of life and mortality rates of HD patients, most notable among which are depression, the patient's perception of their disease, and the

amount of social support that they receive. Anxiety disorders have also been found to be associated with lower quality of life. Assessment of depression in patients undergoing HD is quite difficult because of the similarities between somatic depression symptoms with symptoms of kidney failure and the side effects of kidney replacement therapy. Several studies have proven a decrease in quality of life and increased mortality rates among HD patients with depression.^{10,11}

Social support, either from the patient's family or healthcare providers, plays an important role in improving the quality of life. Patients who received adequate social support from both their family and healthcare provider have reported a better quality of life.^{10,11}

Coping strategies hold an important role in determining the quality of life of HD patients. Kidney disease and HD are traumatic experiences that cause stress to patients and their families thereby reducing quality of life. Inability to adapt or cope with the situation will reduce the quality of life for HD patients.^{10,13}

EFFORTS TO IMPROVE THE QUALITY OF LIFE OF PATIENTS WITH RENAL FAILURE WHO UNDERGO HEMODIALYSIS

Resolving Anemia

Extensive studies and articles that investigate anemia among renal failure patients have come to similar conclusions. A systematic study by Leaf and Goldfarb concluded that erythropoietin therapy in a study using SF-36, showed a dramatic improvement in physical symptoms, vitality, energy, and performance. It also found a small improvement in social functioning and mental health, and an improvement in emotional health. Optimal improvement was found when hemoglobin levels ranges around 10-12 g/dl.^{10,14,15}

Resolving Malnutrition

Nutritional status assessment, monitoring, and intervention are components that play a crucial role in the management of patients with CKD. Adequate nutritional therapy is very important in the long-term management of CKD patients. The increasing prevalence of renal

failure has led to improved awareness throughout the world to further enhance strategies to inhibit the progression of CKD. The approach of nutritional therapy in pre-dialysis CKD is one of the strategies that aim to inhibit CKD progression. The approach generally focuses on the intake of protein, salt, potassium, calcium, phosphorus, alkaline derivates, oxalate, citrate, uric acid and water.¹⁶

The goal of nutrition management in cases of protein-energy wasting (PEW) is to fulfill optimal nutrient intake (carbohydrates, protein fats and micronutrients) which are expected to improve the nutritional status of patients. For decades, protein restriction has been the basic regime for CKD in the pre-dialysis stage. This restriction allows an intake of <0.6-0.8 gram/kg/day in which 50% of the protein source is expected to come from proteins with high biological value. This protein restriction must be accompanied by adequate calorie intake of 30-35 kcal/kg/day. The dietary regime is expected to prevent the occurrence of PEW in the pre-dialysis stage. When the patient has undergone dialysis, the amount of protein intake must be modified from <0.6-0.8 gram/kg/day to 1.2-1.5 grams/kg/day, depending on the patient's dialysis modality.¹⁷

Besides meeting the needs of protein and calories, fulfillment of other nutrients must also be considered using the following recommendations: 1) Adequate fat intake, especially unsaturated fats; 2) Recommended sodium intake is 2-3 grams/day; 3) Recommended potassium intake is 2-4 grams/day; 4) Fluid requirements must be regulated individually referring to the daily mandatory requirements of 1,000 mL/day (+ urine volume); 5) The need for micronutrients in the form of folic acid (1 mg/day), vitamin B6 (10-20 mg/day), vitamin C (30-60 mg/day), vitamin B1 (0.5-1.5 mg/day), and vitamin E 800 IU.¹⁷

Resolving Depression

Various treatment regimens have been reported to treat depression in patients with chronic kidney disease. Anti-depressant medications have been used and the results have been reported to significantly improve symptoms

of depression. However, overcoming depression pharmacologically is often contradictory for various reasons.¹⁰

Assessing Sexual Function

Studies have reported the correlation between sexual dysfunction and other quality of life parameters, such as various mental and physical components. Recent studies have shown that in men with mild to moderate depression, improvement of erectile dysfunction is associated with significant improvement of depression symptoms and quality of life.¹⁰

Resolving Stress

Stress in patients with kidney disease may become a burden. There are various stressors that affect the lives of HD patients. These stressors may include the impact of the disease on the overall body function, nutritional problems, unemployment, financial difficulties, time constraints, mood fluctuations, functional limitations, and fear of physical disability and death.¹⁰

Providing Social Support

Social support has been shown to correlate with a variety of domains including symptoms of depression, the patient's perception of disease, life satisfaction, and overall quality of life of patients. Marital and family problems are generally observed in patients with end stage renal disease and may have a negative impact on the individual. Active support from the community also includes spiritual involvement.¹⁰

CLINICAL APPLICATION OF QUALITY OF LIFE IN PATIENTS WITH RENAL FAILURE WHO UNDERGO HEMODIALYSIS

Assessing quality of life in patients who undergo hemodialysis

Assessing quality of life, in addition to more objective clinical indicators, is now increasingly applied given the numerous questions on its effectiveness and suitability. The Centers for Disease Control and Prevention (CDC) in USA recommends measuring quality of life to help determine the burden of preventable disease, based on its correlation with risk factors. Measuring quality of life will help monitor the progress towards achieving health goals.¹⁸

In nephrology, evaluating the quality of life involves determining the efficiency and effectivity of various forms of kidney replacement therapy (e.g., HD and peritoneal dialysis), in addition to evaluating the efficiency and effectiveness of various treatments that are applied to patients with renal failure (e.g., recombinant human erythropoietin therapy). Various disease-specific and domain-specific assessment tools have been used to assess quality of life in patients undergoing hemodialysis. Disease-specific assessment tools include Quality of Life Index-D (QLI-D), Kidney Disease Quality of Life Short Form (KDQOL-SF), Kidney Disease Questionnaire (KDQ), Renal Quality of Life Profile (RQLP), CHOICE Health Experience Questionnaire (CHEQ) and Renal Dependent Individualized Quality of Life Questionnaire. Domain-specific assessment tools include Barthel Index of Disability (BI) and McGill Pain Questionnaire (MPQ).¹⁸

Jesus NM et al (2018) who measured the QOL of individuals with CKD and compare the QOL scores of patients with CKD to the scores of disease-free individuals to find factors associated with better QOL. The WHOQOL-BREF scores of patients with CKD on hemodialysis were lower than the scores observed in the control group. Only the scores in the physical and psychological domains were statistically different between the case and control groups. The variables that more significantly affected the QOL of individuals with CKD on hemodialysis were having a spouse, the number of comorbidities, undergoing hemodialysis at a public clinic, more years of schooling, older age, living with more persons in the household, and longer hemodialysis sessions.⁶

Pratiwi DT et al (2019) at their study who determined the determinants quality of life among 200 hemodialysis patients in the HD Unit Dr. Hardjono Hospital, Ponorogo, East Java, in April 2019 using the Kidney Disease Quality of Life (KDQoL) SF-36 questionnaire showed age, gender, education, type of financing, family income, stress, frequency of hemo-dialysis, level of physical dependence, comorbidity, and social group affect the quality of life of HD patients.¹⁹

Assist in Decision-making on Patient Management

There are some studies compare the HRQOL of HD and CAPD patients. Surendra NK et al (2019) who measured the health utilities and identified socio-demographic and clinical factors associated with HRQOL for HD and continuous ambulatory peritoneal dialysis (CAPD) of 141 patients (77 HD and 64 CAPD) in Malaysia, showed that CAPD patients had a higher utility index score than HD patients but this was not statistically significant.⁷ Jung HY et al (2019) who compared HRQOL over time in 989 patients starting HD or PD showed both patients on HD and PD experienced significant decreases in different HRQOL domains over two years and the degree of changes in HRQOL over time was not different between dialysis modality. However, the scores of three (effects of kidney disease, burden of kidney disease, and dialysis staff encouragement, all $P < 0.05$) and two (sexual function and dialysis staff encouragement, all $P < 0.05$) ESRD domains were still higher in patients on PD compared with patients on HD at one and two years after initiation of dialysis, respectively. PD shows better HRQOL during the initial period after dialysis even after adjusting for clinical and socioeconomic characteristics, and the effect lasts up to two years.²⁰

The largest impact that quality of life poses on clinical practice is towards decision-making processes regarding administration of HD. Patients with renal failure are faced with various treatment options which must be decided on, such as when to start HD, acceptable HD modalities, the decision on kidney transplantation, and etc. If no medical contraindications are present, these decisions are made based on personal preference while considering the patient and family condition, and the patient's quality of life to treatment options.²¹¹⁷

CONCLUSION

A good quality of life is one of the several indicators of HD therapy success. The factors that affect the quality of life among renal failure patients who undergo HD include sociodemographic factors, mental factors (depression), severity of kidney disease, accompanying disorders,

HD duration, non-adherence to prescribed medications and nutritional problems. All are important comorbidities in kidney disease.

Among said risk factors, the metabolic and nutritional disorder commonly known as protein energy wasting (PEW) plays a crucial role in the course of renal failure patients. Nutrition management in patients with renal failure aims to not only slow down the progression of kidney disease, but to also improve quality of life and reduce cardiovascular morbidity and mortality.

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