

Original Article

Association between family support and activities of daily living among patients undergoing hemodialysis: A cross-sectional study

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Abstract

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Background: Patients with hemodialysis frequently experience physical limitations that may affect their capacity to accomplish Activities of Daily Living (ADL). This decline in independence increases patients' dependence on others. Family support plays a crucial role in helping patients maintain independence and refine the quality of their lives during long-term treatment.

Objective: This study aimed to determine the association between family support and ADL among patients undergoing hemodialysis.

Methods: A cross-sectional analytical correlational study was implemented at Muhammadiyah General Hospital. The participants were 50 patients with chronic kidney disease undergoing hemodialysis for at least three months, aged 18-60 years, selected through purposive sampling. Family support was assessed using the Perceived Social Support-Family (PSS-FA) instrument, while independence in ADL was measured using the Barthel Index. Descriptive statistics were used to summarize participants characteristics. The relationship between family support and ADL was analyzed using Somers' d test at the 5% significance level.

Results: The evidence indicates that most respondents received high levels of family support (86%) and had relatively good levels of independence in performing ADL (68%). Statistical analysis indicated a critical association between family support and ADL among hemodialysis patients ($p=0.001$; $r = 0.61$). These findings imply that higher levels of family support contribute to improve patient independence in carrying out daily activities.

Conclusion: Family support is significantly associated with the capacity of hemodialysis patients to perform ADL. Strengthening family involvement through family-centered nursing interventions may help improve patient independence and overall well-being during long-term hemodialysis treatment.

Background

Chronic kidney disease (CKD) is a progressive deterioration of kidney function characterized by diminish in the glomerular filtration rate for more than three months. CKD has become a major global health problem, with its prevalence and high mortality rate continuing to increase annually. According to the World Health Organization (WHO), CKD ranks as the 12th leading cause of death worldwide and contributes to approximately 5–10 million deaths each year (WHO, 2020) and is projected to be the 5th leading cause of death by 2040 (Makmun et al., 2024). The progression of CKD disrupts several physiological processes, including metabolic balance, endocrine regulation, and immune function. In advanced stages of the disease, patients require renal replacement therapy, most commonly hemodialysis, to substitute the filtration function of the kidneys and maintain

physiological homeostasis (Salsabila et al., 2023).

The burden of CKD is also increasing in Indonesia. National health data indicate that the prevalence of CKD continues to rise, along with the growing number of patients requiring hemodialysis therapy (Makmun et al., 2024). Hemodialysis is routinely accomplished two to three times per week, with each session enduring approximately four to five hours. Although this therapy is essential for removing metabolic waste products and maintaining fluid and electrolyte balance, long-term hemodialysis may lead to several physical and psychological complications. Patients frequently experience fatigue, sleep disturbances, and decreased muscle strength, which may limit their ability to perform activities independently, including personal fundamental tasks such as bathing, dressing, eating, mobilization, and elimination (Purwaningsih, 2023; Al Harby et al., 2025)

A decline in ADL ability among hemodialysis patients not only affects physical functioning but also has broader implications for patients' psychological well-being, social interaction, and overall quality of life. In addition, decreased functional independence may increase the risk of treatment non-adherence and further health complications. As patients become more dependent on others, the responsibility of care often places a greater burden on family members who serve as the primary support system for individuals undergoing long-term hemodialysis therapy (Collins et al., 2021).

Family support is widely recognized as an important psychosocial factor that may influence patients' ability to adapt to chronic illness and maintain functional independence. Family support may take several forms, including emotional support through encouragement and empathy, instrumental support through physical assistance in daily activities, informational support related to disease management, and appraisal support through positive reinforcement and recognition of patients' efforts to cope with their condition (Entiman et al., 2025; Usnaini et al., 2025). Through these mechanisms, family members may help patients manage physical limitation, maintain treatment adherence, and sustain motivation to perform daily activities independently.

Previous studies have highlighted the importance of family support in improving functional outcomes among patients with chronic disease. Research conducted by Sagala & Sitompul, (2019) reported a significant relationship between family support and Activities of Daily Living (ADL) among hemodialysis patients, indicating that higher levels of family support were interacted with greater independence in performing daily activities. Similar findings were reported in a study by Sepadha et al., (2020), which demonstrated that adequate family support can encourage individuals to remain active and independent through emotional companionship, physical assistance, and motivation from family members. These findings suggest that family involvement plays an essential role in supporting the functional capacity of patients receiving long-term hemodialysis therapy.

However, despite the growing evidence regarding the importance of family support, several limitations remain in the existing literature. Many previous studies have focused on general chronic disease populations or have examined psychosocial factors without specifically exploring their relationship with functional impairment in Activities of Daily Living among hemodialysis patients. Furthermore, empirical evidence examining this relationship in Indonesian clinical settings remains relatively limited, particularly in hospital-based populations where cultural values emphasize strong family involvement in patient care. Understanding this relationship is important for developing effective nursing interventions that integrate family participation into patient care management.

Therefore, this study aims to investigate the relationship between family support and Activities of Daily Living in patients undergoing hemodialysis. The novelty of this study lies in its focus on the multidimensional role of family support in maintaining functional independence among hemodialysis patients within a clinical hospital setting. It is hypothesized that higher levels of family support are positively associated with greater independence in performing ADL among patients receiving hemodialysis.

Methods

Study Design

This study revealed an analytical correlational design with a cross-sectional approach, in which exposure and outcome variables were compiled simultaneously at a single point in time. A cross-sectional design was considered appropriate for the present study because the primary objective was to examine the association between family support and the level of independence in ADL among patients undergoing hemodialysis, rather than to determine causal relationships or longitudinal changes. This design allows researchers to assess the distribution of variables and the strength of their association within a defined population during a specific period (Syafitri et al., 2021).

Study Setting

The study was conducted at the Hemodialysis Unit of Universitas Muhammadiyah Malang General Hospital, a secondary-level referral hospital located in East Java, Indonesia. The hemodialysis unit provides routine hemodialysis services for patients with chronic kidney disease and operates six days per week. Hemodialysis is typically performed 2 – 3 times per week for each patient, with each session lasting approximately four hours. The unit manages approximately 100 active hemodialysis patients annually, many of whom receive long-term dialysis therapy. This unit is supported by trained health workers, including a consultant nephrologist and certified nurses who are competent in hemodialysis services. The hospital setting reflects a typical Indonesian clinical context where family members are frequently involved in patient care and decision-making during chronic disease management.

Participants and Sampling Procedure

The study population consisted of patients with CKD who were receiving hemodialysis at Universitas Muhammadiyah Malang General Hospital during the study period in September 2025. Purposive sampling was used to recruit participants who met the predefined inclusion criteria and were considered capable of providing reliable information regarding family support and daily functioning. The sample size was determined using Slovin's formula with a margin of error of 10%, resulting in a minimum required sample of 50 participants from a total population of 100 hemodialysis patients. The inclusion criteria were (1) patients diagnosed with CKD who had undergone hemodialysis for at least 3 months, (2) adult patients aged 18-60 years, (3) patients living with family members in the same household, and (4) patients who were willing to participate and provided informed consent. Patients who were critically ill, had severe cognitive impairment, or were unable to communicate effectively were excluded from the study. Based on these criteria, a total of 50 patients were recruited as study participants. Participants were selected through the following procedure. First, the researchers obtained a list of patients scheduled for

hemodialysis sessions from the dialysis unit. Second, patients were screened according to the eligibility criteria. Third, eligible patients were approached during their dialysis sessions and provided with information about the study. Patients who agreed to participate were asked to provide written informed consent before completing the questionnaire.

Variables and Measurement

Family Support

Family support was deliberately used in the Perceived Social Support–Family (PSS-Fa) poll. Conceptually, family support refers to emotional, informational, instrumental, and appraisal support, provided by family members to individuals coping with health-related challenges (Dewanto et al., 2025). Operationally, family support in this study was referred to as the total score obtained from the PSS-FA questionnaire. The questionnaire consists of 20 items that evaluate the extent to which respondents perceive attention, assistance, understanding, and tangible support from their families. Each item is rated using a Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree). The total score extend from 20 – 100, with high scores indicating stronger perceived family support. For analytical purposes, the total scores were categorized into 3 levels based on tertile distribution : low family support (≤ 59), moderate (60-79), and high family support (≥ 80). The Indonesian version of the PSS-FA questionnaire had previously undergone cultural adaptation and psychometric testing. Prior studies declare satisfactory internal consistency with a Cronbach's alpha coefficient ranging from 0.85 to 0.90, indicating good reliability (Mardiyah et al., 2019). Content validity was established through expert review involving nursing and public health specialists.

Activities of Daily Living (ADL)

ADL were evaluated using the Barthel Index questionnaire. Conceptually, ADL refers to a person's ability to perform basic self-care tasks necessary for independent subsistence. Operationally, ADL in this study was defined as the total score obtained from the Barthel Index

(BI) questionnaire. The questionnaire consists of 10 items evaluating independence in performing basic daily activities such as feeding, bathing, grooming, dressing, bowel control, bladder control, toilet use, transfers, mobility, and stair climbing (Arselina, et al., 2025). Each item is assigned a weighted score based on the level of assistance required, with total scores ranging from 1 – 100. Higher scores indicate greater independence. The total scores were categorized according to established BI interpretation guidelines : total dependence (0-20), severe dependence (21-60), moderate dependence (61-90), mild dependence (91-99), independent (100). The Barthel Index has been widely used in clinical and rehabilitation research and has demonstrated good reliability and validity. Previous studies reported a Cronbach's alpha value above 0.80, indicating permissible internal consistency.

Data Analysis

The data underwent analysis using SPSS Statistics version 27. Descriptive statistics were used to summarize respondents' demographic characteristics well as the distribution of family support and ADL variables. Bivariate analysis was performed using the Somers' d correlation test to determine the association between family support and Activities of Daily Living

(ADL). Somers' d was chosen because both variables were measured on an ordinal scale and categorized into ordered levels. This statistical test is appropriate for assessing the strength and direction of association between ordinal variables while accounting for the ordered nature of the data. A significance level of $p < 0.05$ was used to determine statistical significance.

Ethical Considerations

This study was implemented following ethical principles for research comprising human participants. Ethical approval was obtained from the Research Ethics Committee of Universitas Muhammadiyah Malang with approval number No. E.5.a./267/KEPK-UMM/X/2024. All participants acquired an explanation regarding the study objectives, protocolled, confidentiality, and voluntary nature of participation before providing written informed consent.

Results

Participants Characteristics

This study involved 50 CKD patients with hemodialysis at Universitas Muhammadiyah Malang General Hospital (RSU UMM). The profile of the participants are demonstrated in Table 1.

Table 1. Characteristics of Hemodialysis Patients

Variable	Category	Frequency (n)	Percentage (%)
Sex	Male	31	62
	Female	19	38
Age (years)	18-44	15	30
	45-59	20	40
	≥60	15	30
Comorbid	Yes	37	74
	No	13	26
Duration of Hemodialysis (year)	<1	7	14
	1-5	25	50
	>5	18	36
Family Support	Low	2	4
	Moderate	5	10
	High	43	86
Activity of Daily Living	Complete Dependence	0	0
	Severe Dependence	3	6
	Moderate Dependence	10	20
	Mild Dependence	3	6
	Independent	34	68

The results imply that nearly all of the hemodialysis patients were male and belonged

to the late adult age group (45–59 years). Most respondents had comorbid conditions and had

undergone hemodialysis therapy for 1–5 years, while patients who had received hemodialysis for less than one year represented the smallest proportion. Table 1 shows that the majority of respondents received high levels of family support, accounting for 43 participants (86%), whereas only 2 participants (4%) reported low family support. The table also indicates that almost all respondents were categorized as independent in performing Activities of Daily Living (ADL), totaling 34 participants (68%). Meanwhile, the smallest proportions were found in the severe dependence category (2 participants; 4%) and the moderate dependence category (2 participants; 4%).

Bivariate analysis was carried out using the Somers' d test to determine the association between family support and Activities of Daily Living (ADL) among hemodialysis patients at Universitas Muhammadiyah Malang General Hospital. As presented in Table 2, the Somers' d test yielded a p-value of 0.001 ($p < 0.05$), indicating that the alternative hypothesis was approved. This result shows a significant association between family support and Activities of Daily Living (ADL) among hemodialysis patients.

Table 2. Family Support and Activity of Daily Living (ADL) among Hemodialysis Patients

Family Support	Activity of Daily Living					Total	p-value	(r)
	Complete	Severe	Moderate	Mild	Independence			
Low	0	2	0	0	0	2	0.001	0.617
Moderate	0	1	4	0	0	5		
High	0	0	6	3	34	43		
Total	0	3	10	3	34	50		

Furthermore, the correlation coefficient (r) was 0.617, indicating a positive relationship with strong correlation strength. This finding suggests that higher levels of family support are associated with greater independence in performing Activities of Daily Living (ADL) among hemodialysis patients (See Table 2).

Discussion

This study aimed to investigate the association between family support and the capacity to accomplish Activities of Daily Living (ADL) among patients with Chronic Kidney Disease (CKD) undergoing hemodialysis. The outcomes indicate that higher levels of family support tend to demonstrate greater of independence in performing daily activities. However, beyond confirming a statistical association, these findings highlight the broader role of family support as a facilitating factor that may help patients adapt to the complex physical and psychological challenges associated with long-term hemodialysis therapy. Hemodialysis is a lifelong treatment modality that requires strict adherence to dietary and fluid restrictions, regular treatment schedules, and the ability to cope with treatment-related symptoms such as

fatigue, weakness, and reduced physical endurance (Gabriela et al., 2021). These ongoing demands may compromise patients' functional capacity, making family involvement an important supportive resource in maintaining independence in everyday life.

The results of this study suggest that family support may influence patients' independence through several interrelated mechanisms. These activities represent fundamental components of self-care and are commonly used as indicators to assess an individual's functional status. From the perspective of social support theory, family members may provide emotional, instrumental, informational, and appraisal support that collectively contribute to improved health outcomes. Emotional support helps patients maintain psychological stability and cope with the stress associated with chronic illness and long-term treatment. Instrumental support, such as assistance with transportation to dialysis sessions or help with household tasks, may reduce physical burden and conserve patients' energy for essential self-care activities. Informational support may improve patients' understanding of disease management, dietary

restrictions, and treatment adherence. Meanwhile, appraisal support may strengthen patients' self-confidence and motivation to maintain independence in managing their health condition (Purwaningsih, 2023). These mechanisms suggest that family support does not merely involve providing direct assistance but may also enhance patients' psychological resilience and engagement in self-care behaviors.

Despite these positive associations, the relationship between family support and ADL independence should be interpreted within a broader clinical context. The findings indicate that some patients with relatively strong family support still experience limited independence in daily activities. This suggests that family support alone may not fully determine functional outcomes among hemodialysis patients. Individuals undergoing dialysis frequently experience physiological complications such as post-dialysis fatigue, muscle weakness, sleep disturbances, and metabolic imbalances that can significantly reduce physical functioning (Collins et al., 2021). These physiological conditions may restrict patients' ability to perform daily tasks even when adequate family support is available. In addition, psychological conditions such as depression, anxiety, and decreased motivation—commonly reported among patients with chronic kidney disease—may further limit patients' participation in self-care activities.

Several potential confounding factors may therefore influence the relationship observed in this study. Age is an important determinant of functional capacity, as older patients generally experience decreased muscle strength, reduced mobility, and a higher prevalence of comorbidities. The presence of chronic conditions such as diabetes mellitus, hypertension, and cardiovascular disease may further compromise physical functioning and increase dependency in daily activities. Clinical factors, including the duration of hemodialysis therapy, anemia status, nutritional status, and dialysis adequacy, may also affect patients' energy levels and overall physical performance (Tatali et al., 2018; Bhowmik et al., 2025). In

addition, psychosocial variables such as socioeconomic status, educational background, and health literacy may influence patients' access to information and support resources that facilitate self-care. Because these factors may independently affect functional independence, they should be considered when interpreting the association between family support and ADL performance.

When compared with previous studies, the findings of this research reinforce the importance of family support while also highlighting the multifactorial nature of functional independence among hemodialysis patients. Previous studies have consistently reported that higher family support is associated with better ADL performance among patients undergoing dialysis (Sagala & Sitompul, 2019; Sepadha et al., 2020). However, the present study provides additional insight by suggesting that the influence of family support may vary depending on patients' clinical conditions and demographic characteristics. In this context, family support may function as a protective or moderating factor that helps patients cope with the physical limitations associated with chronic kidney disease and dialysis therapy rather than serving as the sole determinant of functional independence.

From a clinical perspective, the findings of this study have several important implications for nursing practice and patient management in hemodialysis settings. First, healthcare professionals should recognize family members as key partners in the management of chronic kidney disease. Family-centered approaches in patient education and care planning may improve treatment adherence, dietary management, and patients' engagement in self-care activities. Second, nurses should conduct comprehensive assessments that evaluate not only the level of family support but also the physical, psychological, and clinical factors that may influence patients' functional status. Identifying these multidimensional factors can help healthcare providers develop individualized interventions aimed at improving patients' independence. Third, structured caregiver education programs may help family members provide effective support

without fostering excessive dependency, thereby encouraging patients to maintain autonomy in performing daily activities.

Overall, the findings of this study emphasize that maintaining independence in Activities of Daily Living among hemodialysis patients requires a multidimensional approach. Although family support plays an important role in supporting patients' functional capacity, optimal outcomes are more likely to be achieved when family involvement is integrated with comprehensive clinical management, psychological support, and individualized nursing interventions.

Despite these contributions, diverse limitations should be acknowledged. First, the cross-sectional design of this study limits the ability to establish causal relationships between family support and ADL independence. While the results demonstrate an association between these variables, the temporal direction of this relationship cannot be determined. Longitudinal or prospective studies are therefore needed to explore how family support influences functional independence over time. Second, several potential confounding variables that may affect ADL performance were not fully controlled in this study. Factors such as dialysis adequacy, nutritional status, anemia levels, depression, and physical activity patterns may independently influence patients' functional capacity. The absence of these variables in the analysis may limit the comprehensiveness of the findings. Third, the study was implemented in a single-center study, which may restrict the generalizability of the outcomes to other healthcare environments with dissimilar patient characteristics, healthcare systems, and cultural contexts regarding family involvement in patient care.

Future research should consider employing longitudinal study designs to elucidate the causal pathways between family support and functional outcomes among patients undergoing hemodialysis. Additionally, further studies should incorporate a wider range of clinical and psychosocial variables to clarify the relative contribution of family support compared with other determinants of functional

independence. Intervention-based studies evaluating family-centered nursing programs may also provide valuable evidence regarding strategies to improve patients' self-care capacity and quality of life. Such research may contribute to the development of more comprehensive and patient-centered care models for individuals living with chronic kidney disease.

Conclusion and Recommendation

This study showed a significant association between family support and independence in Activities of Daily Living (ADL) among patients with chronic kidney failure undergoing hemodialysis. Patients who gain stronger family support tend to be more independent in performing daily activities such as bathing, dressing, eating, mobility, and elimination. Family support, including emotional, instrumental, informational, and appraisal support, plays an important role in maintaining patients' physical and psychological well-being during long-term hemodialysis treatment.

Therefore, healthcare providers should encourage greater family involvement in the care of hemodialysis patients through continuous education and support programs. Future studies are recommended to use longitudinal designs with larger samples and broader research settings to improve the generalizability of the findings.

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Declaration of conflict of interest

The authors declare no competing interests.

Declaration on the Use of AI

No AI tools were used in the preparation of this manuscript.

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