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Quality of Life of Patients with Chronic Kidney Disease Undergoing Hemodialysis and Continuous Ambulatory Peritoneal Dialysis: A Literature Review

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ABSTRACT

The prevalence of Chronic Kidney Disease (CKD), according to the World Health Organization (2018), explains that CKD is a significant health problem, and there are 1/10 of the world's population identified with CKD. Many researchers emphasize that improving the quality of life will reduce complications, mortality, and morbidity and improve CKD patients' quality of life. The purpose of this study is to compare the quality of life of patients with chronic kidney disease who undergo hemodialysis (HD) therapy and continuous ambulatory peritoneal dialysis (CAPD). Searches were conducted on PubMed, ScienceDirect, and Scopus databases. The keywords used were "CKD," "hemodialysis," "continuous ambulatory peritoneal dialysis," and "quality of life". The article was limited to the last ten years, namely the period 2014 – 2024. Out of 76 articles related to the topic, 29 were used. There is literature that states that CKD patients who undergo CAPD have a better quality of life, but other literature mentions the opposite. The quality of life between CKD patients undergoing HD and CAPD does have a difference, but the difference is not significant. The quality of life between CKD patients undergoing HD and CAPD does have a difference, but the entire literature states that the difference is not significant.

Keywords: chronic kidney disease; quality of life; hemodialysis; continuous ambulatory peritoneal dialysis; human disease

HIGHLIGHTS

1. This review meticulously compares the quality of life in chronic kidney disease (CKD) patients undergoing hemodialysis (HD) versus continuous ambulatory peritoneal dialysis (CAPD). Although there are variations in patient experiences, the differences in quality of life between HD and CAPD are not statistically significant.

2. The study evaluates multiple dimensions of health, including cognitive and physical health, in CKD patients. While some studies suggest CAPD patients have better overall health outcomes, other research indicates HD patients might have slight advantages in specific areas. However, these differences are minor.

3. Emphasizing the need for a holistic approach to managing CKD, the review suggests that improving quality of life involves addressing not only medical and physiological aspects but also social, family, and psychological support systems. This comprehensive view is crucial for enhancing the overall well-being of CKD patients.

INTRODUCTION

Chronic kidney disease (CKD) refers to a condition where the kidneys are damaged or their ability to filter waste products from the blood, known as eGFR, is significantly reduced for three months or longer. CKD is marked by a gradual decline in kidney function, which can eventually lead to the need for dialysis or a kidney transplant. Kidney damage can be identified through various tests, including imaging scans, tissue samples, or the presence of abnormalities or excessive protein in the urine (Jin *et al.*, 2024; Petramala *et al.*, 2024; Vaidya *et al.*, 2024).

There are three primary modalities of therapy in treating CKD disease, namely kidney transplantation and dialing therapy, which includes HD and peritoneal dialysis (Arjuna *et al.*, 2016). While receiving a new kidney is the optimal solution for restoring kidney function in CKD patients, the lack of available organs and the high cost associated with transplants often force most patients to rely on dialysis to survive. (Torreggiani *et al.*, 2023; Vaidya *et al.*, 2024; Zeng *et al.*, 2022).

The prevalence of CKD, according to the WHO (2018) explains that CKD is a significant health problem, and there are 1/10 of the world's population is identified with CKD. It is estimated that five to ten million deaths every year are due to acute kidney failure (Syahputra *et al*., 2022). Based on primary health research data (Riskesdas), in 2018, the number of chronic kidney failure patients in Indonesia was 713.783 patients, with the highest number in West Java with 131,846 patients, and the lowest number in North Kalimantan with 1.838 patients (Ministry of Health, 2019). According to PENEFRI (2018), from 2007 to 2018, the number of new patients undergoing dialysis therapy in Indonesia totaled 66.433 people, and 132.142 patients were active in dialysis therapy in Indonesia. In 2018, the number of new patients undergoing HD increased to 35.602 people, and every year, it is constantly increasing (Putri *et al*., 2023).

The high number of CKD cases results in the emergence of various health problems caused by a decrease in the ability of the kidneys to function so that it significantly affects all aspects of life, such as cardiovascular disorders, anemia, electrolyte and alkaline acid disorders, bone mineral disorders, death and quality of life which will also have an impact on families and society (Bello *et al*.., 2017; Sutadji *et al*., 2023). The assessment of the success of dialysis therapy is not only based on the adequacy of dialysis, such as laboratory and adjudication values, but also on the patient's quality of life because when physiological measures are met, HD patients do not necessarily have a satisfactory quality of life (Mailani, 2015). The results of the study showed that CKD patients undergoing dialysis therapy had a worse quality of life compared to the general public and experienced disorders or lower scores in most quality-of-life domains (Galaresa, 2023). Many researchers emphasize that improving the quality of life will reduce complications, mortality, and morbidity, and improving the quality of life of CKD patients requires a holistic family approach, both medical, family, social and from the patient himself (Ania-Gonzales *et al*., 2022; Wakhid *et al*., 2018).

OBJECTIVE

This study aims to evaluate the quality of life of chronic kidney disease (CKD) patients undergoing dialysis therapy using two main methods, namely HD and CAPD. Based on the different findings from various studies, there is a need to investigate the factors that influence the quality of life of CKD patients undergoing these two types of therapy. The main objectives of this study include Analyzing the differences in quality of life between CKD patients undergoing HD and CAPD therapy, assessing the impact of cognitive aspects on the quality of life of CKD patients undergoing HD and CAPD, and identifying factors that contribute to differences in patient quality of life, including demographic characteristics, site of therapy, and differences in assessment instruments used. This article can, therefore, provide recommendations for clinical practice and health policy based on the findings of this study to improve the quality of life of CKD patients undergoing dialysis.

Hemodialysis

Hemodialysis (HD) provides patients with effective waste removal and fluid balance, often leading to improved physical health outcomes. This can positively impact various aspects of their quality of life (Purwaningtyas et al., 2019; Suryansyah et al., 2019). Moreover, HD centers offer social interaction opportunities, which can be beneficial for patients' emotional well-being (Pretto et al., 2020). However, HD necessitates regular visits to a dialysis center, which can be time-consuming and disruptive to daily life. Additionally, the procedure can be associated with pain and discomfort, particularly for those with inadequate vascular access or experiencing complications (Santana et al., 2020). Travel to and from the dialysis center can also be a burden for some patients, potentially affecting their overall quality of life (Djamaluddin et al., 2024).

Continuous Ambulatory Peritoneal Dialysis

Continuous Ambulatory Peritoneal Dialysis (CAPD) offers patients the advantage of independence and flexibility as they can perform dialysis at home without the need for frequent visits to a dialysis center (Tian et al., 2016). This flexibility allows patients to maintain their daily routines and schedules, contributing to a better quality of life (Jamila & Herlina, 2019). Additionally, studies suggest that CAPD may be associated with better cognitive function compared to hemodialysis in some cases, although these findings can be influenced by various factors (Neuman et al., 2018). However, CAPD has its challenges. Patients may experience discomfort and pain during the procedure, and there is a risk of complications such as peritonitis, hernia, and flow blockage (Tian et al., 2016). These issues can negatively impact a patient's quality of life and may necessitate additional medical intervention (Chuasuwan et al., 2020; Matrisch et al., 2024).

DISCUSSION

Patients with chronic kidney disease (CKD) often experience multiple comorbidities as a consequence of HD treatment, including anemia and blood pressure fluctuations. This state of multimorbidity can significantly impair the patient's quality of life (Purwaningtyas *et al*., 2019; Suryansyah *et al*., 2019). A study conducted by Zeng *et al.* (2022) on 265 CKD patients undergoing dialysis therapy using three instruments to assess the quality of life of CKD patients, namely MoCA, SF-36, and KDTA, showed that CKD patients who received CAPD therapy had lower scores in cognitive aspects and quality of life compared to CKD patients who received HD therapy (Zeng *et al*., 2022).

A study conducted on 141 CKD patients with quality of life assessment instruments using utility index score and Visual Analogue Scale (VAS) found that patients who received HD therapy modalities had a small advantage in quality of life compared to patients with CAPD therapy, although there was a

slight difference in the amount of quality of life, but the difference was not significant (Rini *et al*., 2021). Surendra *et al.* (2019), in their research, obtained different findings from what Zeng *et al*. obtained. The study was conducted on 250 CKD patients who underwent dialysis therapy with a quality of life assessment instrument using EQ-5D and the results were obtained that patients undergoing HD had a better quality of life compared to patients with CAPD but the difference in quality of life was not significant (Surendra *et al*., 2019).

The research of Surendra *et al.* (2019) and Rini *et al.* (2021) has the same conclusion, namely that both show that there is no significant difference in the quality of life in CKD patients with HD or CAPD therapy modalities. However, the two literatures have different results, namely the research Rini *et al* (2021); Murdeshwar *et al*., (2023); Paneerselvam *et al*., (2019) showed that patients who underwent HD had a slightly better quality of life compared to those who underwent CAPD. This is in line with the research of Lin *et al.* (2015), which stated that HD does not increase the risk of low quality of life compared to those who receive CAPD therapy. There is no noticeable difference in the effects of peritoneal dialysis and HD on cognitive dysfunction.

There is another similar study, namely the study of Tian *et al* (2016), which states that every time a patient does HD, the target value of Kt/V is achieved chiefly, which helps improve the quality of life. Meanwhile, CAPD, which is supposed to be more flexible and continuous during dialysis, has comorbidities and complications such as peritonitis, hernia, and blockage of flow from CAPD access, so these conditions can affect the patient's quality of life (Tian *et al*., 2016).

This is in line with the research of Neuman *et al* (2018), which also concluded that CAPD was associated with better quality of life outcomes than HD at the beginning of the action and the follow-up period even though HD patients in the study sample were excluded from cognitive tests more often than CAPD. There may be a slight bias to be generalized to specific populations (Chuasuwan *et al*., 2020; Matrisch *et al*., 2024). This is because CKD patients undergoing HD therapy form strong social and emotional bonds between HD patients when therapy is ongoing and interact like siblings so any death or deterioration of the condition of other HD patients will affect the individual psychologically even though death is a constant fear among CKD patients (Pretto *et al*., 2020).

The results of the study conducted by Jamila and Herlina (2019) concluded that there was a difference in the quality of life reviewed from the dimensions of physical health (p-value = 0.001), psychological health (p-value = 0.008), social relationships (p-value = 0.001), and environment (p-value = 0.002) in CKD patients undergoing HD therapy and patients undergoing CAPD therapy, thus indicating that patients with CAPD therapy have physical health, better psychological, social, and environmental health compared to patients undergoing HD therapy. The conclusion of the results of this study is in line with the research of Zeng *et al.* (2022) (Jamila & Herlina, 2019).

CKD patients who receive HD therapy without serious complications only feel pain from the therapy that occurs two or three times a week. As for HD patients who have undergone treatment for an extended period with competent vascular access, they feel less pain because they have adapted and are more comfortable undergoing HD, while CKD patients who undergo CAPD therapy do regular independent dialysis at home four times a day, more often feel discomfort because they have a lot of wasted time and sometimes feel pain while undergoing therapy (Santana *et al*.., 2020).

The research conducted by Zeng *et al.* (2022) concluded that the quality of life of CKD patients who underwent CAPD had a lower quality of life compared to those who received HD therapy. Good quality of life can be affected by adequate transportation access or a location close to where the patient lives that makes them consistent with undergoing HD therapy. Adequate access can also reduce stress and discomfort during travel, which can improve the quality of life. Meanwhile, the poor quality of life is due to difficulties in accessing the HD center, which makes them reluctant to stop doing HD therapy (Djamaluddin *et al*., 2024).

The difference in results in the literature can be caused by differences in therapy locations; for example, this patient experience will be different from the experience of patients managed in dialysis centers or large hospitals, with ordinary hospitals at the district level. In addition, demographic characteristics and sample differences also affect statistical counts. Another factor that can cause differences in research results is the differences in the instruments used to assess the quality of life of CKD patients. The advantage of this literature review is that it combines previous research so that it can be compared with research that has been combined. The strength of this article lies in providing a comparative analysis between HD and CAPD therapies, thus presenting insights into the relative benefits of each treatment modality. However, some studies, such as those conducted by Neumann et al. (2018), have the potential to be biased due to the exclusion of certain groups of patients from cognitive tests, which is a limitation of this article.

CONCLUSION

There is literature that states that CKD patients who undergo CAPD have a better quality of life. However, other literature states the opposite, namely, patients who undergo HD have a better quality of life. The quality of life between CKD patients undergoing HD and CAPD does have a difference, but the entire literature states that the difference is not significant.

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CONFLICT OF INTEREST
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AUTHOR CONTRIBUTION
All authors have contributed to all processes in this research, including preparation, data gathering, and analysis, drafting, and approval for publication of this manuscript.

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