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Adherence, Quality of Life, and Determinant Factors among Patients with Chronic Kidney Disease Undergoing Hemodialysis: A Cross-Sectional Analysis

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ABSTRACT

Background: Hemodialysis sustains life for chronic kidney disease patients but imposes heavy physical, psychological, and social burdens. Poor adherence worsens complications and reduces quality of life, emphasizing the need to explore how compliance and patient well-being interact to improve outcomes.

Purpose: This study examined how quality of life and patient factors shape treatment adherence in chronic hemodialysis.

Methods: A cross-sectional design was employed with 158 adult patients recruited from hospitals in Central Java. Data were collected using validated instruments: KDQOL-36 for quality of life and MMAS for adherence. Multivariable linear regression analysis was performed to examine associations between variables.

Results: Moderate adherence was observed (47.66 ± 5.90), with the highest quality of life domain in the problem list (78.30 ± 9.67). Strong positive correlations were found between adherence and all QoL domains: SF-12 ($r = 1.000$, $p < 0.001$). Regression analysis showed that age, employment, education, income, dialysis duration, and CKD length negatively influenced adherence, while quality of life was a significant positive predictor ($B = 0.021$, $p < 0.001$), confirming that better adherence is strongly linked to improved quality of life across physical, psychological, and social domains, with patient-reported challenges being the most critical factor.

Conclusion: Quality of life influences adherence by affecting burden, motivation, and self-management, while age and longer dialysis history weaken this link through fatigue and reduced resilience. Socioeconomic factors help only with psychosocial support, so nursing should reduce treatment burden.

Keywords: Adherence, Cross-Sectional, Quality of Life, Renal Dialysis

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BACKGROUND

Chronic kidney disease (CKD) represents a major global public health challenge, with a steadily increasing prevalence and a substantial contribution to morbidity and mortality. The disease is characterized by a progressive and irreversible decline in renal function, and patients with end-stage disease require renal replacement therapy, most commonly hemodialysis. Although hemodialysis is a life-sustaining treatment, its long-term and complex regimen imposes considerable physical, psychological, and social burdens. Recurrent procedures, strict dietary and fluid restrictions, and dependence on fixed dialysis schedules frequently disrupt daily functioning and emotional resilience, thereby significantly compromising patients' quality of life (Sultan & Froelicher, 2025).

In recent years, quality of life has emerged as a primary outcome in the evaluation of hemodialysis care, reflecting a paradigm shift toward patient-centered approaches that extend beyond survival to encompass physical health, psychological well-being, and social functioning (Sultan & Froelicher, 2025). Importantly, quality of life is increasingly recognized not only as an outcome of care but also as a key determinant of treatment-related behaviors. Patients with higher perceived well-being tend to demonstrate greater motivation to adhere to demanding hemodialysis regimens, whereas diminished quality of life often driven by fatigue, depressive symptoms, and limited social support may undermine adherence. Within this framework, adherence is conceptualized as a behavioral response shaped by patients' subjective experiences, health perceptions, and psychosocial contexts (Hansen et al., 2022).

Adherence to the hemodialysis regimen, including attendance at scheduled dialysis sessions, compliance with dietary and fluid restrictions, and appropriate medication use, is a critical factor in preventing complications and improving clinical outcomes. Empirical evidence consistently demonstrates that non-adherence is associated with increased morbidity, hospitalization, and mortality among patients undergoing hemodialysis (Religioni et al., 2025). Nevertheless, adherence levels remain variable, indicating the influence of complex individual and contextual determinants.

Although several studies have examined the relationship between quality of life and adherence among patients receiving hemodialysis (Khatri et al., 2025). Empirical evidence simultaneously analyzing quality of life and the determinants of adherence remains limited, particularly in developing countries such as Indonesia. Previous research suggests an association between quality of life and adherence; however, understanding of how demographic, socioeconomic, and psychosocial factors shape adherence behaviors remains incomplete(Baghdadi & Alsaiady, 2024). Moreover, most existing studies emphasize clinical outcomes or narrowly focus on single dimensions of quality of life, providing limited insight into the broader multidimensional context in which adherence occurs, especially in resource-constrained settings, where cultural and economic barriers may further exacerbate adherence challenges (Kengne et al., 2024; Yang et al., 2025; Zhang et al., 2025).

To address these gaps, an integrated analysis of quality of life and its key determinants is needed to support the advancement of evidence-based nursing practice and patient-centered health policy. The uniqueness of this study lies in its cross-sectional approach, which positions quality of life as a determinant rather than merely a consequence of treatment adherence, using patient-reported outcomes as the primary perspective. This approach advances understanding of adherence behavior and provides empirical evidence to inform nursing interventions, patient education, and holistic psychosocial support strategies (Chen et al., 2025; Yuan et al., 2021). Therefore, this study analyzes the relationship between treatment adherence, quality of life, and determinant factors among patients undergoing chronic hemodialysis. This study contributes to the advancement of evidence-based nursing care, underscoring the need for

interventions that integrate medical, psychological, and social dimensions of living with chronic kidney disease.

OBJECTIVE

This study aimed to examine the association between quality of life and treatment adherence and to identify factors associated with treatment adherence among patients undergoing chronic hemodialysis.

METHODS

Study Design

This study is quantitative research with a cross-sectional design. The research was conducted at Hospital in Semarang and Surakarta City, Central Java. The independent variable in this study is quality of life. Meanwhile, the dependent variable is the treatment adherence. Ethical approval for this study was obtained from the Health Research Ethics Committee of Poltekkes Kemenkes Semarang, with registration number: 669/EA/F.XXIII.38/2025.

Population and Sample

The study population consists of all patients haemodyalisis at two of hospital in East Java. The study obtained a total sample of 158 respondents, using purposive sampling. Respondents were chosen based on the inclusion criteria of patients with chronic renal failure, being a native speaker of Indonesia and Java language, voluntary participation in the study, and undergoing hemodialysis during the recent week or the recent year. The exclusion criteria were; auditory or verbal/oral problems in patients and lack of inclination for participation.

Data Collection Technique

Data were collected to examine the relationship between quality of life (QoL) and treatment adherence among patients with end-stage renal disease (ESRD). A structured questionnaire was used, incorporating validated instruments to measure QoL domains and adherence indicators. Adult ESRD patients who underwent routine hemodialysis at tertiary care hospitals were recruited through purposive sampling. Before data collection, each participant received a detailed explanation of the study objectives, procedures, and ethical safeguards. Respondents who agreed to participate signed a written informed consent form, which ensured voluntary participation and confidentiality. Data were obtained through face-to-face interviews conducted by trained researchers, a method that minimized misunderstanding of questionnaire items and allowed clarification when necessary. The study protocol was reviewed and approved by the institutional ethics committee, and all procedures followed the principles of the Declaration of Helsinki.

Research Instruments

The quality of life variable was measured using the Kidney Disease Quality of Life (KDQOL-36) questionnaire, which consists of 36 questions. Treatment adherence variable was measured using the Morisky Medication Adherence Scale (MMAS), which consists of 11 questions. The validity test of the questionnaire on quality of life, and treatment adherence used the Pearson product-moment test, while the reliability test used Cronbach's Alpha. Validity and reliability assessments were performed on 30 samples that met the same criteria as the research population. The validity test of the Medication Adherence Scale questionnaire yielded correlation (r) values ranging from 0.0338 to 0.926, with all reliability coefficients exceeding 0.352. For the KDQOL instrument, the validity test of the SF-12 component produced r values between 0.413 and 0.803, with a reliability coefficient of 0.738. The Burden of Kidney Disease domain showed r values from 0.620 to 0.804 and reliability of 0.694. The Problem List domain yielded r values between 0.235 and 0.701, with reliability of 0.738. Meanwhile, the Effect on Daily Life domain demonstrated r values ranging from 0.398 to 0.822, with reliability

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coefficients above 0.782. Since all calculated r values exceeded the r-table threshold of 0.361 (for 30 samples), the instruments were deemed valid. Furthermore, as all reliability values were above 0.60, the instruments were considered reliable.

Data are collected at the hospital between May and August 2025. The analytic process employs three stages. First, univariate analysis examines demographic characteristics, quality of life, and treatment adherence. Results are presented using descriptive statistics, including mean, median, minimum–maximum values, and standard deviation. Second, bivariate analysis is conducted to determine the relationship between quality of life and treatment adherence. Given that both variables are measured on an interval scale, the Pearson correlation test is applied to assess the strength and direction of associations. Finally, multivariate analysis is performed using linear regression modeling to identify determinant factors that independently influence adherence among patients with chronic kidney disease undergoing hemodialysis. This approach allows for the simultaneous evaluation of multiple predictors, thereby providing a comprehensive understanding of the interplay between demographic, socioeconomic, and psychosocial variables in shaping adherence behaviors.

RESULTS

Table 1. Demographic Characteristics of Respondents

Variable	Category	Frequency	Percentage	Mean ± SD
Age	19-40	19.5	24.7	50.04 ±4.60
Min = 19	41-65	49.5	62.7	
Max = 77	65-77	10.0	12.7	
Gender	Male	73	36.5	
	Female	85	42.5	
Level Education	No schooling	3	1.5	
	Elementary	39	19.5	
	Secondary	87	43.5	
	Higher education	29	14.5	
Employee	Unemployed	36	18	
	Housewife	47	23.5	
	Housewife	13	6.5	
	Private Employee	19	9.5	
	Civil Servant	4	2	
	Pension	8	4	
	Other	31	15.5	
Income	No income	77	38.5	
	0-1,000,000	28	14	
	1,000,000-1,900,000	25	12.5	
	2,000,000-2,900,000	20	10	
	3,000,0000	8	4	
Duration hemodialysis	3 Hours	1	5	4.6 ±0.48
	4 Hours	54	27	
	5 Hours	89	44.5	
	3-6 months	33	16.5	28.79 ± 30.43

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Variable	Category	Frequency	Percentage	Mean ± SD
Duration of suffering from chronic kidney disease (CKD)	6–12 months	36	18	
	>12–36 months	51	25.5	
	>36 months	38	19	

Based on table 1, the demographic profile of respondents revealed that the majority were middle-aged adults (41–65 years, 62.7%), with a mean age of 50 years. More than half were female (53.5%), and most had attained secondary education (43.5%), followed by elementary (19.5%) and higher education (14.5%). Employment status was dominated by housewives (23.5%), unemployed individuals (18%), and informal workers (15.5%), while only a small proportion were civil servants (2%) or pensioners (4%). In terms of income, a large share reported no income (38.5%), with only 4% earning above Rp 3,000,000, reflecting the generally low socioeconomic status of the sample.

Clinical characteristics showed that most respondents underwent hemodialysis for 4–5 hours per session (71.5%), with an average duration of 4.6 hours. The mean length of ESRD illness was 28.79 months, though 16.5% had been diagnosed for less than six months. These findings suggest that the study population is predominantly composed of middle-aged, low-income women with moderate educational attainment, who face significant socioeconomic and clinical challenges. Such demographic and clinical patterns provide important context for interpreting subsequent analyses on quality of life, treatment adherence, and social support among ESRD patients.

Table 2. Final regression of variables related to treatment adherence.

Variable	B	SE	t	p value	R	R square
Age	-0.010	0.000	-36.069	0.000	0.998	0.995
Gender	0.006	0.006	1.011	0.316		
Employee	-0.026	0.002	-11.117	0.000		
Education level	-0.284	0.054	-5.300	0.000		
Income	-0.188	0.004	-44.142	0.000		
Duration HD	-0.215	0.009	-24.964	0.000		
Duration of suffering from chronic kidney disease (CKD)	-0.002	0.000	-15.193	0.000		
Quality of life	0.021	0.000	54.274	0.000		

Based on table 3, the regression analysis shows that the constructed model has a very high predictive power with $R = 0.998$ and $R^2 = 0.995$, indicating that 99.5% of the variation in patient adherence is explained by the included variables. Of the eight variables tested, almost all exert a significant effect on adherence, except gender ($p = 0.316$).

Specifically, age ($B = -0.010$, $p < 0.001$) demonstrates a negative association with adherence, suggesting that as age increases, patient compliance with the hemodialysis regimen tends to decline. Employment status ($B = -0.026$, $p < 0.001$) also exerts a negative influence, with employed patients being at greater risk of non-adherence, possibly due to time constraints and occupational demands. Educational level ($B = -0.284$, $p < 0.001$) and income ($B = -0.188$, $p < 0.001$) unexpectedly show negative relationships with adherence, which may be interpreted as external factors or competing priorities influencing compliance among patients with higher socioeconomic backgrounds.

Furthermore, duration of hemodialysis ($B = -0.215$, $p < 0.001$) and length of CKD diagnosis ($B = -0.002$, $p < 0.001$) also reduce adherence, potentially related to treatment fatigue,

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complications, or declining motivation over time. In contrast, quality of life (B = 0.021, p < 0.001) emerges as the only variable with a significant positive effect, reinforcing that patients with better quality of life are more likely to adhere to their hemodialysis regimen.

Table 3. Overview of Quality of life and Treatment Adherence

Variable	N	Mean	Standar Deviation	Minimum Value	Maximum value
SF 12	158	47.67	20.51	19	79
Burden kidney disease	158	64.3	19.11	27	100
Problem list	158	78.30	9.671	53	94
Effect on daily life	158	73.40	16.09	49	100
Treatment adherence	158	47.66	5.90	32	56

Based on table 2, descriptive analysis revealed that hemodialysis patients reported the highest quality of life in the problem list dimension (mean = 78.30, SD = 9.67), indicating relatively strong perceived ability to manage specific concerns. In contrast, the lowest score was observed in the SF-12 domain (mean = 47.67, SD = 20.51), reflecting poorer perceptions of overall health status. The burden of kidney disease (mean = 64.3, SD = 19.11) and effect on daily life (mean = 73.40, SD = 16.09) demonstrated moderate levels of perceived impact, suggesting that while patients experience notable challenges, many maintain functional adaptation in daily living. Treatment adherence averaged 47.66 (SD = 5.90), with scores ranging from 32 to 56, indicating a moderate level of adherence overall but with considerable variation among respondents. This variability points to the influence of psychosocial and contextual factors such as education, caregiving experience, and social support.

Overall, these findings suggest that while patients generally maintain moderate adherence and report relatively high quality of life in specific domains, targeted interventions addressing psychosocial and informational needs are essential. Enhancing patient education, strengthening support systems, and reducing disease burden may improve both adherence and quality of life outcomes in ESRD populations.

Table 4. Relationship Between Quality of Life and Treatment adherence

Variable	Treatment adherence	
	Correlation coefficient	P value
SF 12	1.000	0.000
Burden kidney disease	0.845	0.000
Problem list	0.728	0.000
Effect on daily life	0.941	0.000

Based on Table 4, all dimensions of quality of life show a positive relationship with treatment adherence among patients with end-stage renal disease (ESRD). The SF-12 score demonstrates the strongest relationship (r = 1.000), indicating that better perceived health status is closely associated with improved adherence. The burden of kidney disease (r = 0.845) and effect on daily life (r = 0.941) also reveal strong correlations, suggesting that patients who perceive lower disease burden and less disruption in daily activities are more likely to adhere to treatment regimens. The problem list dimension exhibits a substantial relationship (r = 0.728), highlighting that effective management of patient-reported problems contributes

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significantly to adherence. All of these positive correlation coefficients indicate that the higher the quality of life across multiple domains, the better the treatment adherence among ESRD patients. This finding underscores the importance of holistic care approaches that address physical, psychological, and social aspects of patient well-being to optimize adherence outcomes.

DISCUSSION

These findings confirm that patient adherence in chronic kidney disease (CKD) is not only influenced by clinical factors but also by demographic and socioeconomic variables. Specifically, age, employment status, education, income, and treatment duration act as negative determinants, indicating the need for targeted interventions for patient groups at higher risk of non-adherence. In contrast, quality of life emerges as a strong protective factor, suggesting that improvements in psychosocial aspects, family support, and symptom management serve as effective strategies to enhance adherence (Alqalah et al., 2025). Moreover, the non-significance of gender indicates that adherence to hemodialysis is universal and not restricted by sex differences (Mharapara et al., 2025), reinforcing the perspective that interventions should prioritize age, socioeconomic background, and quality of life rather than demographic aspects alone (Lakshmanan et al., 2025).

Building upon this, the regression model demonstrated an exceptionally high predictive capacity ($R = 0.998$, $R^2 = 0.995$), indicating that nearly all variation in treatment adherence among ESRD patients can be explained by the included variables. Within this framework, several extreme findings warrant closer attention, particularly the positive effect of quality of life ($B = 0.021$, $t = 54.274$, $p < 0.001$) and the negative impact of income ($B = -0.188$, $t = -44.142$, $p < 0.001$) and age ($B = -0.010$, $t = -36.069$, $p < 0.001$). Among these variables, the strongest positive predictor, quality of life, reinforces the notion that patients who perceive better physical, psychological, and social well-being are significantly more likely to adhere to hemodialysis regimens. This finding is consistent with prior studies reporting that higher HRQoL scores are associated with improved self-management and adherence behaviors in ESRD populations (Lu et al., 2024). Consequently, the extremity of this result underscores the importance of holistic nursing interventions that enhance patient well-being, as adherence cannot be divorced from the lived experience of illness.

Conversely, the negative association between income and adherence is unexpected, as higher socioeconomic status is often assumed to facilitate compliance. However, this finding may reflect competing priorities, lifestyle demands, or reduced perceived urgency among patients with greater financial resources. Indeed, similar paradoxical results have been observed in nephrology research, where socioeconomic advantages do not always translate into better adherence (Oates et al., 2025). Therefore, this highlights the need for nurses to tailor interventions beyond economic considerations, focusing instead on motivational and behavioral support.

Similarly, the negative effect of age is another critical finding, suggesting that older patients are at greater risk of non-adherence. This may be attributed to treatment fatigue, cognitive decline, or comorbidities that complicate regimen compliance. Previous studies have documented that advancing age often correlates with reduced adherence in chronic disease management, necessitating age-sensitive nursing strategies (Gebrie et al., 2023). As a result, interventions such as simplified treatment schedules, caregiver involvement, and enhanced patient education may mitigate this risk.

Taken together, these extreme results emphasize that quality of life is the most powerful positive determinant of adherence, while age and income emerge as significant negative

predictors. For nursing practice, this means that interventions must be multidimensional—enhancing patient well-being, addressing age-related barriers, and recognizing that socioeconomic advantage does not guarantee compliance.

Extending this discussion, the present study examines the relationship between quality of life and treatment adherence among patients undergoing chronic hemodialysis. The findings reveal that all dimensions of quality of life, including SF-12, burden of kidney disease, problem list, and effect on daily life are positively correlated with treatment adherence, underscoring the interdependence of psychosocial well-being and clinical behaviors in end-stage renal disease (ESRD) management (Arie Kusumo et al., 2025; Khatri et al., 2025; Lemmih et al., 2025). Furthermore, this result is consistent with prior evidence that adherence to dialysis schedules, dietary restrictions, and medication regimens significantly improves physical functioning and reduces symptom burden, thereby enhancing overall quality of life (Alatawi et al., 2024).

In addition, these findings emphasize that adherence is not merely a clinical construct but is shaped by patients' perceptions of their health, motivation, and social support systems. The strongest correlation observed in the problem list dimension highlights that effective management of patient-reported problems contributes substantially to adherence outcomes, aligning with studies that show patients who perceive fewer barriers and better manage daily health challenges are more likely to comply with treatment regimens (Religioni et al., 2025). Likewise, moderate associations between SF-12 scores, disease burden, and daily life impact highlight that perceived health status and psychosocial functioning are critical determinants of adherence behaviors (Andersson et al., 2025).

Most notably, the perfect correlation between SF-12 scores and adherence ($r = 1.000$, $p < 0.000$) suggests that patients' perceived health status is not only related to adherence but may serve as a decisive factor in determining compliance with treatment regimens. Such a result underscores the pivotal role of health-related quality of life (HRQoL) in shaping patient behaviors. Previous studies have consistently demonstrated that higher SF-12 scores are linked to improved self-management and adherence in chronic illness populations, including ESRD (Gebrie et al., 2023; Tasnim et al., 2025).

Equally compelling, the strong correlation between the effect on daily life and adherence ($r = 0.941$, $p < 0.000$) illustrates that patients who experience minimal disruption to their daily activities are significantly more likely to adhere to treatment. Dialysis schedules, dietary restrictions, and symptom burdens often interfere with daily functioning, and when these challenges are not adequately addressed, adherence falters. Evidence from Scopus-indexed nursing research emphasizes that interventions designed to integrate treatment into patients' lifestyles such as flexible scheduling, psychosocial support, and lifestyle counselling are essential to sustaining adherence (Saeed et al., 2019).

Within this context, nursing practice plays a pivotal role. Nurses extend beyond clinical monitoring to encompass psychosocial support, structured education, individualized counseling, and family involvement, all of which significantly improve adherence outcomes and reduce morbidity in hemodialysis populations (Wang & Gan, 2025). By fostering therapeutic communication and coordinating multidisciplinary care, nurses strengthen patients' motivation to comply with complex treatment regimens, thereby improving both adherence and perceived quality of life (Religioni et al., 2025). This holistic approach is particularly essential in resource-limited settings, where cultural and economic factors may exacerbate adherence difficulties (Keita, 2025). Ultimately, nursing interventions contribute not only to clinical stability but also to the broader goal of enhancing patients' quality of life while living with CKD (Alodhailah & Almutairi, 2025; Nozu et al., 2024).

Despite the strength of these findings, certain limitations must be acknowledged. The perfect correlation observed between SF-12 and adherence may reflect sample-specific characteristics or methodological constraints, which should be interpreted cautiously. Additionally, socioeconomic variables such as income and education may interact with cultural and contextual factors not fully captured in this model. Future studies should incorporate qualitative perspectives to better understand patient motivations and barriers. Future research should explore longitudinal designs to assess how adherence behaviors evolve over time, particularly in relation to treatment fatigue and psychosocial adaptation. Moreover, intervention studies focusing on lifestyle integration, age-sensitive strategies, and family-centered care could provide practical insights into sustaining adherence. Expanding research across diverse cultural and economic contexts will further strengthen the generalizability of these findings.

CONCLUSION

Beyond confirming that quality of life and treatment adherence move together, this study suggests how the relationship likely works. When patients feel less burdened by illness and better able to manage daily disruptions, following a dialysis regimen becomes psychologically easier and adherence, in turn, prevents complications that would otherwise erode quality of life further. Quality of life doesn't just result from adherence; it appears to drive it. The predictors of lower adherence show where this cycle breaks down: older patients and those further into treatment may simply be worn down by its long-term demands, leaving less capacity for self-management. Higher income and education were linked to worse adherence, suggesting resources alone don't help unless the psychological weight of illness is also addressed. Gender made no difference, so this pattern appears to hold regardless of sex.

This implies nursing interventions built only around information or financial support will only go so far, easing the perceived burden of illness matters more. Education, counseling, family involvement, and psychosocial support are the levers most likely to break the cycle linking declining well-being to non-adherence, especially for older, longer-treated patients. Since the cross-sectional design cannot confirm directionality, longitudinal research is still needed to test whether reducing perceived burden actually improves adherence over time.

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CONFLICTS OF INTEREST

The authors declare that there are no conflicts of interest regarding the publication of this research.

REFERENCES

Alatawi, A. A., Alaamri, M., & Almutary, H. (2024). Social Support and Adherence to Treatment Regimens among Patients Undergoing Hemodialysis. *Healthcare (Basel)*, *12*(19). https://doi.org/10.3390/healthcare12191958.

Alodhailah, A. M., & Almutairi, M. (2025). Evidence-based nursing strategies and quality of life in Saudi CKD patients with cardio-renal-metabolic comorbidities. *BMC Nursing*, *24*(1), 1291. https://doi.org/10.1186/s12912-025-03944-7.

Alqalah, T. A. H., Alrubaiee, G. G., & Alkubati, S. A. (2025). Factors Associated with the Quality of Life and Needs of Hemodialysis Patients in Saudi Arabia: A Basis for Improved Care. *Medicina*, *61*(2), 180. https://www.mdpi.com/1648-9144/61/2/180.

Andersson, J., De Smidt, M. F., Sundström, A. E., Nordin, S., Wennberg, P., & Näslund, U. (2025). Psychosocial moderators of the effect of lifestyle interventions in primary prevention of cardiovascular disease: a scoping review. *BMC Public Health*, *25*(1), 2969. https://doi.org/10.1186/s12889-025-24076-2.

Arie Kusumo, D., Ima, N., & Raden Khairiyatul, A. (2025). Health Coaching Based on Social Cognitive Theory in Increasing Compliance with Fluid Restrictions, Controlling Interdialytic Weight Gain and Improving the Quality of Life of Hemodialysis Patients. *Journal Of Nursing Practice*, *8*(2), 270-281. https://doi.org/10.30994/jnp.v8i2.539.

Baghdadi, L. R., & Alsaiady, M. M. (2024). Medication Adherence Barriers and Their Relationship to Health Determinants for Saudi Pediatric Dialysis Patients. *Children (Basel)*, *11*(3). https://doi.org/10.3390/children11030293.

Chen, Z., Ma, J., Ou, H., & Pu, L. (2025). Impact of nursing interventions on hemodialysis patients using the integrated theory of health behavior change. *Medicine (Baltimore)*, *104*(2), e41050. https://doi.org/10.1097/md.0000000000041050.

Gebrie, M. H., Asfaw, H. M., Bilchut, W. H., Lindgren, H., & Wettergren, L. (2023). Health-related quality of life among patients with end-stage renal disease undergoing hemodialysis in Ethiopia: a cross-sectional survey. *Health Qual Life Outcomes*, *21*(1), 36. https://doi.org/10.1186/s12955-023-02117-x.

Hansen, M. S., Tesfaye, W., Sewlal, B., Mehta, B., Sud, K., Kairaitis, L., Tarafdar, S., Chau, K., Zaidi, S. T., & Castelino, R. L. (2022). Psychosocial factors affecting patients with end-stage kidney disease and the impact of the social worker. *J Nephrol*, *35*(1), 43-58. https://doi.org/10.1007/s40620-021-01098-8.

Keita, D. (2025). Quality of life in older immigrant adults on hemodialysis. *PLOS ONE*, *20*(9), e0322426. https://doi.org/10.1371/journal.pone.0322426.

Kengne, A. P., Brière, J. B., Zhu, L., Li, J., Bhatia, M. K., Atanasov, P., & Khan, Z. M. (2024). Impact of poor medication adherence on clinical outcomes and health resource utilization in patients with hypertension and/or dyslipidemia: systematic review. *Expert Rev Pharmacoecon Outcomes Res*, *24*(1), 143-154. https://doi.org/10.1080/14737167.2023.2266135.

Khatri, D., Gahatraj, N. R., Chhetri, Y., Kc, B. B., & Paudel, S. (2025). Quality of Life Among Hemodialysis Patients Attending Dialysis Centers in Pokhara Metropolitan, Nepal: A Cross-Sectional Study. *Health Sci Rep*, *8*(8), e71132. https://doi.org/10.1002/hsr2.71132.

Lakshmanan, J., Gopalakrishnan, B., Shanmugam Rajendran, S., Cithambaram, K., Ramasamy Venkatasalu, M., G, M., Subramanian, R., George, N., Asaithambi, N., & Palavesam, P. (2025). Effectiveness of nurse-led interventions on psychological well-being among older adults: A systematic review and meta-analysis. *Bioinformation*, *21*(8), 2319-2327. https://doi.org/10.6026/973206300212319.

Lemmih, H., Raoui, S. M., Bakzaza, B., & Rachiq, S. (2025). Quality of Life of Patients with End-stage Renal Disease Undergoing Hemodialysis in Morocco: Cross-sectional Study. *Annals of African Medicine*. https://doi.org/10.4103/aam.aam_136_25.

Lu, Y., Zhai, S., Liu, Q., Dai, C., Liu, S., Shang, Y., & Chen, C. (2024). Correlates of symptom burden in renal dialysis patients: a systematic review and meta-analysis. *Ren Fail*, *46*(2), 2382314. https://doi.org/10.1080/0886022x.2024.2382314.

Mharapara, P., Ahmed, S. B., Olson, J., & Schick-Makaroff, K. (2025). Sex and Gender Characteristics of Adults on Hemodialysis Experiencing Depression and Depressive Symptoms: A Scoping Review. *Can J Kidney Health Dis*, *12*, 20543581251378018. https://doi.org/10.1177/20543581251378018.

Nozu, H., Tamura, H., Kudo, T., Araki, T., Sato, H., Watanabe, T., & Sasagawa, I. (2024). The role of advanced practice nurses in improving healthcare outcomes for patients with chronic kidney disease: A scoping review protocol. *PLOS ONE*, *19*(4), e0301676. https://doi.org/10.1371/journal.pone.0301676.

Oates, G. R., Riekert, K. A., Ford, C., Dickinson, K. M., Butcher, J. L., Naranjo, D., Phan, H., Daines, C., Grabowski, H., & Schechter, M. S. (2025). Associations Between Socioeconomic Status and Adherence to Medications in People With Cystic Fibrosis. *Pediatr Pulmonol*, *60*(8), e71230. https://doi.org/10.1002/ppul.71230.

Religioni, U., Barrios-Rodríguez, R., Requena, P., Borowska, M., & Ostrowski, J. (2025). Enhancing Therapy Adherence: Impact on Clinical Outcomes, Healthcare Costs, and Patient Quality of Life. *Medicina (Kaunas)*, *61*(1). https://doi.org/10.3390/medicina61010153.

Saeed, F., Sardar, M. A., Davison, S. N., Murad, H., Duberstein, P. R., & Quill, T. E. (2019). Patients' perspectives on dialysis decision-making and end-of-life care *Clin Nephrol*, *91*(5), 294-300. https://doi.org/10.5414/cn109608.

Sultan, B., & Froelicher, E. S. (2025). Effectiveness of patient education on adherence to treatment regimen and quality of life in hemodialysis patients: a systematic review and meta-analysis. *Minerva Urol Nephrol*, *77*(6), 762-775. https://doi.org/10.23736/s2724-6051.24.05718-5.

Tasnim, T., Karim, K. M. R., Rahman, T., & Rashid, H.-U. (2025). Health-related quality of life and its predictors among chronic kidney disease patients: A hospital-based cross-sectional study. *PLOS ONE*, *20*(2), e0319100. https://doi.org/10.1371/journal.pone.0319100.

Wang, L., & Gan, C. (2025). The impact of personalized health education interventions on treatment adherence and quality of life in maintenance hemodialysis patients: A retrospective cohort study based on nursing practice. *Medicine (Baltimore)*, *104*(49), e46019. https://doi.org/10.1097/md.0000000000046019.

Yang, Q., Zheng, L., Cheng, R., Zhou, L., Zhao, J., & Hao, M. (2025). Impact of refined nursing care on psychological outcomes, treatment adherence, and quality of life in patients with coronary heart disease. *Medicine (Baltimore)*, *104*(43), e44936. https://doi.org/10.1097/md.0000000000044936.

Yuan, L., Yuan, H., Feng, Q., & Zhao, J. (2021). Effect of continuous nursing on quality of life of hemodialysis patients: A protocol for systematic review and meta-analysis. *Medicine (Baltimore)*, *100*(12), e24942. https://doi.org/10.1097/md.0000000000024942.

Zhang, Y. M., Wang, Y. Y., Liu, Y., Zhong, C. C., Zhou, M., Chen, L., & Guo, S. L. (2025). Nurses' perspectives on the implementation of patient-reported outcomes: a descriptive qualitative study. *BMC Nurs*, *24*(1), 1186. https://doi.org/10.1186/s12912-025-03847-7.