

Quality of Life Among Patients with End-Stage Renal Disease Undergoing Peritoneal Dialysis: A Systematic Review

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Abstract: **Background:** Peritoneal dialysis was one specific method of dialysis used to manage an End-Stage Renal Disease. Therefore, this systematic review analyzed the quality of life among patients with End-Stage Renal Disease undergoing peritoneal dialysis. **Methodology:** The PubMed and Embase were the databases used with keywords. The PRISMA guideline was used yielding a total of 112 records. The STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) checklist was the most appropriate appraisal tool to evaluate the studies included. **Results:** Of the 112 studies, only 3 were used in this review. Significant domains of the quality of life such as the physical, psychosocial, and vitality appropriate for patients undergoing peritoneal dialysis were found to be achieved by End-Stage Renal Disease. **Conclusion:** The overall well-being of End-Stage Renal Disease patients undergoing peritoneal dialysis developed more effective strategies to enhance the quality of life.

Keywords: end-stage renal disease, quality of life, peritoneal dialysis.

1. Introduction

End-Stage Renal Disease (ESRD) represents the most advanced phase of chronic kidney disease, characterized by the near-total loss of kidney function (Ejaz et al., 2021). At this critical stage, the kidneys can no longer perform their essential role of filtering waste products and excess fluids from the blood. Consequently, patients with ESRD require renal replacement therapy to sustain life. Renal replacement therapy options include dialysis, a process that artificially removes waste and excess fluids from the blood, to achieve significant domains of the quality of life (QOL) (Chuasuwat et al., 2020).

Peritoneal dialysis is one specific method of dialysis used to manage ESRD (Hiramatsu et al., 2020). This treatment utilizes the peritoneum, a semipermeable membrane lining the abdominal cavity, as a natural filter. During peritoneal dialysis, a cleansing fluid called dialysate is introduced into the abdominal cavity through a catheter (Andreoli & Totoli, 2020). After a specified dwell time, the dialysate, now containing the filtered waste, is drained from the abdomen and replaced with fresh fluid, repeating the cycle (Nourse et al., 2021). This continuous process helps maintain the body's balance of fluids and electrolytes, effectively performing the filtration role that the damaged kidneys can no longer accomplish (Cullis et al.,

2021).

That is why this systematic review aimed to analyze the QOL among patients with ESRD undergoing PD.

2. Methodology

The systematic review process commenced with the use of databases and key words to select appropriate studies. Table 1 showed the PubMed and Embase as databases with keywords.

PubMed, maintained by the United States National Library of Medicine, offered access to a vast repository of life sciences and biomedical research, encompassing millions of citations from various medical journals (Ossom Williamson & Minter, 2019). Its comprehensive indexing of clinical studies, reviews, and trials made it an invaluable resource for understanding the multifaceted impacts of ESRD and peritoneal dialysis on patients' QOL. Embase, produced by Elsevier, provided another crucial dimension to the literature search, with its broader focus on international biomedical and pharmacological research (Gusenbauer, 2022). Embase's extensive indexing of European and Asian journals, along with its inclusion of conference abstracts and proceedings, ensured that the review captured a more global perspective on ESRD and PD. This database's emphasis on drug and device studies also enriched the review by incorporating detailed information on the pharmacological and technological interventions available for ESRD patients. Furthermore, the combination of these databases facilitated a more rigorous and exhaustive search strategy. PubMed's robust MeSH (Medical Subject Headings) terms enabled precise and targeted searches, ensuring that relevant studies were not overlooked (Gusenbauer & Haddaway, 2020). Embase complemented this with its Emtree thesaurus, which offered additional indexing terms and enhanced the ability to capture studies with varying terminologies and regional differences.

The PRISMA guideline found in figure 1, had the identification of records through extensive database searching and other sources, yielding a total of 112 records. From this initial pool, 12 duplicates were removed, leaving 100 articles to be screened based on their titles and abstracts. During the screening phase, 74 articles were excluded for various reasons,

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including 64 that were unrelated to the topic, six that were reviews or meta-analyses, and four that were in languages other than English. The remaining 26 records were then assessed for eligibility. At this stage, 18 articles were excluded due to a lack of sufficient data, and five were discarded for being retrospective or not research-based. Ultimately, only three studies met the criteria and were included in the quantitative synthesis for the systematic review.

3. Results

Of the 112 studies, only 3 were used in this review. Table 2 presented a comprehensive overview of studies focusing on different domains of QOL in patients with ESRD undergoing peritoneal dialysis.

The physical domain was examined in a cross-sectional study by Azzeh et al. (2022), which highlighted the physical well-being of patients with ESRD on peritoneal dialysis. This study compared with other studies underscored the significant physical discomfort and challenges these patients faced, which were intricately associated with their overall physical health and treatment adherence (Bello et al., 2022; Milan Manani et al., 2020).

In the psychosocial domain, Sallam et al. (2022) conducted a cross-sectional study that explored the sense of motivation and engagement among patients dealing with ESRD on PD. Sallam et al. (2022) emphasized the importance of psychological support and the impact of mental health on patients' ability to manage their condition and maintain a positive outlook on life. Compared with other study findings, this pointed to a crucial need for interventions that addressed the psychosocial aspects to enhance patient motivation and engagement (Blake & Brown, 2020; Cangini et al., 2019; Lu & Chai, 2022).

The vitality domain was investigated by Alhamad et al. (2023), who carried out a cross-sectional study focusing on the sense of energy and vigor in patients with ESRD on PD. This study illustrated how the patients' vitality and energy levels were affected by their condition and treatment, highlighting the role of comprehensive care strategies in improving these aspects. In this research, like other studies, it also suggested that enhancing patients' vitality could significantly contribute to better treatment outcomes and overall QOL (Guedes et al., 2021, 2022; Sitjar-Suñer et al., 2022).

These physical (Tao et al., 2021), psychosocial (Nili et al., 2023), and vitality (Guedes et al., 2020) domains collectively provided valuable insights into the multifaceted impact of ESRD on patients undergoing PD. They revealed the intricate connections between the 3 domains and underscored the importance of addressing each aspect to improve the overall QOL for these patients (Khaled et al., 2024; Mousa et al., 2021). In addition to the primary domains of physical, psychosocial, and vitality, several other aspects fell under these overarching categories for ESRD patients undergoing peritoneal dialysis.

Under the physical domain, the management of symptoms such as pain and fatigue were critical (Tian et al., 2020). Pain, often resulting from both the disease and the dialysis process, affected the patients' overall physical comfort and ability to engage in daily activities (K. Zhang et al., 2020). Fatigue, a common and debilitating symptom, impacted the patients' physical functionality and their ability to maintain a normal lifestyle (Maninet et al., 2023). Nutritional status also played a significant role, as maintaining an adequate diet was essential

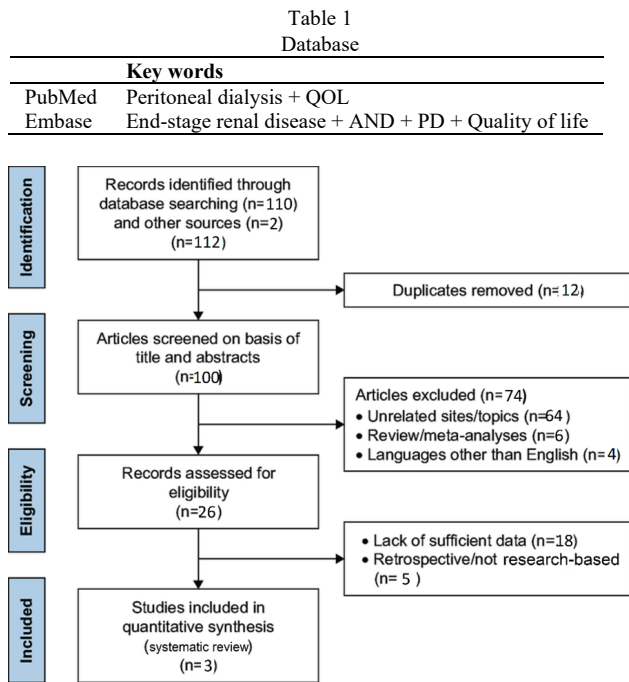


Fig. 1. PRISMA guideline

This rigorous selection process ensured that only the most relevant and robust studies were considered, providing a comprehensive and reliable synthesis of the available research on the subject.

The best critical appraisal tool checklist for the three studies was the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) checklist because all conducted the cross-sectional study design (Cuschieri, 2019). The STROBE checklist ensured comprehensive and transparent reporting of cross-sectional studies. Using the STROBE checklist ensured that these cross-sectional studies met the standards for high-quality reporting, facilitating better interpretation and replication of the findings. The checklist covered essential aspects such as title and abstract, introduction, methods, results, discussion, and funding. By adhering to the STROBE guidelines, these studies were analyzed with clarity in presenting their objectives, methods, results, and conclusions, thereby contributing to the robustness and reliability of their research outcomes.

Table 2
Result of the review

Variables	Studies	Findings
Physical domain	(Azzeh et al., 2022)	physical well-being associated with ESRD on PD
Psychosocial domain	(Sallam et al., 2022)	sense of motivation and engagement for those grappling with ESRD on PD
Vitality domain	(Alhamad et al., 2023)	sense of energy and vigor for those grappling with ESRD on PD

for managing the disease and improving overall physical health (Kiebalo *et al.*, 2020).

Within the psychosocial domain, emotional well-being was a crucial component (Duncanson *et al.*, 2022). The ESRD patients frequently experienced depression and anxiety, stemming from the chronic nature of the disease and the demands of ongoing dialysis treatments (Nadort *et al.*, 2022). Social support systems, including relationships with family, friends, and healthcare providers, were vital in providing emotional stability and enhancing the patients' ability to cope with their condition (Brown *et al.*, 2020). The sense of autonomy and control over their treatment also influenced their psychosocial health, as feeling empowered in their healthcare decisions contributed positively to their mental well-being (Talbot *et al.*, 2022).

The vitality domain encompassed aspects such as energy levels and overall life satisfaction (Aniort *et al.*, 2021). Sleep quality, often disrupted by the symptoms of ESRD and the peritoneal dialysis process, significantly impacted the patients' vitality (H. Zhang *et al.*, 2021). Poor sleep exacerbated feelings of fatigue and reduced their overall energy levels. Engaging in physical activities and exercise, tailored to their health condition, helped improve their energy and vitality, promoting a sense of normalcy and enhancing their quality of life (Bennett *et al.*, 2020). Additionally, the ability to participate in hobbies and leisure activities provided a sense of fulfillment and contributed to their overall vitality (Tarca *et al.*, 2022).

Together, these additional aspects under the physical, psychosocial, and vitality domains highlighted the multifaceted challenges faced by ESRD patients undergoing peritoneal dialysis (Finkelstein & Foo, 2020). Addressing these areas holistically was essential in improving their overall quality of life and ensuring comprehensive care. The interconnected nature of these domains emphasized the need for a multidisciplinary approach in managing ESRD, focusing not only on the medical aspects but also on the emotional, social, and lifestyle factors that influenced the patients' well-being. By integrating findings from Azzeh *et al.* (2022), Sallam *et al.* (2022), and Alhamad *et al.* (2023), healthcare providers could develop more holistic and effective care plans that catered to the diverse needs of patients with ESRD on peritoneal dialysis.

Using the STROBE checklist to analyze further the 3 studies — Azzeh *et al.* (2022), Sallam *et al.* (2022), and Alhamad *et al.* (2023) — revealed several critical insights into their design, methods, and reporting quality. The STROBE checklist provided a comprehensive framework for evaluating the clarity and completeness of observational studies, ensuring transparency and reproducibility (Sharp *et al.*, 2020).

In the study by Azzeh *et al.* (2022), the title and abstract clearly stated the research question, study design, and key results, aligning well with the STROBE guidelines. The introduction provided a robust background and rationale for the study, identifying the significance of malnutrition among hemodialytic patients. The methods section meticulously described the study design, setting, participants, and variables. It detailed the data sources, measurement tools, and statistical methods used to analyze the prevalence of malnutrition. Results

were presented with appropriate summary measures and were accompanied by tables and figures for better understanding. The discussion section contextualized the findings within the existing literature, discussing the study's limitations and implications for practice. However, some areas for improvement were noted in reporting participant flow and the handling of missing data, which were partially addressed.

Similarly, Sallam *et al.* (2022) adhered closely to the STROBE checklist. The title and abstract succinctly conveyed the study's aim and principal findings. The introduction provided a comprehensive review of the prevalence of depression in end-stage renal disease patients, highlighting the study's importance. Detailed descriptions of the study design, population, data collection methods, and statistical analyses were provided in the methods section. The results were presented clearly, with relevant measures of variability and uncertainty, supported by tables and graphs. The discussion reflected on the study's findings in the context of existing research, acknowledged limitations such as potential selection bias, and suggested areas for future research. The study's funding sources and potential conflicts of interest were also transparently reported, enhancing its credibility.

Alhamad *et al.* (2023) also followed the STROBE checklist effectively. The title and abstract outlined the study's objective and key findings, providing a clear overview. The introduction established the study's context, emphasizing the significance of understanding factors affecting adherence to hemodialysis therapy. The methods section included detailed descriptions of the study design, setting, participant selection, data collection, and analysis procedures. The results section presented comprehensive data with appropriate statistical measures, illustrated by well-organized tables and figures. The discussion interpreted the findings within the broader literature, acknowledged study limitations, and proposed practical implications and recommendations for future research. The study's funding and potential conflicts of interest were transparently disclosed, contributing to its overall reliability.

Overall, the application of the STROBE checklist demonstrated that all three studies adhered to high standards of reporting for observational research. Each study effectively communicated its design, methods, results, and conclusions, enhancing their validity and reliability. However, some minor areas for improvement were noted, particularly in detailing participant flow and handling missing data, which could further strengthen the robustness of their findings. By adhering to the STROBE guidelines, these studies contributed valuable insights to their respective fields and provided a solid foundation for future research.

4. Discussion

The studies by Azzeh *et al.* (2022), Sallam *et al.* (2022), and Alhamad *et al.* (2023) displayed various forms of biases found in table 3, that could potentially impact their findings. Selection bias in Azzeh *et al.* (2022) was due to the inclusion criteria being limited to two centers in the Jeddah region, which had fully represented the broader population of patients with ESRD. Similarly, Sallam *et al.* (2022) focused on a specific population

Table 3
Biases found from the studies

Study	Selection Bias	Attrition Bias	Detection Bias	Reporting Bias
Sallam et al., 2022	Selection bias was present as the study focused on a specific population in Saudi Arabia, possibly limiting generalizability.	Attrition bias could have resulted from missing data on patients who did not complete the depression assessments.	Detection bias could have occurred if the depression scales used did not capture the full spectrum of depressive symptoms.	Reporting bias was reduced by including detailed results, although non-significant findings might have been less emphasized.
Alhamad et al., 2023	Selection bias was possible due to the regional focus in Al-Ahsa, which might not represent the broader population.	Attrition bias might have been introduced if patients who were non-adherent to hemodialysis were underrepresented.	Detection bias was mitigated by employing rigorous methods to measure energy and vigor, but subjective measures could still influence results.	Reporting bias was minimized by comprehensive reporting, though some negative findings might have been less highlighted.
Azzeh et al., 2022	Potential selection bias due to the inclusion criteria being limited to two centers in the Jeddah region.	Attrition bias might have occurred if patients who dropped out had different characteristics from those who completed the study.	Detection bias was minimized by using standardized assessment tools for physical well-being.	Reporting bias was addressed by transparently reporting all findings, but some results might have been underreported.

in Saudi Arabia, thus possibly limited the generalizability of the results. Alhamad et al. (2023) also faced selection bias as the study was confined to the Al-Ahsa region, potentially not reflecting the wider population.

Attrition bias in these studies was another concern. In Azzeh et al. (2022), attrition bias might have occurred if patients who dropped out had different characteristics from those who completed the study. Sallam et al. (2022) had experienced attrition bias due to missing data from patients who did not complete the depression assessments, possibly affecting the study's outcomes. In Alhamad et al. (2023), attrition bias was introduced if non-adherent patients to hemodialysis were underrepresented, leading to skewed results.

Detection bias was also a potential issue in these studies. Azzeh et al. (2022) attempted to minimize detection bias by using standardized assessment tools for physical well-being, yet the subjective nature of some measures could still influence the outcomes. Sallam et al. (2022) had faced detection bias if the depression scales used did not capture the full spectrum of depressive symptoms, thereby potentially affecting the accuracy of the findings. In Alhamad et al. (2023), while rigorous methods were employed to measure energy and vigor, the use of subjective measures had still introduced detection bias.

Reporting bias was another factor to consider. In Azzeh et al. (2022), although all findings were transparently reported, some results might have been underreported, possibly leading to an incomplete understanding of the study's outcomes. Sallam et al. (2022) reduced reporting bias by including detailed results; however, non-significant findings had been less emphasized, potentially skewing the overall interpretation of the data. Alhamad et al. (2023) minimized reporting bias through comprehensive reporting, yet some negative findings had been less highlighted, which had influenced the perceived effectiveness of the interventions studied.

The synthesis of new knowledge from the systematic review of the three studies revealed significant insights into the QOL among patients with ESRD undergoing peritoneal dialysis. Each study contributed distinct findings that collectively highlighted various domains impacting patient well-being, including physical, psychosocial, and vitality domains (Manera et al., 2021). Despite the valuable information obtained, notable gaps identified, indicating areas for limited exploration of personalized interventions tailored to individual patient needs.

Azzeh et al. (2022) focused on the physical domain, demonstrating that physical well-being was closely associated with ESRD patients on peritoneal dialysis. Their study identified critical factors influencing malnutrition among these patients, highlighting the prevalence of physical discomfort and the necessity for improved nutritional interventions. However, the study primarily concentrated on malnutrition, leaving a gap in understanding other physical challenges such as pain management and mobility issues.

Sallam et al. (2022) examined the psychosocial domain, revealing a significant sense of motivation and engagement among ESRD patients on peritoneal dialysis. This study underscored the prevalence of depression and the psychological burden faced by these patients. While the research provided valuable insights into the mental health aspects, it lacked a comprehensive analysis of the broader psychosocial impacts, such as social support systems and coping mechanisms, which are crucial for a holistic understanding of patients' psychosocial well-being.

Alhamad et al. (2023) investigated the vitality domain, finding that a sense of energy and vigor was essential for patients grappling with ESRD on peritoneal dialysis. Their study emphasized the importance of adherence to hemodialysis therapy and its effect on patients' vitality. Although the findings highlighted the significance of maintaining energy levels, the study did not delve into the long-term sustainability of these vitality levels and the potential influence of lifestyle modifications.

5. Conclusion

While the systematic review offered valuable insights into the QOL of ESRD patients undergoing peritoneal dialysis, it also highlighted significant domains such as the physical, psychosocial, and vitality.

The overall well-being of ESRD patients undergoing peritoneal dialysis developed more effective strategies to enhance the QOL. The systematic review synthesized these findings, highlighting the multifaceted impact of ESRD on patients' QOL across different domains. Nevertheless, the review also identified substantial gaps in the literature. One prominent gap was the lack of comprehensive longitudinal studies that assess the long-term effects of peritoneal dialysis on patients' physical, psychosocial, and vitality domains.

Additionally, there was a need for more nuanced research on the interplay between these domains and how improvements in one area might influence others.

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