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FACTORS ASSOCIATED WITH FAMILY RESILIENCE AMONG HEMODIALYSIS PATIENTS: A CROSS-SECTIONAL STUDY

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Abstract

Background: Family resilience plays a crucial role in maintaining psychological well-being and adaptive coping among families caring for hemodialysis patients. Chronic illness and prolonged treatment often impose emotional and physical burdens that challenge the family's ability to adapt, highlighting the need to identify determinants influencing resilience.

Objective: This study aimed to analyze the relationships between demographic and clinical factors: age, gender, education level, duration of hemodialysis, and comorbidities, and family resilience among patients undergoing hemodialysis at Ahmad Yani Islamic Hospital, Surabaya, Indonesia.

Methods: This study used a correlational analytic design with a cross-sectional approach. The population included 110 hemodialysis patients, and 86 respondents were selected using simple random sampling. Independent variables included age, gender, education level, duration of hemodialysis, and comorbidities, while the dependent variable was resilience. The Connor–Davidson Resilience Scale (CD-RISC) was used to measure resilience. Data were analyzed using the Chi-Square test with a significance level of $\alpha = 0.05$.

Result: Most respondents (88.4%) demonstrated a very high level of resilience. Significant relationships were found between resilience and gender ($p = 0.002$), education level ($p < 0.001$), duration of hemodialysis ($p < 0.001$), and comorbidities ($p < 0.001$), while age showed no significant association ($p = 0.019$).

Conclusion: Family resilience among hemodialysis patients was classified as very high. Socio-demographic factors, health conditions, and treatment duration influenced resilience levels. These findings highlight the need for nursing interventions focusing on psychosocial support, patient education, and family empowerment to enhance adaptive coping in long-term hemodialysis care.

INTRODUCTION

Chronic kidney disease (CKD) is a major global public health concern, affecting approximately 850 million people worldwide and contributing to 5–10 million deaths annually, partly due to limited

access to renal replacement therapy (Ulasi et al., 2022). As CKD progresses to end-stage renal disease (ESRD), patients often require lifelong renal replacement therapy, with hemodialysis being the most widely used modality (Park & Kim, 2022). The global number of dialysis patients continues to rise, particularly in low- and middle-income countries where health system capacity and psychosocial support are often inadequate (Wang et al., 2018). In Indonesia, this trend is reflected by a rapid increase in active hemodialysis patients, exceeding 177,000 in 2023, with a high concentration in East Java Province (Indonesian Renal Registry, 2020).

While hemodialysis prolongs survival, it also imposes persistent psychosocial and economic burdens on patients and their families. Continuous treatment demands, lifestyle restrictions, and long-term caregiving responsibilities challenge family resilience, defined as the family's ability to adapt, reorganize functioning, and maintain well-being when facing adversity (Safi et al., 2024). International evidence indicates that family resilience is associated with socio-demographic and clinical characteristics as well as psychosocial resources (Abed et al., 2020; Qiu et al., 2021). However, evidence from Southeast Asia remains limited. In Indonesia, previous studies have predominantly emphasized caregiver burden, stress, and quality of life, with less attention to the adaptive resilience processes that enable families to remain functional in the context of chronic illness (Novita Nirmalasari & Ike Wuri Winahyu Sari, 2025).

This research gap is particularly relevant given that Indonesian families manage hemodialysis care within collectivist cultural values and family caregiving roles that align with the five family health tasks, including recognizing health problems, making health-related decisions, providing care, maintaining a supportive home environment, and utilizing health care services. These culturally embedded caregiving roles may shape resilience differently from Western individualistic contexts (Zhou et al., 2025). The present study is guided by Walsh's Family Resilience Framework (2016), which conceptualizes resilience as a dynamic process involving family belief systems, organizational patterns, and communication and problem-solving processes.

Empirical studies suggest that families with higher educational attainment and stable organizational patterns are better equipped to sustain caregiving responsibilities and emotional stability (Wisk & Weitzman, 2017). Although longer caregiving experience may enhance adaptive coping, prolonged treatment can also contribute to fatigue and emotional exhaustion (Silaule et al., 2024). Conceptually, family resilience is understood as the adaptive outcome of interacting socio-demographic, clinical, and psychosocial determinants that influence how families mobilize resources and regulate emotions while managing chronic illness. Despite this, the determinants of family resilience among hemodialysis patients in Indonesia remain insufficiently explored, limiting the development of holistic, culturally congruent, and family-centered nursing interventions.

This study aimed to identify and analyze the factors associated with resilience among patients undergoing hemodialysis at Ahmad Yani Islamic Hospital, Surabaya, Indonesia. Specifically, this research sought to examine the relationships between age and resilience, gender and resilience,

educational level and resilience, duration of hemodialysis and resilience, as well as the relationship between comorbidities and resilience among hemodialysis patients.

METHODS

Study Design

This study employed a quantitative analytic design with a cross-sectional approach to identify and analyze the factors associated with resilience among patients undergoing hemodialysis. The cross-sectional design allows for the simultaneous measurement of several variables, such as age and resilience, gender and resilience, educational level and resilience, duration of hemodialysis and resilience, as well as the relationship between comorbidities and resilience among hemodialysis patients.

Settings

The research was conducted at Ahmad Yani Islamic Hospital, located in Surabaya, East Java, Indonesia.

Research subject

The research subjects consisted of patients undergoing regular hemodialysis treatment at Ahmad Yani Islamic Hospital, Surabaya, Indonesia. The study used a probability random sampling strategy, which allowed each patient an equal opportunity to be selected, ensuring representative results and minimizing sampling bias.

The inclusion criteria were as follows: patients aged 18 years or older; those who had received hemodialysis treatment for a minimum of three consecutive months; patients attending dialysis twice weekly; individuals in stable physical and psychological condition; and those who voluntarily agreed to participate and signed an informed consent form. The exclusion criteria included patients with severe psychiatric disorders, cognitive impairments, or communication difficulties that could interfere with data collection.

Participants were recruited during their scheduled hemodialysis sessions. With assistance from the dialysis unit nurse, the researcher explained the study objectives and procedures to eligible patients and invited them to participate. After obtaining informed consent, questionnaires were distributed to the respondents. The total population of hemodialysis patients at the hospital was 110 individuals. Based on this population, a sample size of 86 participants was calculated using the Slovin formula with a 5% margin of error, which is commonly applied in finite population studies to ensure adequate representativeness.

Although a formal a priori power analysis was not conducted, the obtained sample size represents approximately 78% of the total population. It exceeds the minimum recommended proportion for cross-sectional correlational studies. According to methodological guidelines, samples exceeding 10–20 participants per variable or including more than two-thirds of the target population are considered sufficient to detect meaningful associations in observational studies (Polit & Beck, 2021).

Therefore, the sample size in this study was deemed adequate to provide reliable estimates and examine associations between the studied variables.

Instruments

Data were collected using a structured self-administered questionnaire consisting of two sections: demographic and clinical characteristics, and resilience assessment using the Connor–Davidson Resilience Scale (CD-RISC). The CD-RISC consists of 25 items rated on a 5-point Likert scale ranging from 0 (“not true at all”) to 4 (“true nearly all the time”), with total scores ranging from 0 to 100. Higher scores indicate greater resilience. In this study, resilience levels were categorized based on total scores as follows: low resilience (≤ 50), moderate resilience (51–75), and high resilience (> 75). These cut-off points were used to facilitate the interpretation of resilience levels among hemodialysis patients.

Data Collection

Data collection was conducted between April and August 2025 at the hemodialysis unit of Ahmad Yani Islamic Hospital after obtaining ethical clearance and institutional permission. Coordination was first established between the researcher and the head nurse of the dialysis unit to identify eligible participants.

Participants completed the questionnaire during their dialysis sessions to ensure comfort and accessibility. For patients who experienced fatigue, the researcher or trained assistant read the questions aloud and recorded the responses to maintain accuracy. As this was a non-experimental cross-sectional study, no intervention or control group was involved. The researcher only observed and recorded existing conditions without manipulating any variables. After completion, each questionnaire was reviewed for completeness before being collected. Participants were thanked for their contribution and given a small token of appreciation.

Data Analysis

The data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 27.0. Prior to analysis, data underwent editing, coding, and tabulation to ensure accuracy and completeness. Descriptive statistics (frequency, percentage, mean, and standard deviation) were used to summarize participants’ demographic and clinical characteristics. To examine the relationships between independent variables (age, gender, education level, duration of hemodialysis, and comorbidities) and the dependent variable (resilience), the Chi-Square test was employed. Statistical significance was defined as $p < 0.05$, indicating a meaningful association between the variables examined.

Ethical Consideration

This research adhered strictly to the ethical principles governing studies involving human participants. Ethical clearance was obtained from the Health Research Ethics Committee of Ahmad Yani Islamic Hospital, Surabaya, Indonesia, under approval number 203.EC.KEP.RSIAY.07.25. The ethical review ensured that all procedures were conducted in accordance with the Declaration of

Helsinki and national research ethics standards. Before data collection began, participants were given a comprehensive explanation of the study's purpose, procedures, and potential benefits. They were informed that participation was entirely voluntary and that they could withdraw at any time without penalty. Written informed consent was obtained from all participants prior to inclusion in the study.

The ethical principles of anonymity, confidentiality, and justice were upheld throughout the research process. Participants' names and identifying details were not recorded, and unique codes were used to ensure data privacy. All information collected was stored securely in password-protected files and was used exclusively for academic and research purposes. In addition, institutional permission from Ahmad Yani Islamic Hospital was obtained to ensure compliance with the hospital's internal governance and research conduct policies.

RESULTS

The findings of this study describe the demographic and clinical characteristics of hemodialysis patients and analyze the relationships between these factors and family resilience. Data were obtained from 86 respondents, and the results are presented in descriptive and inferential forms to address the study objectives.

General Characteristics

Table 1 show about a total of 86 hemodialysis patients participated in this study. The majority were in the early elderly age group (46–55 years, 38.4%), followed by the late elderly group (56–65 years, 37.2%), indicating that most respondents were older adults. More than half of the participants were male (59.3%), and the largest proportion had a primary education level (55.8%). Most respondents (76.7%) had been undergoing hemodialysis for less than one year, and the majority (61.6%) reported having one comorbid disease. In terms of psychological well-being, almost all respondents (88.4%) demonstrated a very high level of resilience, suggesting strong adaptive coping mechanisms among hemodialysis patients in this setting.

Table 1. Characteristics of Hemodialysis Patients (N=86).

Respondent Characteristics	Frequency (n)	Percentage(%)
Age (years)		
1. Late adolescence: 17 – 25	1	1.2
2. Early adulthood: 26 - 35 Tahun	8	9.3
3. Late adulthood: 36 - 45 Tahun	12	14
4. Early elderly: 46 - 55 Tahun	33	38.4
5. Late elderly: 56 - 65 Tahun	32	37.2
Total	86	100

Respondent Characteristics	Frequency (n)	Percentage(%)
Gender		
1. Male	51	59.3
2. Female	35	40.7
Total	86	100
Education Level		
1. Primary	48	55.8
2. Secondary	37	43
3. Tertiary	1	1,2
Total	86	100
Duration of hemodialysis		
1. < 1 year	66	76.7
2. 1 – 3 years	17	19.8
3. > 3 years	3	3.5
Total	86	100
Comorbidities		
1. None	27	31.4
2. 1 disease	53	61.6
3. > 2 diseases	6	7
Total	86	100
Resilience Level		
1. Very high	76	88.4
2. High	7	8.1
3. Moderate	3	3.5
Total	86	100

Relationship between resilience and age, sex, education level, duration of hemodialysis, and comorbidities

Figure 1 visually presents these results, with the red dashed line representing the significance threshold ($p = 0.05$). All tested variables fall below this line, reinforcing the statistical evidence that demographic and clinical characteristics play a crucial role in shaping family resilience among hemodialysis patients. The results of the Chi-Square analysis revealed significant associations between several demographic and clinical factors and family resilience among hemodialysis patients, as summarized in Figure 1. The p-values for the tested variables ranged from 0.001 to 0.019, all of which were below the predefined level of statistical significance ($p < 0.05$). These findings indicate that age, gender, education level, duration of hemodialysis, and comorbidities were significantly associated with

resilience among families caring for hemodialysis patients. Specifically, age ($p = 0.019$) and gender ($p = 0.002$) showed significant associations with resilience, suggesting that both life stage and gender-related roles may influence family coping capacity. In addition, education level, duration of hemodialysis, and comorbidities demonstrated highly significant relationships with resilience ($p < 0.001$).

Table 2. Relationship between resilience and age, sex, education level, duration of hemodialysis, and comorbidities

No.	Dependent Variable	Independent Variable	Value	df	Asymptotic Significance (2-sided)
1.	Resilience	Age	18.351	8	0.019
		Sex	12.235	2	0.002
		Education level	35.772	4	<.001
		Duration of hemodialysis	43.884	4	<.001
		Comorbidities	89.317	4	<.001

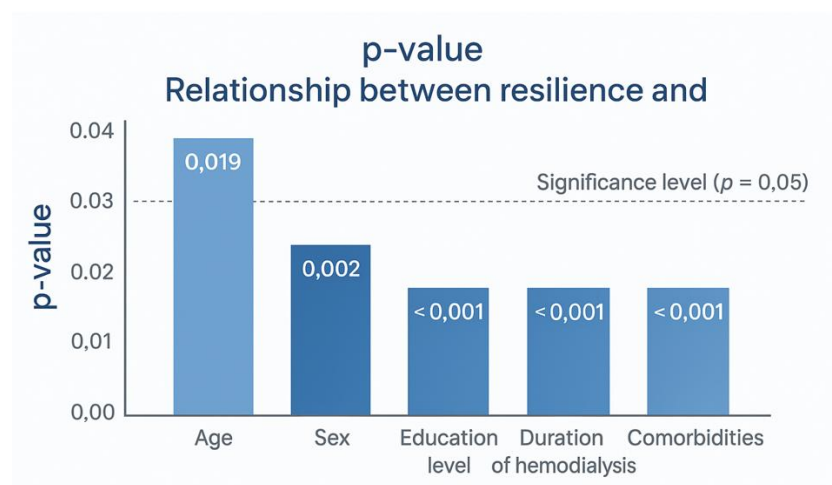


Figure 1. Relationship between Resilience and Characteristics of Respondents.

The results suggest that families with higher levels of education and shorter durations of hemodialysis treatment tend to demonstrate greater resilience, likely due to stronger health literacy and a lower accumulation of chronic stress. In addition, families caring for patients with fewer comorbid conditions show higher resilience, which may be related to reduced emotional and physical caregiving burdens. Overall, these findings underscore the multifaceted nature of resilience and indicate that both

individual and contextual factors play important roles in shaping families' adaptive capacity when managing the long-term demands of hemodialysis care.

DISCUSSION

Age and Family Resilience

A statistically significant association was found between age and family resilience among hemodialysis patients ($p = 0.019$). This finding suggests that resilience is not determined solely by chronological age but is influenced by psychological adaptability and accumulated coping experience. According to the Transactional Model of Stress and Coping, effective stress management depends more on cognitive appraisal and available coping resources than age itself (Lazarus & Folkman, 1987). Previous studies similarly report that both younger and older caregivers may demonstrate comparable resilience levels when supported by adaptive coping strategies and family cohesion (Hejazi et al., 2020; Xu, Ma, et al., 2024). This finding aligns with Walsh's Family Resilience Framework, which emphasizes meaning-making and flexibility as key protective factors (Walsh, 2003).

Gender and Family Resilience

Gender was significantly associated with family resilience ($p = 0.002$), with male caregivers demonstrating higher resilience levels than females. This difference may be related to gender-based coping patterns, where men tend to employ problem-focused coping strategies that enhance perceived control (Goren et al., 2025). Previous research supports this pattern, indicating higher emotional regulation among male caregivers in chronic care settings (de Graaff et al., 2025). However, other studies suggest that female caregivers can achieve comparable resilience when supported through strong social and spiritual networks (Afita & Nuranasmita, 2023). These findings highlight the importance of gender-inclusive interventions that strengthen coping resources for both men and women.

Education and Family Resilience

Education level showed a highly significant association with family resilience ($p < 0.001$). Higher educational attainment has been consistently linked to improved problem-solving skills, health literacy, and adaptive coping in families managing chronic (Hayati et al., 2023; Xu, Qiu, et al., 2024). Educated families may be better equipped to navigate treatment demands and mobilize psychosocial resources, thereby fostering resilience. This finding underscores education as a key determinant of family resilience in the hemodialysis context.

Duration of hemodialysis and Family Resilience

The duration of hemodialysis was significantly associated with family resilience ($p < 0.001$), with lower resilience observed among families involved in long-term caregiving. Prolonged dialysis has been associated with increased fatigue, anxiety, and depression, which may negatively affect both

patients and family dynamics (Ahmed et al., 2025; Bakhsh & Mahallawi, 2025). Extended treatment duration can intensify emotional and logistical burdens, leading to diminished family adaptive capacity (Ye et al., 2022). These findings suggest the need for sustained psychosocial support for families over the course of long-term dialysis care.

Comorbidities and Family Resilience

A strong association was observed between comorbidities and family resilience ($p < 0.001$), with lower resilience reported among families managing multiple chronic conditions. Higher comorbidity burden increases caregiving complexity and psychological strain, which may disrupt family functioning and coping mechanisms (Jaber et al., 2024; Mizher et al., 2023). This finding aligns with previous evidence emphasizing that cumulative illness burden poses significant challenges to family resilience (Lalo et al., 2025; Qiu et al., 2021). Tailored family-centered interventions are therefore essential for families caring for hemodialysis patients with multiple comorbidities.

LIMITATION

This study has several limitations. First, the cross-sectional design limits causal inference between the studied variables and family resilience. Second, the use of self-reported questionnaires may have introduced recall bias and social desirability bias, despite the application of validated instruments. Third, selection bias may be present, as participants were recruited from a single hospital and those who agreed to participate may have differed systematically from non-participants. The single-center setting also limits the generalizability of the findings to populations with different sociodemographic or healthcare contexts. In addition, the absence of qualitative data restricted deeper exploration of cultural meanings and lived experiences related to family resilience. Future studies are recommended to employ longitudinal and mixed-method approaches to reduce bias and better capture the dynamic and contextual nature of family resilience among hemodialysis patients.

CONCLUSION

This study found that family resilience among haemodialysis patients was significantly associated with age, gender, education level, duration of haemodialysis, and comorbidities. Higher resilience was observed in families with higher educational attainment, shorter caregiving duration, and fewer comorbid conditions, highlighting the role of both demographic and clinical factors in shaping adaptive capacity.

Practical implications include the need for family-centered nursing interventions integrated into routine haemodialysis care. Nurses should prioritize structured family education, coping skills training, and psychosocial support, particularly for families facing long term dialysis and multiple comorbidities. Incorporating resilience assessment into discharge planning and community follow-up may help

identify families at risk and guide targeted support. Future research should adopt longitudinal and mixed-method designs to further examine resilience trajectories and contextual influences over time.

AUTHOR CONTRIBUTION

Dwi Ayu Lestari : Conceptualization, Methodology, Data Curation, Investigation, Writing Original Draft.

Nety Mawarda Hatmanti : Supervision, Project Administration, Validation, Writing Review & Editing, Correspondence, Proofreading, and Final Approval.

Lono Wijyanti : Formal Analysis, Software, Data Interpretation, Visualization.

Nunik Purwanti : Resources, Literature Review, Theoretical Framework, Validation.

Destyorini Suryandari : Data Collection, Field Coordination, Participant Recruitment, and Proofreading.

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CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest associated with this research. The study was conducted independently, and no financial, institutional, or personal relationships could have influenced the results, interpretation, or preparation of this manuscript.

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