The Effect of Family Functionality and Social Support on Hemodialysis Patient's Quality of Life Among CKD Patients with Hypertension and Diabetes in Royal Prima Hospital

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ABSTRACT

Hemodialysis, which involves regular visits to the hospital, increases the risk of social disability, where lack of social support contributes to mental and emotional problems experienced by patients undergoing hemodialysis. This study aims to determine the effect of social support and family functionality on the quality of life of chronic kidney disease patients undergoing hemodialysis. This study involved 42 patients with chronic kidney disease undergoing hemodialysis at the Hemodialysis Unit of Royal Prima Medan Hospital, selected by incidental technique. Primary data in this study were collected using the Kidney Disease Quality of Life Questionnaire, Multidimensional Scale of Perceived Social Support, and Family APGAR, while secondary data were sourced from patients' medical records. Data were analyzed using binomial logistic regression. This study found that 78.5% of respondents had hypertension, 40.5% had diabetes mellitus, and 31% had both. In addition, most respondents had low levels of social support (38.1%) but had highly functional families (47.6%). Logistic regression analysis found that social support was the only factor affecting the quality of life of chronic kidney disease patients undergoing hemodialysis (p<0.001; OR: 13.355). It can be concluded that adequate social support benefits the quality of life of chronic kidney disease patients undergoing routine hemodialysis, so promoting a positive social environment that supports hemodialysis patients is necessary.

Keywords: Social support, hemodialysis, chronic kidney disease.

INTRODUCTION

The World Health Organization (WHO) estimates that noncommunicable diseases are responsible for 41 million deaths each year, or about 74% of all deaths worldwide (World Health Organization, 2023). Out of this figure, at least 17.9 million (32.3%) were attributed to cardiovascular disease, and 2 million deaths were attributed to diabetes, including fatalities from diabetes-related kidney disease (World Health Organization, 2023). This high incidence of diabetes and

cardiovascular diseases, including hypertension, increases the risk of chronic kidney disease and end-stage renal disease. All over the world, hemodialysis remains the primary long-term therapy for end-stage renal disease, which attaches the patients to a machine for a relatively long period. This dependency on a machine (mostly in a hospital setting) limits patients' ability to work and socialize, resulting in self-isolation and, worse, depression. Hence, it is necessary and very important for them to have a strong familial and social support system.

This study aims to determine the effect of family functionality and social support as a whole on chronic kidney disease patients who are on hemodialysis quality of life.

LITERATURE REVIEW

Data from the Basic Health Research (Riset Kesehatan Dasar/Riskesdas) in 2018 showed that the prevalence of hypertension in Indonesia is as high as 34.11%, but the prevalence of hypertension diagnosed by a doctor and receiving anti-hypertensive therapy is only around 8.36% nationwide (Kementerian Kesehatan Republik Indonesia, 2018). The prevalence of diabetes mellitus in Indonesia is reported to be 1.5%, while the prevalence of physician-diagnosed diabetes mellitus in the population aged more than 15 years is 2.0% (Kementerian Kesehatan Republik Indonesia, 2018). Meanwhile, the prevalence of chronic kidney disease in Indonesia is reported to be 0.38% (Kementerian Kesehatan Republik Indonesia, 2018). Nevertheless, this data is significantly different from the data in the 2019 GBD report, which found that the prevalence of diabetes mellitus in Indonesia in 2018 was 3.99% and increased to 4.14% in 2019, while the prevalence of chronic kidney disease in Indonesia reached 10.14% in 2018 and slightly increased to 10.34% in 2019 (Global Burden of Disease 2019 Diseases and Injuries Collaborators, 2024).

The Indonesian Renal Registry (IRR) report shows that the incidence of end-stage renal disease (ESRD) in Indonesia has increased by more than 600% in 10 years, from 9,649 cases in 2010 to 61,786 cases in 2020 (Indonesian Renal Registry, 2023). This tremendous growth in incidence was followed by an increase in prevalence that reached more than 1,100% in the same period, from 11,484 cases in 2010 to 130,931 cases in 2020 (Indonesian Renal Registry, 2023). In chronic kidney disease, treatment options for patients are limited to renal function replacement therapy, which can be in the form of dialysis, either hemodialysis, peritoneal dialysis, or

kidney transplantation. Hemodialysis as a renal replacement therapy is an unavoidable measure to prolong the life span and maintain the quality of life of patients and is still the most commonly prescribed form of renal replacement therapy (Hughes, 2021; Levy et al., 2016; Murdeshwar & Anjum, 2023; National Kidney Foundation, 2018, 2023; Nissenson et al., 2023).

In patients with chronic kidney disease undergoing hemodialysis, there is a general increase in depressive symptoms, increased incidence of recurrent infections, pain and anemia, weakness after hemodialysis sessions, and poor medication adherence (Pretto et al., 2020; Salmi et al., 2021; Wyld et al., 2021). As a chronic disease that requires long-term care, patients with chronic kidney disease often experience physical, mental, and emotional problems (Hejazi et al., 2021). A study by Asiri *et al.* (2023) found that social support, whether from family, friends, or religiosity, affects individual patients' satisfaction with their lives, including their quality of life (Asiri et al., 2023). The importance of social support was also found in another study, which found that social support positively impacts treatment adherence of chronic kidney disease patients undergoing hemodialysis, resulting in a better quality of life (Badawy et al., 2024).

METHODS

This research is a quantitative analytic study using a cross-sectional approach. The population in this study were all chronic kidney disease patients undergoing hemodialysis at the hemodialysis unit of Royal Prima Medan Hospital, which consisted of 112 patients. The sample size in this study was calculated using the Lemeshow formula, and it was found that the minimum sample size was five patients. The number of samples used in this study was 42 patients. The sample was selected using the incidental sampling technique.

The data in this study consisted of primary and secondary data. Primary data in this study consisted of the patient's quality of life, perceived social support, and family functionality. Primary data collection was carried out using valid and reliable standardized questionnaires, namely Kidney Disease Quality of Life-36 (KDQOL-36) for patient quality of life, Multidimensional Scale of Perceived Social Support (MSPSS) for perceived social support, and APGAR Family questionnaire for patient family functionality. Secondary data in this study were obtained from patient

medical records consisting of body weight before and after hemodialysis, hemodialysis duration, serum creatinine levels, and eGFR of patients before and after hemodialysis.

This study and its protocol have been ethically cleared under the letter of the Health Research Ethics Committee of Prima Indonesia University Number 028/KEPK/UNPRI/VIII/2024. Data analysis was performed using binomial logistic regression.

RESULTS

Table 1. Respondents Characteristics

Characteristic	Frequency	Percentage (%)
Sex		
Male	26	61.9
Female	16	38.1
Age (Years)		
≤25	2	4.8
26-45	14	33.3
46-65	17	40.5
>65	9	21.4
Ethnicity		
Batak	14	33.3
Karonese	1	2.4
Javanese	5	11.9
Malay	14	33.3
Chinese	4	9.5
Others	4	9.5
Civil Status		
Married	8	19.0
Not Married	34	81.0
Last Education		
Elementary School (SD)	1	2.4
High School (SMP/SMA)	26	61.9
College/University	15	35.7

Table 1. Respondents Characteristics

Characteristic	Frequency	Percentage (%)
Employment		
Employed	26	61.9
Not Employed	16	38.1
Health Insurance		
Has Health Insurance	42	100.0
Do not Have Health Insurance	0	0.0
Monthly Income		
<Rp 3,769,082	30	71.4
≥Rp 3,769,082	12	28.6

The respondents involved in this study were predominantly male (61.9%), aged 46-65 years old (40.5%), belonged to Batak (33.3%) or Malay (33.3%) ethnic groups, and were unmarried (81%). However, this study did not differentiate between never married or divorced in the unmarried status. In addition, more than half of the respondents had a high school (SMP/SMA) education (61.9%), were employed (61.9%), and had a monthly income less than the Medan City minimum wage (IDR 3,769,082) (71.4%). All participating respondents had health insurance in the form of Jaminan Kesehatan Nasional (JKN), a national insurance program (100%).

Table 2. Respondents Hemodialysis Profiles

Characteristic	Frequency	Percentage (%)
Length of Undergoing Hemodialysis		
<1 Years	11	26.2
1-3 Years	26	61.9
4-6 Years	4	9.5
>6 Years	1	2.4
Hemodialysis Durations		
4 Hours	15	35.7
4.5 Hours	23	54.8
5 Hours	4	9.5

Table 2. Respondents Hemodialysis Profiles

Characteristic	Frequency	Percentage (%)
Post-Hemodialysis Weight Loss		
<2% Pre-Hemodialysis Body Weight	2	4.8
2-5% Pre-Hemodialysis Body Weight	23	54.8
>5% Pre-Hemodialysis Body Weight	17	40.5
Post-Hemodialysis Creatinine Level Decrease		
<50% Pre-Hemodialysis Serum Creatinine Level	3	7.1
≥50% Pre-Hemodialysis Serum Creatinine Level	39	92.9
Post-Hemodialysis eGFR Increase		
<100% Pre-Hemodialysis eGFR	1	2.4
100-300% Pre-Hemodialysis eGFR	30	71.4
301-500% Pre-Hemodialysis eGFR	8	19.0
>500% Pre-Hemodialysis eGFR	3	7.1

More than half of the 42 respondents who participated in this study had been on hemodialysis for 1 to 3 years (61.9%), while 11 respondents (26.2%) had been on hemodialysis for less than a year. On average, respondents underwent hemodialysis for approximately 4.5 hours (54.8%). All respondents experienced weight loss after hemodialysis; most lost around 2-5% (54.8%) of their body weight before hemodialysis. In addition, all respondents also experienced a decreased serum creatinine concentration after undergoing hemodialysis, with the majority of the respondents having their serum creatinine decreased by ≥50% (92.9%) compared to before undergoing hemodialysis, followed by an increase in eGFR between 100-300% (71.4%) compared to eGFR before undergoing hemodialysis.

Table 3. Respondents Comorbidities Profile

	Frequency	Percentage (%)
Hypertension Status		
Normotension	7	16.7

Table 3. Respondents Comorbidities Profile

	Frequency	Percentage (%)
Pre-Hypertension	2	4.8
Grade 1 Hypertension	8	19.0
Grade 2 Hypertension	25	59.5
Length of Time with Hypertension		
<5 Years	8	19.0
5-10 Years	23	54.8
>10 Years	4	9.5
Diabetes Status		
Non-Diabetic	25	59.5
Diabetic	17	40.5
Length of Time with Diabetes		
<5 Years	1	5.9
5-10 Years	13	76,5
>10 Years	3	17.6
Hypertension + Diabetes Mellitus		
Yes	13	31.0
No	29	69.0

Among the respondents who participated in this study, 29 respondents (69%) had only hypertension or only diabetes mellitus, while 13 respondents (31%) had both hypertension and diabetes mellitus simultaneously. Among the 42 respondents, 25 respondents (59.5%) had grade 2 hypertension, with the majority of respondents having hypertension (since diagnosis) for 5 to 10 years (54.8%). Meanwhile, the number of respondents who had diabetes mellitus was 17 respondents (40.5%), where the majority (76.5%) had been diagnosed with diabetes mellitus for 5 to 10 years.

Table 4. Respondents Social/Family Support Profile and Quality of Life

	n	%
Social Support		
Low	16	38.1

Table 4. Respondents Social/Family Support Profile and Quality of Life

	n	%
Medium	14	33.3
High	12	28.6
Family Functionality		
Severely Dysfunctional	7	16.7
Moderately Dysfunctional	15	35.7
Highly Functional	20	47.6
Quality of Life		
Below Average	22	52.4
Above Average	20	47.6

This study used two metrics of support measurement: social support and family support. Based on the data in this study, 38.1% of respondents had low levels of social support, 33.3% had moderate levels of social support, and only 28.6% felt they had high levels of social support. Meanwhile, most respondents had a highly functional family structure (47.6%), and only 16.7% had a severely dysfunctional one.

Based on assessing respondents' quality of life in this study using KDQOL, 22 respondents (52.4%) had a quality of life below average, and 20 others (47.6%) had a quality of life above average.

Table 5. Relationship Between Social Support and Family Functionality with Chronic Kidney Disease Patients' Quality of Life

	Quality of Life				p-value
	Below Average		Above Average		
	n	%	n	%	
Social Support					
Low	15	93.8	1	6.3	
Medium	6	42.9	8	57.1	0.000
High	1	8.3	11	91.7	
Family Functionality					
Severely Dysfunctional	6	85.7	1	14.3	0.053

Table 5. Relationship Between Social Support and Family Functionality with Chronic Kidney Disease Patients' Quality of Life

	Quality of Life				p-value
	Below Average		Above Average		
	n	%	n	%	
Moderately Dysfunctional	9	60.0	6	40.0	
Highly Functional	7	35.0	13	65.0	
Total	**22**	**100.0**	**20**	**100.0**	

Table 5 shows that most respondents with low perceived social support had below-average quality of life (n=15), and only one with low perceived social support had an average quality of life. A similar pattern was found in the high-perceived social support group, where most respondents with high perceived social support had an above-average quality of life. A chi-square analysis found that these two aspects had a significant relationship (p<0.001).

Similarly, it was seen that the majority of patients who had a quality of life below the average of the study population had moderately dysfunctional family dynamics. In contrast, most patients with a quality of life above the average of the study population had highly functional families. However, the relationship between family functionality and quality of life of kidney disease patients in this study was not significant (p>0.05).

Table 6. Multivariate Analysis of Factors Affecting Chronic Kidney Disease Patients' Quality of Life

		β	p-value	OR	CI 95% OR	
					Lower	Upper
Step I	Weight Loss	1.513	0.232	4.539	0.379	54.359
	Diabetes Status	1.024	0.379	2.784	0.284	27.277
	Ethnicity	-0.324	0.410	0.723	0.335	1.563
	Education	-0.165	0.922	0.848	0.031	23.159
	Family Functionality	-0.283	0.759	0.754	0.123	4.606
	Age	-1.256	0.150	0.285	0.052	1.573

	Income	-0.391	0.871	0.676	0.006	75.283
	Employment Status	0.972	0.505	2.644	0.152	46.026
	Social Support	2.613	0.013	13.642	1.720	108.179
	Constant	-5.434	0.326	0.004		
Step IX	Social Support	2.592	0.000	13.355	3.115	57.250
	Constant	-5.048	0.001	0.006		

Multivariate analysis was conducted using binomial logistic regression with the backward conditional method, where variables with insignificant significance values (p>0.05) were eliminated gradually until only variables with significance less than 0.05 remained. In the first stage of analysis, it can be seen that among the nine variables, only the social support variable (MSPSS) is significant (p<0.05), while the other variables have a significance value of more than 0.05. In the second stage, the variable with the highest p-value, education (p: 0.922), was eliminated. This process continued until at stage IX of the analysis, only the social support variable (MSPSS) was left, which had a significant effect on the quality of life of chronic kidney disease patients (p<0.001) with a beta coefficient (β) value of 2.592, which means that for every 1-point increase in social support (MSPSS), there is an increase in quality of life by 2.592 points. In addition, the chance of this effect is also relatively large, where the odds ratio reaches 13,355.

The model feasibility test also shows that this model is feasible, where the Hosmer and Lemeshow feasibility test found a significance value of 0.642. Due to the p>0.05 value, the model is considered fit, with an accuracy of predicting the patient's quality of life of around 81%.

DISCUSSION

The increasing incidence of hypertension and diabetes mellitus in Indonesia has significantly contributed to the increase in the occurrence of chronic kidney disease in Indonesia. In the 2022 Annual Report on Prevention and Control of Noncommunicable Diseases of the Indonesian Ministry of Health, the prevalence of hypertension in Indonesia increased from 25.8% in 2013 to 34.11% in 2018 (Kementerian Kesehatan Republik Indonesia, 2022). Likewise, the incidence of

diabetes mellitus in Indonesia increased from 1.5% in 2013 to 2% in 2018 (Kementerian Kesehatan Republik Indonesia, 2022).

In this study, most chronic kidney disease patients who undergo hemodialysis at the Hemodialysis Unit of Royal Prima Medan Hospital have grade II hypertension (59.5%), while only 40.5% have diabetes mellitus. This finding is similar to the data in the Indonesia Renal Registry 2020 annual report, which found that 61% of chronic kidney disease patients undergoing hemodialysis had comorbidities of hypertension, and 23% had diabetes mellitus (Indonesian Renal Registry, 2023). However, the data did not include the number of hemodialysis patients who had comorbidities of hypertension and diabetes mellitus as in this study, where hemodialysis patients at the Hemodialysis Unit of Royal Prima Medan Hospital who had hypertension and diabetes mellitus were around 31%. The previous study by Yonata et al. (2022) in RSUD Abdoel Moeloek Lampung also found that hypertension was the most prominent etiology of chronic kidney disease (58.2%), followed by diabetes mellitus (30.6%) (Yonata et al., 2022).

Yonata et al. (2022) found that the quality of life of hemodialysis patients was related to economic status (p<0.05) (Yonata et al., 2022). This is also to the findings in this study, which found that economic status, in this case, income, was associated with the quality of life of hemodialysis patients (p<0.05), but multivariate analysis in this study did not find a significant effect (p>0.05). Another study by Huda et al. (2024) also found that income level was associated with the quality of life of hemodialysis patients at Surabaya Islamic Hospital (p<0.001) (Huda et al., 2024). Furthermore, the study mentioned above also found that quality of life was associated with age (p<0.001), faith in religion (p<0.05), and the education level (p<0.001) of hemodialysis patients (Huda et al., 2024).

On the contrary, Kasanah, Umam, and Putri (2021) found that age, gender, education level, and occupation were not related to the quality of life of hemodialysis patients (p>0.05) (Kasanah et al., 2021). This partially contradicts the results of this study, which found that age and occupation were associated with the quality of life of hemodialysis patients (p<0.05). In contrast, gender and education level were not associated with the quality of life of hemodialysis patients (p>0.05). While both age and occupation were associated with the quality of life of hemodialysis patients in the bivariate analysis, in the multivariate analysis, both factors did not significantly influence the quality of life of hemodialysis patients. Meanwhile, Nurcahyati,

Sansuwito, and Hasan's study found that age, gender, and occupation were associated with the quality of life of hemodialysis patients (Nurchayati et al., 2022). Pathophysiologically, age affects the quality of life of hemodialysis patients because the number of damaged nephron cells increases with age, so pathophysiologically, patients with older age have fewer nephrons, thus having a lower filtration capability (lower GFR) (VanMeter & Hubert, 2023).

In the bivariate analysis between social support and family support with the quality of life of hemodialysis patients, it was found that only social support was significantly associated with the quality of life of hemodialysis patients (p<0.001), while family functionality was not significantly associated (p>0.05). This contradicts the study by Budhiana et al. (2022), who found that family support directly affects the quality of life of hemodialysis patients (p<0.01) (Budhiana et al., 2022). Meanwhile, Lim and Kwon's study (2023) found that social support is directly related to the quality of life of hemodialysis patients (p<0.001) (Lim & Kwon, 2023). Furthermore, another study in the Philippines also found that family support measured using family functionality (APGAR Family Scale) did not influence the quality of life of chronic kidney disease patients (Guimbatan et al., 2021). Another study using the APGAR Family Scale also found that family functionality did not significantly affect multiple sclerosis patients' quality of life (Martins et al., 2024). The difference in these results can be caused by the fact that the APGAR family questionnaire scope is relatively narrow due to the questions comprising only five items. At the same time, in the research of Budhiana et al. (2022), the instrument used was the perceived social support-family scale (PSS-fa) questionnaire, which consists of 20 items, broadening its scope (Budhiana et al., 2022). Meanwhile, the MSPSS social support instrument is multidimensional and not limited to family but includes support from friends and significant others in one's life. This instrument explains the patient's social condition more broadly and is not limited to the family. This is likely why social support in this study was associated with hemodialysis patients' quality of life and influenced patients' quality of life. Social support from family and social circles, such as friendship and community, affects patients' quality of life undergoing hemodialysis (Alrowaie et al., 2023; El-Habashi et al., 2020).

Currently, in Indonesia, hemodialysis is still the primary long-term therapy for patients with chronic kidney disease, which is characterized by the number of chronic kidney disease patients undergoing hemodialysis reaching 98%. In

comparison, those undergoing ambulatory dialysis are only around 2%, while transplantation is still less than 0.01% (Indonesian Renal Registry, 2023). Since hemodialysis is a therapy that involves specific machines and infrastructure, hemodialysis is generally only performed in clinics and hospitals, where patients must visit the clinic or hospital regularly and be connected to the hemodialysis machine for 3 to 5 hours for each session (Moura-Neto et al., 2021). This leads to social limitations in hemodialysis patients and can cause feelings of isolation and abandonment (Nataatmadja et al., 2021; O'Hare et al., 2018; Sluiter et al., 2024). This social disability is potentially experienced by patients undergoing hemodialysis and the patient's primary caregiver attached to the patient (Nataatmadja et al., 2021). Research by Avdal et al. (2020) found that dialysis patients, both ambulatory dialysis and hemodialysis, experienced depression and reduced or lost social support after they developed chronic kidney disease (Avdal et al., 2020). Even in patients with peritoneal dialysis that can be performed at home, patients sometimes lack support from family, resulting in a sense of loss of social support that patients expect (Avdal et al., 2020). Other studies have also found that people who are on peritoneal dialysis have a tendency to isolate themselves due to fear and embarrassment of the tube and bag, resulting in self-alienation (Diao et al., 2023).

Social support from family, friends, and hospital/hemodialysis unit staff (in the form of positive interactions) can help avoid social disabilities such as isolation, alienation, suspicion, and abandonment (O'Hare et al., 2018). In addition, a study by Song et al. (2021) found that social support contributes to a sense of coherence and self-management in hemodialysis patients (Song et al., 2021). The same study also suggested that health workers and health facilities can strengthen social support, thus strengthening hemodialysis patients' sense of coherence and self-care ability (Song et al., 2021). These results are consistent with other studies conducted in Indonesia, which found that adequate social support contributes to self-care ability in hemodialysis patients (Noviana & Zahra, 2022).

CONCLUSION

Based on the findings of this study, it can be concluded that although various factors affect the quality of life of chronic kidney disease patients undergoing hemodialysis, only patients perceived social support has a significant effect (p<0.001; OR: 13.355).

Social support is not limited to support from family, friends, colleagues, and health workers involved in the patient care process. It is recommended that hemodialysis units facilitate the formation of social support groups for hemodialysis patients consisting of patients undergoing hemodialysis, families, professionals, and volunteers so that patients feel adequate social support and improve their quality of life.

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