ORIGINAL ARTICLES

Factors affecting quality of life of hemodialysis patients at Binh Phuoc Hoan My hospital, Vietnam

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ABSTRACT

Object: Hemodialysis is the common treatment that causes different problems affecting the quality of life (QoL) of chronic kidney disease patients. This study aims to examine the associated factors related to QoL in patients with end-stage kidney disease (ESKD).

Methods: The study employed a cross-sectional design and was conducted from January- November 2022. Data was collected from 78 patients who have hemodialysis using a validated KDQOL-SF™ questionnaire version 1.3 often used to assess the QoL for patients on hemodialysis (HD). There was 01 focus group discussion with Chronic Kidney Disease (CKD) patients and 04 in-depth interviews with management staff. T-test and ANOVA were conducted to analyze quantitative variables.

Results: Among the 78 study patients, the total QoL in the patients as shown by KDQOL-SF™ was 54.28 ± 4.98. In which, the SF-36 score was $51,27 \pm 7,15$ and the KDQOL score was 57.29 ± 5.98. Some demographic characteristics were associated with the low QoL score among ESKD patients such as elderly people (aged 60 years old or over), occupation pensioner/elderly, unemployment ($p<0.001$, t=4.3, 95%Cl: 2.4 to 6.4), and some other characteristics of diseases are longer duration of disease >5 years (p=0.006), duration of HD >3 years (p=0.001); Family factors were also associated with QoL: distance from home to hospital over 5km (p=0.014, t = 2.5, 95% CI: 0.6 to 5.1), family income (poor and near-poor households) (p<0.001, t=-3.7, 95% Cl: -10.4 to -3.1), and Social factors: health insurance benefits 95%, no social support (p<0.001). Management factors: The health insurance's payment policy affects the QoL of CKD patients.

Conclusion: The QoL score of patients with ESKD is relatively higher compared with previous studies. Some demographic, disease-related characteristics (duration of disease and treatment), family factors (distance, income), social factors (health insurance, community support), and health insurance payment policy were associated with lower patient of QoL.

Keywords: Chronic kidney disease, end-stage kidney disease, hemodialysis, quality of life.

INTRODUCTION

Chronic Kidney Disease (CKD) consists of 5 stages classified based on glomerular filtration rate (GFR) and albuminuria. End-Stage Kidney Disease (ESKD) is the most severe stage of chronic kidney disease. End-stage chronic renal failure corresponds to stage 5 chronic kidney disease (GFR < 15 ml/min/1.73 m2) (1).

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Each year, nearly 750,000 people develop end-stage kidney disease in the United States. Treatment is mainly dialysis and kidney transplantation, however, there are more than 100,000 patients on the list of kidney transplants, but only 1/5 of them are responded (2). Hemodialysis (HD) becomes the treatment of choice for most patients with chronic kidney disease (90%). Vietnam has an estimated 5 million people with kidney failure and about 8,000 new cases every year.

The Centers for Disease Control has defined "health-related quality of life" as the effects that disease has on an individual's comfort and ability to enjoy life. ESKD itself has a negative impact on QoL, and quality of life tends to decline gradually as the disease progresses (3). Furthermore, QoL is associated with increased mortality in patients with ESKD (4),(5). Many previous studies have shown that patients on dialysis have a very low quality of life and their quality of life tends to decrease gradually without appropriate interventions (6),(7). Because they not only have to deal with symptoms of illness or anxiety/depression but also the intrusion of a time-consuming therapy (8),(9). In developing countries, there is support from national health insurance, but patients still face difficulties in terms of transportation, accommodation, or lack of sympathy from friends, family, or society, leading to impaired quality of life for HD patients (9),(10).

In Vietnam, the number of people with ESKD who need HD is about 800,000 people, accounting for 0.1% of the population. However, HD for ESKD not only prolongs life but also maintains quality of life (11). As QoL is associated with morbidity and mortality in HD patients, QoL should be considered in the routine monitoring of HD patients. There are very few studies on the quality of life of hemodialysis patients in Vietnam, especially in places with limited insurance and low

social support, which negatively affects the quality of life. Binh Thuoc Hoan My hospital is one such hospital in Binh Phuoc province, Vietnam. This study was conducted to measure the quality of life and identify some related factors in hemodialysis patients at Binh Thuoc Hoan My hospital in 2022.

METHODS

From January 01 to November 01, 2022, a cross-sectional study was conducted at Binh Phuoc Hoan My hospital, Vietnam. The inclusion criteria were patients 18 years and older, having been diagnosed with ESKD and having been undergoing HD for at least 3 months, and consenting to participate in the study. The exclusion criteria were: patients with acute diseases, chronic diseases (heart failure, liver failure, cancer...), surgical diseases, serious systemic diseases affecting the quality of HD, or the patient having difficulty communicating. All seventy-eight patients on hemodialysis in this hospital were enrolled in the study by convenience sampling.

The study used the KDQOL-SF™ (Kidney disease quality of life) toolkit, which is a combined tool with the general quality of life assessment tool SF 36, for specific research on kidney disease. The Kidney Patient Quality of Life - Short Form™ (KDQOL-SF™) tool was developed by KDQOL to assess the quality of life of people with kidney disease and on dialysis. The KDQOL -SF™ questionnaire was published in 1997 by RAND (a non-profit organization that helps improve public policy through research and analysis) (11). Refer to the study on the application of a standardized toolkit in Vietnam according to the study of Le Thi Huyen used in the study to assess the QoL of patients with chronic kidney failure at the Vietnam - Cuba Hospital, Dong Hoi in 2016 (12).

Each subject selected for the study answered questions about QoL through a pre-prepared set of questions, including demographic characteristics, pathological features, family factors, social factors, and quality of life through the KDQOL-SF™ scale version 1.3 included 11 disease-targeted items focused on particular health-related concerns of individuals with of kidney disease and 8 multi-item measures of physical and mental health status (SF-36™). The values from 0-10 selected by the patient are converted to a scale of 0 to 100 respectively. A higher score represents a better quality of life.

After scoring and converting the scores, the research calculates the average score of each factor. The scores of the items are the average of the corresponding questions according to the chart below:
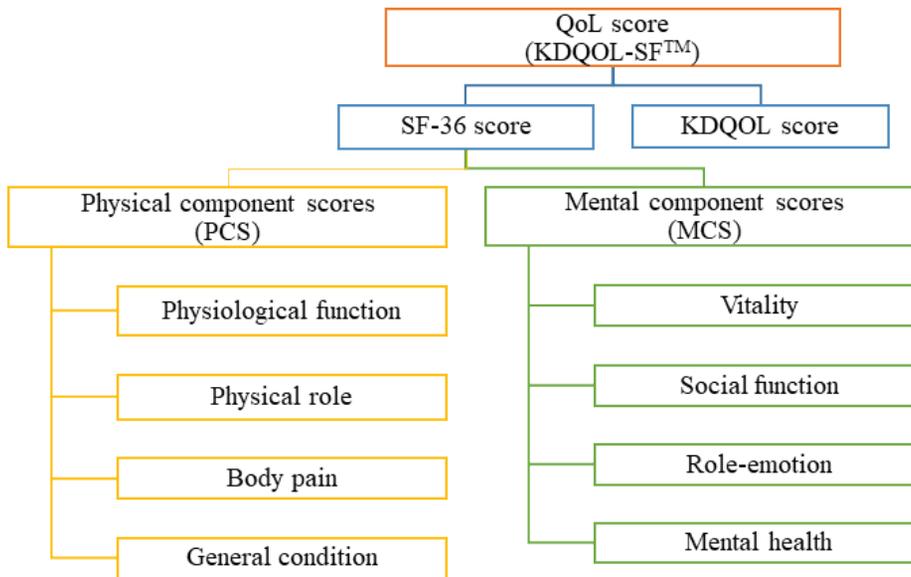

Figure 1. Scores of the items in the KDQOL-SF questionnaire to assess QoL

- Quality of life score (KDQOL-SF™) is the average of the SF-36 score and the KDQOL score.

- The SF-36 score is the average of the physical component scores and mental component scores

- The physical component score (PCS) is the average of four items: Physiological function, Physical role, Body pain, and General condition.

- The mental component score (MCS) is the average of four items: Vitality, Social function, Role-emotion, and Mental health.

- The KDQOL score is the average of the 11 kidney disease-specific items.

Qualitative component: 01 group discussion with hemodialysis patients and 06 in-depth interviews with managers with 1 year of experience or more in order to determine the health service management factors affecting the patient's quality of life, including: 1) policy on the management of HD patients, 2) facilities, equipment, 3) human resource allocation, 4) health care communication, 5) communication between patients and health workers, 6) appointment reminder service, 7) insurance payment policy, 8) policies to support patients with difficult circumstances, 9) monitoring the quality of dialysis. In-depth interviews and focus group discussions were

recorded after obtaining informed consent.

Data were imported using Epidata 3.1 and analyzed using SPSS 26. Comparison between two or more groups of normally distributed quantitative variables by Independent Samples T-test or ANOVA, respectively. Comparison between two groups of nominal variables by Fisher Exact test. The α value of 0.05 value is statistically significant.

Qualitative components: Interview content is transcribed from audio files, and then the researchers performed analyses by topic to understand the service factors that affect the QoL of HD patients.

The study was consented to by the patients and approved by the Ethics Committee of Hanoi University of Public Health (decision No. 371/2022/YTCC-HD3 dated August 15, 2022).

RESULTS

Quality of life score

Table 1. Demographic characteristics of the Study Population (n=78)

Demographic characteristics		Number (n)	Percentage (%)
Gender	Male	30	38.5
	Female	48	61.5
Age group	< 30	4	5.1
	30-44	22	28.2
	45-60	29	37.2
	> 60	23	29.5
Education	Below high school	3	3.9
	High school	34	43.6
	Intermediate/College	24	30.8
	Undergraduate/Postgraduate	17	21.8
Occupation	Manual labor	15	19.2
	Mental labor	28	35.9
	Retirement/Elderly people	35	44.9
Working status	Still working	34	43.6
	Not working	44	56.4
Monthly income	5 – 10 million	59	75.6
	>10 million	19	24.4

A 100% response rate was achieved in the analysis of all 78 patients' data. The patients' average age was 51.4 years (± 13.1), and 37.2% of them were between the ages of 45 and 60. There were 61.54% female patients, or over two-thirds of the total. (Table 1).

Table 2. Total score and scores for each dimension of QOL in hemodialysis patients.

Influencing factors	Mean ± SD	Minimum	Maximum
Physical component scores (PCS)			
Physiological function	37.4± 10.3	10	55
Physical role	76.3± 37.3	0	100
Body pain	42.1± 11.9	23	58
General condition	47.6± 7.6	20	60
Total PCS	**50.85 ± 11.59**	**24**	**67**
Mental component scores (MCS)			
Vitality	50.4± 2.2	48	56
Social function	43.7 ± 32.2	0	100
Role-emotion	59.6 ± 18.6	38	75
Mental health	54.1 ± 5.0	45	60
Total MCS	**51.70 ± 9.05**	**36**	**70**
Kidney disease Quality of life			
The symptoms	57.4 ± 20.3	31	75
Effects of kidney disease	27.9 ± 3.8	22	38
Burden of kidney disease	60.7 ± 9.5	38	75
Job Status	40.0 ± 21.9	3	54
Cognitive function	83.6 ± 19.8	60	100
Social interaction function	64.5 ± 4.5	53	67
Sexual function	20.8 ± 17.4	0	50
Sleep	43.4 ± 6.2	30	55
Social support	80.8 ± 12.9	36	100
Support from dialysis staff	76.1 ± 15.2	50	100
Patient satisfaction	54.9 ± 7.7	50	67
Total KDQOL	**57.29 ± 5.98**	**46**	**68**
KDQOL-SF™	**54.28 ± 4.98**	**42**	**64**

Factors affecting the quality of life of dialysis patients

The total QoL score in the patients in this study as shown by KDQoL-SF™ was 54.28 ± 4.98. QoL scoring with the SF-36 scale was 51,27 ± 7,15 and the KDQoL scale was 57.29 ± 5.98. The score for each dimension of QOL is listed in Table 2.

Demographic factors

Table 3. Quality of life score in hemodialysis patients about demographic characteristics

Demographic characteristics		Mean ± SD	p-value
Gender	Male	54.9 ± 4.6	0.43* MD = 0.9, t = 0.8 95% CI: -1.4 to 3.2
	Female	53.9 ± 5.2	
Age group	<30	60.7 ± 0.9	0.00**
	30-44	57.5 ± 3.5	
	45-60	54.4 ± 3.5	
	> 60	50.0 ± 4.7	
Education	Below high school	47.0 ± 2.8	0.06**
	High school	54.3 ± 4.9	
	Intermediate/College	54.3 ± 4.8	
	Undergraduate/Postgraduate	55.3 ± 4.9	
Occupation	Manual labor	56.3 ± 4.6	0.00**
	Mental labor	56.5 ± 3.9	
	Retirement/Elderly people	51.7 ± 4.7	
Working status	Still working	56.8 ± 3.8	0.00* MD= 4.4, t = 4.3 95% CI: 2.4 to 6.4
	Not working	52.4 ± 4.9	
Monthly income	5 – 10 million	53.9 ± 5.2	0.21* MD= -1.7, t = -1.3 95% CI: -4.3 to 0.9
	>10 million	55.5 ± 4.1	

* T-test/ ** Anova test, MD: Mean Different.

The total QoL score decreased with increasing age ($p < 0.01$). The total score in Retirement/Elderly people or not working was significantly lower than that in other jobs or still working ($p < 0.01$)

Pathological factors

Table 4. Quality of life score in hemodialysis patients about pathological features

Pathological features		Mean±SD	p value
Duration of illness	<3 years	58.7 ± 3.62	0.00**
	3-5 years	54.9 ± 4.59	
	5 -10 years	52.3 ± 5.07	
	>10 years	54.4 ± 4.46	
Duration of hemodialysis	Under 1 year	58.5 ± 3.5	0.00**
	1-3 year(s)	56.8 ± 4.8	
	3-5 years	53.8 ± 4.5	
	5-10 years	52.4 ± 4.8	

Pathological features		Mean±SD	p value
Frequency of hemodialysis/week	9-12 hours	52.9 ± 5.3	0.91*
	> 12 hours	54.9 ± 4.7	MD=-2.0, t = -1.7 95% CI: -4.4 to 0.3
Number of comorbidities	None	55.8 ± 4.6	0.05**
	1 disease	54.2 ± 5.1	
	2 diseases	53.6±3.6	
	3 diseases	49.3±6.7	

* T-test/ ** Anova test, MD: Mean Different.

The total QoL score decreased with a longer duration of illness, and a longer duration of hemodialysis, and the differences were statistically significant ($p < 0.05$).

Family factors

Table 5. Quality of life score in hemodialysis patients about family factors

Family factors		Mean±SD	p value
Distance from home to hospital	≤ 5km	56.1 ± 4.9	0.014*
	> 5km	53.3 ± 4.7	MD=2.9, t = 2.5 95% CI: 0.6 to 5.1
Monthly family income	Poor households, near-poor	48.2 ± 5.5	0.00*
	Enough to eat, well-off or more	54.9 ± 4.5	MD= -6.7, t = -3.7 95% CI: -10.4 to -3.1
Number of dependents	Single	52.2 ± 3.1	0.42**
	1-2 people	54.6 ± 5.3	
	≥ 3 people	54.2 ± 4.8	

* T-test/ ** Anova test, MD: Mean Different.

The total QoL score decreased with lower family income and longer distance and the differences were statistically significant ($p < 0.05$).

Social factors

Table 6. Quality of life score in hemodialysis patients about social factors

Social factors		Mean±SD	p value
Health insurance status	80% of medical costs	56.3 ± 4.2	0.00**
	95% of medical costs	51.3 ± 4.8	
	100% of medical costs	55.9 ± 3.2	
Social support	No	50.1 ± 5.0	0.00*
	Yes	55.4 ± 4.3	MD= -5.3, t = -4.3 95% CI: -7.8 to -2.9

* T-test/ ** Anova test, MD: Mean Different.

The percentage of expenses covered by health insurance was found to be considerably associated with lower QoL *(p < 0.01)*. The total score in patients who did not receive social support was significantly lower than that in those who did *(p < 0.01)*.

Health service management factors

Patient management policy: The personalization of each patient with an individual number to identify them in the hospital information system. This policy helps managers control the number of patients being treated at the ward, thereby proactively offering a suitable treatment schedule without overlap, helping patients save waiting time.

At the ward, patients are given an ID code for each patient during dialysis (Participant 2).

Periodic treatment patients are prioritized to schedule morning and afternoon shifts, evening shifts are for patients who do not have regular treatment or can not arrange the time of day (Participant 5).

Healthcare communication: Strengthening communication activities is considered to have a good impact on patients, helping them and their families understand and adhere to treatment, thereby improving treatment effectiveness and patient satisfaction.

"Medical staff carefully explain and guide patients and caregivers so that they understand the hospital's procedures, policies and management." (Participant 3).

Communication between patients and health workers: Effective communication between patients and health workers is a factor that can prevent errors related to this cause. The sympathetic concern of health workers for patients will help create a friendly atmosphere and active sharing.

"Knowledge and attitude almost determine the

patient's quality of life because attitude is related to satisfaction, while knowledge and skill level directly affect the patient's health." (IDI5)

Appointment reminder service: This factor is considered to have a positive effect on patient's quality of life, helping them feel more cared for and increasing treatment adherence.

"Hospital has implemented SMS service" (Participant 1)

"Patients are provided with a treatment schedule and called to remind them if they forget their schedule" (Participant 2).

Health insurance and other support policies: According to the actual situation, most dialysis patients have health insurance, but the level of benefit for each patient is different, in addition, other costs incurred greatly affect the economic status of the patient and family.

"For voluntary health insurance, patients have to pay an additional 15-20% of hospital fees which is also an economic burden for them because of the long treatment process. Some medical drugs are limited so they cannot be prescribed while most patients have health insurance." (IDI4).

Treatment costs become a great economic burden for people with chronic kidney disease, especially for low-income families. Administrators believe that supportive policies for these cases are essential to improve patient's quality of life.

"Partial support for dialysis costs, waiting area, rest area for caregivers, meals, transportation for patients" (IDI5).

DISCUSSION

Quality of life score

The mean score of quality of life according to KDQOL-SF36™ of hemodialysis patients

at Hoan My Binh Phuoc Hospital is 54.28 ± 4.98. This result is higher than the study of Thenmozhi P (2018) in Turkey (48.73 ± 22.65) (6) and the study of Barzegar H (2017) in Iran (48.09 ± 5.00) (7). This difference is because the physical health score of previous studies is quite low (32.13 ± 18.55), causing the SF36TM score to decrease, while the QoL score (KDQOL-SFTM) is the average of the SF-36 score. and KDQOL score.

There was not much difference between the physical health score and mental health score in this study. However, previous studies have shown a significant disparity between these two scores, with the physical health score consistently lower due to kidney disease complications and the effects of dialysis (13),(14). This difference shows that Binh Phuoc Hoan My Hospital has performed well in providing comprehensive care for patients with CKD.

The mean score for kidney disease problems was 57.29 ± 5.98, out of 11 kidney disease problems, the lowest score was for sexual function with 20.83 ± 17.42. This result is much lower than the study in Indonesia of 55.53 ± 27.44 (15) and in Brazil 85.83 ± 20.52 (16).

Related factors

Demographic factors

The results of this study show that retired/ older people, no longer working, and low income (5-10 million) are the factors that lower the QoL score. This result is similar to the studies of Barzegar H (2017) in Iran, high education level, and high income help patients to have easier access to healthcare services, leading to a higher QoL (7).

Pathological factors

The longer the duration of the disease and the length of treatment, the lower the QoL of kidney disease patients. This is due to an increase in symptoms, the burden of disease, and a decrease in the social support scores that the patient has (7). However, in this study, patients on HD after 5-10 years had a better QoL. This can be explained by the fact that these subjects have more experience in managing health problems.

Patients with comorbidities had a lower mean score of QoL than patients without comorbidities, and the more comorbidities, the lower the QoL score. Comorbidities can lead to loss of function of many organs, affecting physical health, and mental health, and increasing the burden of kidney problems. This is also recognized in the study of Zyoud Sa'ed H, patients with HD have many comorbidities that lead to low QoL (17).

Family factors

The group of patients from poor and near-poor households had a lower mean score of QoL. Similar to the studies of Fathia Ahmed Mersal (2016) in Cairo – Egypt (18) and; the study in Iran by Zolfaghari M (2015) (19) and Kobra Parvan (2015) (20). In addition, the study also found that the longer the distance from the patient's home to the hospital, the lower the average score of QoL.

Social factors

Health insurance coverage affects the mean score of quality of life of kidney disease patients. The treatment of cyclic dialysis for patients with kidney disease is lifelong, affecting the patient's family economy. Therefore, the support of health insurance greatly affects the QoL of this subject (7). The group of patients who received support from the community had a higher mean QoL score. Alexopoulou M reports that 64% of hemodialysis patients need someone else's help with daily activities (21). In Vietnam, HD patients receive a lot of support from the State's policies such as social security

benefits and 100% health insurance cards for patients with no income, reducing the burden of treatment. In addition, the hospital also has many support activities such as raising funds to support HD patients in difficult circumstances and providing free meals between dialysis shifts for patients...

Health service management factors

Patient management policy: Managing personal information and providing identifiers is considered an effective way to help patients shorten the waiting time for each treatment and limit the wrong identification of patients. This has also been clearly instructed in the documents of the Ministry of Health(22).

Healthcare communication: This factor provides patients with the necessary information, which helps them understand the role of adherence, leading to improved patient cooperation and satisfaction. Andrew's study (2016) also shows that patient's understanding of CKD improves treatment outcomes (23).

Communication between patients and health workers: In addition to limiting communication errors, this factor also helps create a friendly environment, and proactive sharing, leading to establishing trust and helping ensure continued treatment of the patient. Author Kousoula has also shown that a good relationship between a patient and a doctor has a positive impact on a patient's quality of life (24).

Appointment reminder service: Providing treatment schedules through SMS and calling services helps patients adhere to treatment and feel cared for by the hospital. A study by Som (2016) showed that intervention through sending phone messages increased compliance rates by 75% and reduced the number of unplanned hospital days by 31% (25).

Health insurance and other support policies: The payment level is less than 100% and some additional costs such as out-of-insurance drugs, and differential costs are factors that increase the economic burden for long-term hemodialysis patients. Shambhu's (2020) results also showed that QoLin people with health insurance was 5.34 times higher than in people without insurance (95% CI = 2.47–11.54) (26).

This evidence-based study has identified factors affecting the quality of life of patients with chronic kidney disease, particularly based on individual, family, social, and health service management factors at a private hospital in the province. Binh Phuoc, Vietnam. Research results will be the basis of impact for managers or policymakers on health and care for hemodialysis patients. The KDQOL-SF36™ toolkit for kidney disease patients has been widely used, so it is easy to compare with previous studies in the world. This study shows that quality of life is influenced by pathological characteristics such as duration of disease and treatment and number of comorbidities. However, quality of life is also determined by the effectiveness of each individual's hemodialysis treatment which was not evaluated in this study. The limitation, furthermore, is that the translation of the original Vietnamese version of data to English for analysis and write-up might have introduced deviation in some contextual expressions of the participants.

CONCLUSIONS

This study recorded the quality of life score of chronic kidney disease patients on cyclic dialysis treatment was 54.28 ± 4.98 points, higher than previous studies. Several factors have been identified related to the quality of life of patients: age group, occupation, working status, duration of disease and

duration of treatment, family, social factors, and insurance payment policy. Further studies need to be conducted to evaluate the impact of clinical indicators and the stages of Chronic kidney disease on the quality of life of hemodialysis patients.

REFERENCES

1. Levin A, Stevens PE, Bilous RW, et al. KDIGO 2012 Clinical Practice Guideline for the Evaluation and Management of Chronic Kidney Disease. Kidney international supplements. 2013;3(1):1-150.

2. Saran R, Robinson B, Abbott KC, Agodoa LYC, Bragg-Gresham J, Balkrishnan R, et al. US Renal Data System 2018 Annual Data Report: Epidemiology of Kidney Disease in the United States. American journal of kidney diseases : the official journal of the National Kidney Foundation. 2019;73(3 Suppl 1):A7-a8.

3. Soni RK, Weisbord SD, Unruh ML. Health-related quality of life outcomes in chronic kidney disease. Current opinion in nephrology and hypertension. 2010;19(2):153-9.

4. Mapes DL, Lopes AA, Satayathum S, McCullough KP, Goodkin DA, Locatelli F, et al. Health-related quality of life as a predictor of mortality and hospitalization: The Dialysis Outcomes and Practice Patterns Study (DOPPS). Kidney International. 2003;64(1):339-49.

5. Mapes DL, Bragg-Gresham JL, Bommer J, Fukuhara S, McKevitt P, Wikström B, et al. Health-related quality of life in the Dialysis Outcomes and Practice Patterns Study (DOPPS). American journal of kidney diseases : the official journal of the National Kidney Foundation. 2004;44(5 Suppl 2):54-60.

6. Thenmozhi P. Quality of life of patients undergoing hemodialysis. Asian Journal of Pharmaceutical and Clinical Research. 2018;11:219.

7. Barzegar H, Jafari H, Charati J, Esmaeili R. Relationship Between Duration of Dialysis and Quality of Life in Hemodialysis Patients. Iranian Journal of Psychiatry and Behavioral Sciences. 2017;In Press.

8. Yuhara N, Kristina S. Quality of life among patients undergoing hemodialysis in Yogyakarta. International Medical Journal (1994). 2020;25:13412051.

9. Yonata A, Islamy N, Taruna A, L P. Factors Affecting Quality of Life in Hemodialysis Patients. Int J Gen Med. 2022;15:7173-8.

10. Joshi VD, Mooppil N, Lim JF. Validation of the Kidney Disease Quality of Life-Short Form: a cross-sectional study of a dialysis-targeted health measure in Singapore. BMC Nephrol. 2010;11.

11. Care RH. Kidney Disease Quality of Life Instrument (KDQOL) 1997 [Available from: https://www.rand.org/health-care/surveys_tools/kdqol.html.

12. Le TH, Ngo HH. The quality of life among patients with chronic kidney disease in VietNam - Cu Ba Dong Hoi Friendship Hospital in 2016. Journal of Nursing Science. 2018;1(2):58-65.

13. Acharya S, Chowdhury ATMM, Shu LY, et al. Clinical evaluation of the quality of life of hemodialysis patients. International Journal of Innovative Medicine and Health Science. 2005;Vol. 4(2015):60-70.

14. Saadat S, Aziz A, Ahmad H, et al. Predicting Quality of Life Changes in Hemodialysis Patients Using Machine Learning: Generation of an Early Warning System. Cureus. 2017;9(9):e1713.

15. Saputri VW, Sitorus RJ, Zulkarnain HM, editors. The Quality of Life Chronic Renal Failure (CRF) Patients in Hemodialysis Unit at District General Hospital Pringsewu Regency Lampung Province in 2018. E3S Web of Conferences; 2018 November 01, 2018.

16. Barbosa J, Moura E, Lira C, Marinho P. Quality of life and duration of hemodialysis in patients with chronic kidney disease (CKD): a cross-sectional study. Fisioterapia em Movimento. 2017;30:781.

17. Zyoud SH, Daraghmeh DN, Mezyed DO, Khdeir RL, Sawafta MN, Ayaseh NA, et al. Factors affecting quality of life in patients on haemodialysis: a cross-sectional study from Palestine. BMC nephrology. 2016;17(1):44.

18. Mersal F, El-Sedawy D, Mersal N. Effect of Nursing Guideline on Dietary and Fluid Compliance among Patients Undergoing Hemodialysis. 2016.

19. Zolfaghari M, Asgari P, Bahramnezhad F, AhmadiRad S, Haghani H. Comparison of two educational methods (family-centered and patient-centered) on hemodialysis: Related complications. Iranian journal of nursing and midwifery research. 2015;20(1):87-92.

20. Parvan K, Hasankhani H, Seyyedrasooli A, Riahi SM, Ghorbani M. The effect of two educational methods on knowledge and adherence to

treatment in hemodialysis patients: clinical trial. Journal of caring sciences. 2015;4(1):83-93.

21. Alexopoulou M, Giannakopoulou N, Komna E, Alikari V, Toulia G, Polikandrioti M. The effect of perceived social support on hemodialysis patient's quality of life. Materia socio-medica. 2016;28(5):338-42.

22. Ministry of Health. Decision No. 2483/QĐ-BYT dated April 13, 2018 on promulgating the document Guidance on Artificial Kidney technical procedures. Ministry of Health. 2018.

23. Narva AS, Norton JM, Boulware LE. Educating Patients about CKD: The Path to Self-Management and Patient-Centered Care.

Clinical journal of the American Society of Nephrology: CJASN. 2016;11(4):694-703.

24. Gerasimoula K, Lefkothea L, Maria L, et al. QUALITY OF LIFE IN HEMODIALYSIS PATIENTS. Mater Sociomed. 2015;27(5):305-9.

25. Som A, Groenendyk J, An T, et al. Improving dialysis adherence for high risk patients using automated messaging: Proof of concept. Scientific Reports. 2017;7.

26. Mahato SKS, Apidechkul T, Sriwongpan P, et al. Factors associated with quality of life among chronic kidney disease patients in Nepal: a cross-sectional study. Health Qual Life Outcomes. 2020;18(1):207.