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Longitudinal Changes in Health-Related Quality of Life Among Older Adults Undergoing Hemodialysis

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ABSTRACT

Chronic kidney disease is a significant public health problem worldwide. Hemodialysis is the most common form of kidney replacement therapy in the world. Hemodialysis therapy is associated with deterioration in health-related quality of life. However, limited studies focused on health-related quality of life subscales among older persons with hemodialysis in the Indonesian population, especially with long-term follow-up. This study aims to explore the six-month longitudinal changes in health-related quality of life subscales among older persons with hemodialysis. This prospective cohort study evaluated 119 older adults undergoing hemodialysis using purposive sampling between March and September 2024 at PKU Yogyakarta Hospital, Indonesia. Outcomes status was evaluated with health-related quality of life at 1-, 3-, and 6-months. The Indonesian version of SF-36 assessed health-related quality of life. Data were analyzed using general estimating equations. In general, the health-related quality of life among older persons with hemodialysis was decreased. The longitudinal changes of eight subscales significantly deteriorated from the first month to the third month and remained consistently worse during the third to the sixth months (p=.001, respectively). Most deterioration was found in role limitation due to physical problem (β=-94.4; p=.001), general health (β=-70.5; p=.001), and vitality (β=-66.9; p=.001). Social function showed the better domain during the 6 months (β=-36.6; p=.001) than other health-related quality of life subscales. Different aspects of health-related quality of life deteriorate differently among older persons with hemodialysis. Specific attention needs to be paid to high-risk Indonesians among older persons with hemodialysis health-related quality of life, especially those who are older.

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INTRODUCTION

Chronic kidney disease is a significant public health problem worldwide (Kovesdy, 2022; Li et al., 2023), including in Indonesia (Hustrini et al., 2022). Studies have reported that chronic kidney disease is one of the leading causes of mortality worldwide (Bello et al., 2022; Castro, 2019; Kovesdy, 2022; Tungsanga et al., 2024). Chronic kidney disease is associated with high morbidity and excess healthcare costs (Adejumo et al., 2020; Bello et al., 2022). Chronic kidney disease is managed via hemodialysis therapy (Bello et al., 2022; Castro, 2019; Elendu et al., 2023). Hemodialysis is the most common (89%) form of kidney replacement therapy in the world (Bello et al., 2022). Studies have reported that chronic kidney disease and hemodialysis therapy are

associated with a high prevalence of health-related quality of life (Bahall et al., 2023; Marthoenis et al., 2021; Teles et al., 2018). Health-related quality of life in hemodialysis patients is dramatically lower than that in the general population and strongly associated with a higher risk of death and hospitalization, independently of a range of demographic and comorbid factors (Ishiwatari et al., 2020).

Health-related quality of life reflects how disease and treatment affect a patient's sense of overall function and well-being. It has been used as a crucial clinical indicator for overall health outcomes of hip-fractured patients receiving medical treatment (Sitlinger & Zafar, 2018). Subjective evaluation of health and related life domains from the client's perspective can enhance our understanding of the impact of the treatments (Alexiou et al., 2018). Studies have shown that lower levels of health-related quality of life predict higher morbidity and mortality in older populations (Wantonoro et al., 2020), including older persons with hemodialysis. The Asian region includes countries with diverse cultural, demographic, and socio-political backgrounds (Tarrrant et al., 2020). The client's perspective on the social and cultural fabric of a people may vary significantly across different cultures. For example, vitality, mental health, social functioning, support systems, and public facilities may exhibit different characteristics in elderly patients in Indonesian society compared to those in Western and Asian developed countries. The majority of current health-related quality of life findings, based on data collected in Western and Asian developed countries (Burden et al., 2020), reveal a significant knowledge gap regarding health-related quality of life among hemodialysis patients, particularly in the Southeast Asia region, including Indonesia. In addition, based on the culture and belief, dependence among hemodialysis patients in Indonesia is cared for at home by family members (Schröder-Butterfill & Fithry, 2014). Thus, the evaluation of health-related quality of life has become increasingly important.

The differences in culture and beliefs might cause the different presentation of health-related quality of life among hemodialysis patients in Indonesia as compared with those in Western and Asian developed countries. To our knowledge, there are still limited studies focused on health-related quality of life among older persons with hemodialysis in the Indonesian population, especially with long-term follow-up to determine the predictive quality of life (QOL) outcomes and inform the development of targeted nursing interventions. Therefore, the purpose of this study was to examine the health-related quality of life during the first 6 months in in older personspersons with hemodialysis. This information can enhance our understanding in order to provide better care of older person with hemodialysis.

METHOD

This study was used a prospective cohort study was used to explore the health-related quality of life among older persons with hemodialysis in Indonesia over 6 months. Outcomes were measured at 1-, 3-, and 6-months (Amphansap & Sujarekul, 2018; Martinez-Cano et al., 2016; Shyu et al., 2004; Wantonoro et al., 2020).

This study was conducted at PKU Yogyakarta Hospital, Indonesia, from March to September 2024, with a sample of 119 out of 234 hemodialysis patients. They were recruited purposively if they met the following inclusion criteria: (1) chronic kidney disease patients undergoing hemodialysis ≤1 month, (2) ≥ 60 years old, (3) current residents of Java Island, Indonesia. Patients were excluded if they had experienced a stroke, had paralysis, or had cognitive impairment according to medical record information.

This study received approval from the Hospital Research Ethics Committee (number 00093/KT.7.4/III/2024). Older persons undergoing hemodialysis were informed about the study's aim and details, as well as their right to withdraw at any time for any reason. Data were collected using self-report instruments during follow-up appointments in the hospital at the end of the first, third, and sixth month (T1, T2, and T3, respectively). If participants were unable to read and complete the instruments independently, research assistants conducted face-to-face interviews to assist them in answering the questions.

Health-related quality of life was operationally defined by the Indonesian version of the Short Form-36 scale (SF-36). It measures concepts of physical functioning (10 items; item 3a to

3j), role limitations due to physical health problems (4 items; item 4a, b, c, d), bodily pain (BP, 2 items; item 7 and 8), general health (GH, 5 items; item 1, 11a, 11b, 11c, and 11d), vitality (VT, 4 items; item 9a, 9e, 9g and 9i), social functioning (SF, 2 items; item 6 and 10), role limitations due to emotional problems (3 items; item 5a,b, c) and mental health (MH, 5 items; item 9d,c,d,f and h). For each scale, rthe everse items scale was computed, and then the raw scale scores were transformed into a scale of 0–100. The higher the score, the better the implied health-related quality of life. The SF-36 has been translated into numerous languages, including Bahasa Indonesia. Internal consistency of the Indonesian SF-36 showed Cronbach's alpha >0.7 for all subscales (Novitasari et al., 2016).

Data were analyzed using statistical application for windows. Mean and standard deviation (SD) were calculated for continuous variables. Linear regression models using the generalized estimating equations (GEE) approach (Liang & Zeger, 1993) were used to determine significant outcomes for H health-related quality of life subscale at the three time points (T1, T2, T3). Model 1 examined the influence of time on outcomes of the health-related quality of life domain of participants after hospital discharge by entering scores for the health-related quality of life domain at the three-time points, T1, T2, and T3.

RESULTS

Sample characteristic

A total 119 older person with hemodialysis agreed to participate in this study and provided informed consent. One hundred nineteen completed functional assessments were conducted at the second assessment and included in the data analysis (T1). A total of 109 participants completed the questionnaires for the 3-month follow-up (T2). Eleven participants withdrew from the study prior to the 6-month follow-up; a total of 98 participants completed the questionnaires at 6-month follow-up (T3). The flowchart for participants in this study is shown in Figure 1. The mean age of the 119 participants prior to hospital discharge (baseline) was 66.56 years (SD=9.26); 59.8% were male. The mean age of the 109 participants at 3 months was 68.26 years (SD=6.22); 53.8% were male. The mean of age of the 98 participants at 6 months was 67.46 years (SD= 5.21); 54.8% were male.

Longitudinal changes in health-related quality of life

Longitudinal changes (mean) of eight subscales during the six months of hospital discharge are presented in the graph in Figure 2. The means of each subscale at each time point are listed in Table 1. The significance of the differences in the trends was examined using GEE, and significant differences were found. It appeared that all subscales of SF-36 consistently deteriorated over the six-month follow-up. Interestingly, the highest subscales during the first month to the third months are social function. By the end of the six months, most of the SF-36 subscales were significantly decreased.

The longitudinal changes of all eight health-related quality of life subscales significantly deteriorated from the first month to the third month after hospital discharge when using the first month as baseline (p=.001, respectively). They consistently decreased from the third to the sixth months when using the third month as baseline (p=.001, respectively). During the first 6 months following discharge, most deterioration were found in role limitation due to physical problem (β=-94.4; p=.001), General Health (β=-70.5; p=.001), and vitality (β=-66.9; p=.001). Interestingly, social function showed the better domain during the 6 months (β=-36.6; p=.001). Social function was found to be consistently higher than another subscale from the third to the sixth month among older persons with hemodialysis (β=-36.6; p=.001) (Table 2).

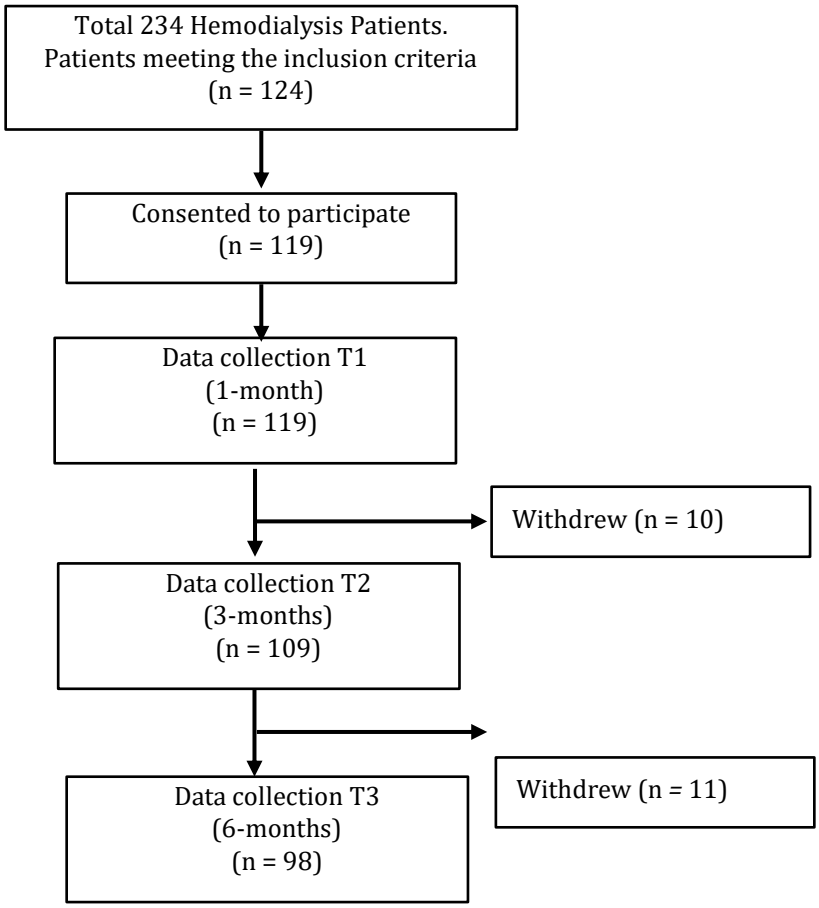
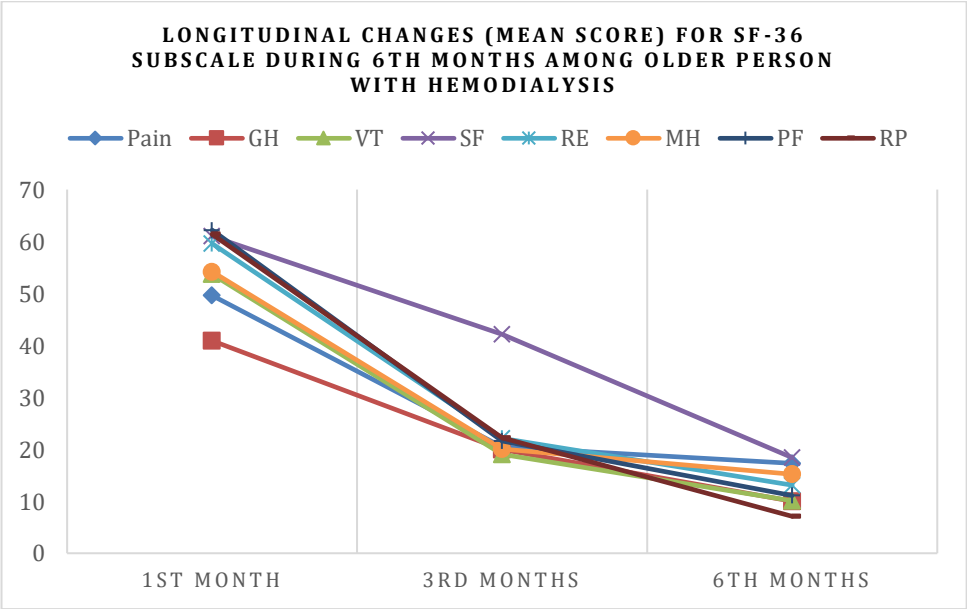


Figure 1. Respondent fowchart



Notes: GH: General Health, VT: Vitality, SF: Social Function, RE: Role limitation due to emotional problem, MH: Mental Health, PF: Physical Function, RP: Role limitation due to Physical problem

Figure 2. Longitudinal changes (mean) of eight subscales during the six months of hospital discharge

Table 1. The longitudinal changes (mean, SD) for the SF-36 subscales during the 6th month

Variables SF-36 Subscales	Time (mean ±SD)		
	Month 1 (T1) (n=119) (baseline)	Month 3 (T2) (n=109)	Month 6 (T3) (n=98)
Pain	49.60±5.67	20.53±14.11	17.37±6.84
General health	40.94±7.54	20.02±8.75	10.06± 8.02
Vitality	53.66±6.86	19.02±8.25	10.12± 7.24
Social function	61.05±55.4	42.1±9.11	18.4±13.85
Role limitation due to an emotional problem	59.63±37.14	22.13±32.30	13.14±15.52
Mental health	54.22±5.92	20.12±5.04	15.15±3.94
Physical function	62.23±12.72	21.67±13.12	11.12±5.36
Role limitation due to a physical problem	61.45±27.12	22.28±22.06	7.15±9.91

Table 2. The GEE longitudinal changes for the SF-36 subscale during the 6th month of hospital discharge

Variables SF36 Subscales	Model 1 (time)											
	Month 3 vs. month 1 (n=119)				Month 6 vs. month 1 (n=119)				Month 6 vs month 3 (n=109)			
	CI 95%				CI 95%				CI 95%			
	β	Lower	Upper	p	β	Lower	Upper	p.	β	Lower	Upper	p
Pain	-15.7	-18.3	-13.2	.001	-45.4	-47.4	-43.4	.001	-29.6	-32.2	-27.0	.001
GH	-32.6	-36.0	-29.2	.001	-70.5	-74.6	-66.4	.001	-18.9	-20.7	-17.1	.001
VT	-13.1	-16.6	-9.6	.001	-66.9	-70.0	-63.8	.001	-26.8	-28.5	-25.2	.001
SF	-5.88	-7.9	-3.8	.001	-42.6	-45.2	-39.9	.001	-36.6	-39.7	-33.5	.001
RE	-23.5	-30.0	-17.1	.001	-52.4	-59.9	-45.5	.001	-29.0	-35.6	-22.3	.001
MH	-10.1	-11.5	-8.1	.001	-26.1	-28.9	-25.3	.001	-16.6	-17.9	-15.4	.001
PF	-38.2	-41.3	-35.1	.001	-94.4	-98.7	-90.1	.001	-28.1	-30.1	-26.0	.001
RP	-13.9	-16.0	-11.9	.001	-21.9	-24.2	-19.7	.001	-20.0	-23.5	-16.4	.001

Notes: GH: General Health, VT: Vitality, SF: Social Function, RE: Role limitation due to emotional problem, MH: Mental Health, PF: Physical Function, RP: Role limitation due to Physical problem

DISCUSSION

Deterioration in health-related quality of life among older persons undergoing hemodialysis has been identified in numerous studies (Alshelleh et al., 2023; Alshelleh et al., 2022). In hemodialysis the mortality is very high and significantly related to age (Bello et al., 2022; Castro, 2019; Kovesdy, 2022; Tungsanga et al., 2024). Hospitalization rates were higher in patients undergoing dialysis, particularly those over 80 years old, with no survival benefit found (van Loon et al., 2019). The health-related quality of life provides a subjective evaluation of health and related life domains from the perspective of elderly persons, supplementing functional and clinical indicators, and offers a holistic view of the effect of interventions (Wantonoro et al., 2020). The current study indicated that different aspects of health-related quality of life deteriorate differently for older persons with hemodialysis. The role limitation due to physical problems, general health, and vitality appeared to make the most significant impact on deterioration in 6 months older person with hemodialysis. Studies have reported decreased patient satisfaction and role limitation in individuals with hemodialysis, affecting both physical and emotional functions (de Rooij et al., 2022; Hasan et al., 2021). A low physical functioning score was associated with a deterioration outcome, suggesting the importance of physical condition in elderly dialysis patients (Chung et al., 2024). It implies deterioration in the health-related quality of life subscale for older persons undergoing hemodialysis.

Based on these findings, several suggestions can be made for clinical practice in taking care of older persons with hemodialysis. First of all, older people with hemodialysis had an impact on not only patients' physical aspects, but also on all aspects of health-related quality of life for these older people with hemodialysis. Health care professionals need to pay attention to all these aspects of health-related quality of life. Secondly, intervention programs should be developed and evaluated to determine their effectiveness in improving physical function and other health-related quality of life aspects. Intervention studies should focus on early intervention. Following hospital hemodialysis treatment, there are no in-home programs available for older individuals with hemodialysis. Finally, interventions can and should be developed to facilitate the older person with hemodialysis in developing effective coping strategies, as well as a realistic perception about their physical problems, in order to speed up improvement of their role functioning, which is affected by their physical limitations.

Limitation this study are the longitudinal changes of health-related quality of life older person with hemodialysis in Indonesia were explored. This study was limited by several factors such as a lack of data collection on the pre-hemodialysis health-related quality of life subscales, the use of a convenience sample, and the absence of a control population of older persons with hemodialysis. These limitations might lessen the impact of a convenience sample on the generalizability of the results.

CONCLUSION

Different aspects of health-related quality of life decreased differently among older persons with hemodialysis. Specific attention needs to be paid to high-risk Indonesians among older persons with hemodialysis HROL, including those who are older with comorbidities. Future studies with a random sample and with collection of a pre-hemodialysis health-related quality of life can be further developed to explore this phenomenon. Interventional studies based on the findings of this study could also be conducted afterward.

AUTHOR'S DECLARATION

Authors' contributions and responsibilities

WW, TVN: study conception and design; **WW**, **SH**: data collection; **WW**, **TVN**: data analysis and interpretation; **TVN**: drafting of the article; **LTH**: critical revision of the article.

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Availability of data and materials

All data are available from the authors.

Competing interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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