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Association Between Dialysis adequacy and Quality of Life among hemodialysis patients

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Abstract

Introduction: Chronic kidney disease (CKD) is a leading cause of death and morbidity around the world.

Objective: The Study amid to assess Quality of life (QoL) and dialysis adequacy in patient undergoing hemodialysis and determine the association between Dialysis adequacy and Quality of Life (QoL)among hemodialysis patients with end -stage disease .

Methodology: A descriptive A-non-probability (purposive sample) of (174) male and female hemodialysis patients in al-Najaf al-Ashraf city of patients with end -stage kidney disease and undergoing hemodialysis. Most patients were diagnosed with ESRD > one year ago from those who have been on a maintenance hemodialysis program for more than a year.Data was analyzed by using of descriptive data analysis (frequencies, percentages, mean, standard deviation, person correlation).

Results: The results of measurement of adequacy of 174 participant , about 35.1% achieved adequate and 64.9% did not achieve adequacy. The results of the quality of life assessment showed that 10.9% had a good quality of life and 89.1% had a poor quality of life.

Conclusions: The study concluded that Patients with chronic kidney disease on dialysis had overall low QOL scores in all domine. Gender ,level of education that affected one or more domains of QOL. End-stage kidney disease affect negatively on patients' quality of life.

Keywords: Association, Dialysis, Quality of Life, hemodialysis.

INTRODUCTION

Chronic kidney disease (CKD) is a leading cause of death and morbidity around the world (Joshi et al., 2017). Without mechanical filtering (dialysis) or a kidney transplant, chronic kidney disease can proceed to end-stage kidney failure, which is fatal. (Al-Ashour & Mohammed, 2021), Because of oedema and the existence of arteriovenous fistulae or a central venous catheter, the condition adversely impairs body image. Patients' quality of life may be impacted by the disease, which may influence their physical and mental health, functional status, independence, general well-being, personal connections, and social functioning.(Cleary & Drennan, 2005) . Kidneys can become diseased or incapable of cleaning the blood as well as healthy kidneys over time. Wastes and excess water build up in the body when the kidneys aren't working properly, which can lead to additional health issues like heart disease and high blood pressure. CKD affects more than 26 million

people in the United States, according to the Centers for Disease Control and Prevention (CDC). They cost $29 million a year in the United States.(Prevention, 2019) . End-stage renal disease (ESRD) is one of the chronic diseases that poses a significant global hazard and places a significant burden on the healthcare system, resulting in increased morbidity and mortality as well as a reduction in quality of life (QOL). End-stage renal disease (ESRD) is now a serious public health concern around the world. According to the latest data of the global burden disease study (GBD) in 2020, chronic kidney disease (CKD) affects approximately 697 million people globally, with a global prevalence of 13.4% (Balouchi et al., 2021). Reduced renal function is a predictor of hospitalization, cognitive dysfunction, and poor quality of life in people with End-Stage Renal Disease (ESRD) (Hill et al., 2016). ESRD is the last stage of CKD, when the kidneys can no longer handle the demands of daily life. Renal replacement therapy is required to stay alive during this period, and hemodialysis (HD) is the most often utilized therapy, playing a critical role in extending patients' lives.(Thenmozhi, 2018). Hemodialysis is the most commonly used renal replacement treatment, and it plays a key role in extending patients' lives. ESRD is the last stage of CKD, when the kidneys are unable to cope with the demands of everyday living. (Ravindran et al., 2020) . ESRD is the last stage of CKD, when the kidneys can no longer handle the demands of daily life. Renal replacement therapy is required to stay alive during this period, and hemodialysis (HD) is the most frequently utilized therapy, playing a critical role in extending patients' lives.(Gilbertson et al., 2019) . One of the determinants of disability and death in dialysis patients is dialysis insufficiency.(Shasti & BABA, 2011). Hemodialysis (HD) is a life-sustaining therapy for those who have kidney failure (ESRD). HD can have a major impact on health-related quality of life (HRQOL) and outcomes.(Zyoud et al., 2016). Hemodialysis prolongs life but does not cure renal disease or compensate for the kidneys' loss of endocrine and metabolic functions. Chronic hemodialysis is used by more than 90% of patients who need long-term renal replacement treatment. (Johansen et al., 2021). One of the leading causes of morbidity and death in hemodialysis patients is insufficient hemodialysis. The efficacy of hemodialysis may be calculated using a variety of ways, one of which is the determination of Kt/V..(Nemati et al., 2017). Chronic renal disease and related treatment modalities have a significant impact on the quality of life of dialysis patients. As a result, renal failure limits the physical, mental, and social activities of patients.(Dąbrowska-Bender et al., 2018). Long-term dialysis therapy can have a detrimental impact on caregivers, resulting in a loss of mobility, increasing reliance, disturbance of marriage and family social life, and diminished financial situations, causing substantial disruptions in both patients' and their families' lifestyles.(Al Salmi et al., 2021). The World Health Organization (WHO) defines quality of life (QoL) as “the individual’s perception of their position in life in the context of the culture and value system in which they live, and in relation to their goals, expectations, standards, and concerns”(Saxena et al., 1997) .As a result, the Kt/V of urea is usually assessed once a month, with the implicit assumption that one hemodialysis session is indicative of all subsequent sessions. Because blood samples must be collected before and after dialysis, it cannot be used in every dialysis session.(Gebregeorgis et al., 2018) . Patients with ESRD who are on dialysis face several challenges to their HRQOL, both from the disease's symptoms and from the physical and mental strain of dialysis therapy. (Jaar et al., 2013). HRQOL is a recognized health outcome for research evaluating healthcare quality, quantifying the impact of sickness, and cost-effectiveness evaluations. (Wan et al., 2015) .

Methodology

A descriptive anon-probability (purposive sample) of (174) patients with end -stage kidney disease and undergoing hemodialysis . The study was conducted at AL-Najaf AL-Ashraf City /AL Sadder Medical City and AL-Hakeem General Hemodialysis Center the

study was begun from September 9th2021 to June 22th 2022. Study was carried out in order to achieve the study objectives. the aims of this study, assigned to study Association Between Dialysis adequacy and Quality of Life among hemodialysis patients . The SF-36 is constituted of 36 questions used in studies about quality of life of patients with terminal chronic renal insufficiency ,the standardized Short Form Health Survey 36 (SF-36) is an important tool for the assessment of quality of life, Higher scores indicate better health status.The time to fulfill the questionnaire, from 5 to 10 minutes. and the comprehensiveness of its use in population surveys and in studies that analyze public policies and health status of patients. The eight SF-36 scales are: physical functioning (10 items), role-physical (4 items), bodily pain (2 items), general health (5 items), vitality (4 items), social functioning (2 items), role-emotional (3 items) and mental health (5 items), and there are two summary measures - physical health and mental health. The procedures to calculate scores were in accordance with the recommendations of the creators of SF-36. The study's selection criteria were (patients who have been on hemodialysis for at least one year, who are medically stable, who agreed to participate in the study, the age of all participants is between 16 and older years, and Alert patients; free of any change in level of consciousness, both sexes, and free of any psychiatric illness).The instrument used for the study was to collect the data are demographic variable and Kidney Disease QOL - short form (KDQOL- 36-SF) scale. Demographic variables contained the information regarding age, sex, residence, marital status, educational status, occupational status, and income. It also includes the clinical variables such as duration of disease ,period of session and some common complication that accurse during hemodialysis (hypotension ,Infection ,Itching, Nausea and vomiting and finally muscle cramps). And part of indexes dialysis adequacy Formia .The quality of life for patients undergoing hemodialysis ,short form Health Survey (SF-36) scale is a multidimensional, reliable and validated questionnaire intended for dialysis patients The eight SF-36 scales are: physical functioning (10 items), role-physical (4 items), bodily pain (2 items), general health (5 items), vitality (4 items), social functioning (2 items), role-emotional (3 items) and mental health (5 items), and there are two summary measures - physical health and mental health. The patient were requested to answer by themselves, Each scale is scored as 0–100, with a higher score indicating better QOL. and a score above 50 in any domain indicates a better health-related quality of life. scoring manual using Microsoft Excel. QOL assessment was done by SPSS Software Statistical.

Results

Table (1): *Distribution of the observed frequencies and percent of Demographical Characteristics for Study Sample*

variables	Rating	Frequency	Percent
Age	<= 16	1	0.6
	17 - 26	18	10.3
	27 - 36	28	16.1
	37 - 46	53	30.5
	47 - 56	37	21.3
	57 - 66	22	12.6
	67 - 76	13	7.5
	77 - 86	2	1.1
Mean + S.D.		**44.80 ±14.19**	
Gender	Male	81	46.6
	Female	93	53.4
Level of Education	Illiterate	45	25.9
	Read and write	63	36.2
	Primary school	30	17.2
	Intermediate school	24	13.8

	Preparatory school	6	3.4
	Instituted	2	1.1
	College	4	2.3
Monthly Income	Insufficient	39	22.4
	Sufficient	135	77.6
Residency	Rural	80	46.0
	Urban	94	54.0
Marital Status	Single	31	17.8
	Married	137	78.7
	Divorced	3	1.7
	Widowed	3	1.7
Occupation	Retired	8	4.6
	House wife	82	47.1
	Employee	13	7.5
	Jobless	27	15.5
	Free job	44	25.3

Table (1) presented that 147 patients included in the study, with the mean age sample was (44.80 ±14.19) ,about 53 (30.5%) were in the age group 37-46 years. The number of female (53.4%) more than the male (46.6%) and the majority of them (54.0%) are residing in the Urban area . The marital status observed more than 78.7% were married. Regarding educational status,63 (36.2%) samples are Read and write. In addition, about (47.1%) of the samples were housewife, and the majority of their monthly income was Sufficient. Data were presented in Table (1).

Table (2): *Distribution of the observed frequencies and percent of Clinical Data Characteristics for Study Sample*

variables		**Rating**	**Frequency**	**Percent**
Duration of Disease		one year	18	10.3
		2-6 years	132	75.9
		7-11 years	22	12.6
		12-16 years	2	1.1
Mean + S.D.			**3.93 ±2.54**	
Period of Session		2 hours	4	2.3
		3 hours	95	54.6
		4 hours	75	43.1
Mean + S.D.			**3.38±0.52**	
Complications of Dialysis	**Hypotension**	Yes	140	80.5
		No	34	19.5
	Infection	Yes	15	8.6
		No	159	91.4
	Itching	Yes	36	20.7
		No	138	79.3
	Nausea and Vomiting	Yes	68	39.1
		No	106	60.9
	muscle cramps	Yes	114	65.5
		No	60	34.5

In Table (2) demonstrated that mean of duration of ESRD since diagnosis of ESRD(3.93 ±2.54) and about (10.3%) of them have 1 year followed with (75.9%) have 2–6 years With regard to(12.6%) as 7-11 and only Tow have (1.1%)of them has 12-16 years duration of ESRD. With regard to period of session about (54.6%) speeding 3 Hours on dialysis machine and (43.1%) speeding 4 Hours on dialysis machine and only four patient (2.3%) speeding 2 Hours on dialysis machine. which reveals that 80.5% of them was found to be the most frequent have reported Hypotension ,(8.6%) have reported infection ,(20.7%) have Itching ,(39.1%) have Nausea and vomiting and of them have reported the Muscle cramps (65.5%) . Data were presented in Table (2).

Table (3): *Summary statistics for patients' QoL Domains Items*

variables	Rating	Frequency	Percent	Mean	Std. Deviation	Assess.
Domain1	Poor	139	79.9	31.55	18.97	Poor
	Good	35	20.1			
Domain2	Poor	120	69.0	28.87	24.98	Poor
	Good	54	31.0			
Domain3	Poor	89	51.1	43.95	26.10	Poor
	Good	85	48.9			
Domain4	Poor	116	66.7	42.27	12.27	Poor
	Good	58	33.3			
Domain5	Poor	125	71.8	43.90	13.59	Poor
	Good	49	28.2			
Domain6	Poor	79	45.4	44.97	17.92	Poor
	Good	95	54.6			
Domain7	Poor	153	87.9	31.95	15.25	Poor
	Good	21	12.1			
Domain8	Poor	99	56.9	43.81	14.04	Poor
	Good	75	43.1			

N (174), poor QoL (49.9 or less) ,good QoL (50 or more)

Table (3) reveals that the patients' responses to the scale of quality of life Rand -36 items as domain items are poor at all most all items .

Table (4): *Summary of Final Assessment for Patients' QoL*

variables	Rating	Frequency	Percent	Mean	Std. Deviation	Assess.
Final QoL Assessment	Poor	155	89.1	38.91	10.34	Poor
	Good	19	10.9			
	Total	174	100.0			

Table (4) reveals that the overall assessment of the patients' responses to the quality of life domain items is poor at all items , The present study assessed the QOL in all subscales of disease item and 36-item Health Survey of KDQOL among study subjects. The mean total score was 38.91.

Table (5): *Summary of Final dialysis Adequacy*

variables	Rating	Frequency	Percent	Mean	Std. Deviation	Assess.
Final dialysis Adequacy Assessment	Inadequate	113	64.9	1.07	0.33	Inadequate
	Adequate	61	35.1			
	Total	174	100.0			

Table (5) The present study assessed the dialysis adequacy by using the parameter KT/V and The mean of dialysis adequacy is undesirable is less thane 1.2 about (1.07 ±0.33), so that considered inadequacy . at Table (5) .

Table (6): *Association between Patients' QoL and Dialysis Adequacy*

	Response	statistics	QoL Assessment		Chi-Square	P-value
			Poor	Good		
Dialysis Adequacy	Inadequate	Freq.	111	2	27.741	0.00 HS
		%	98.2%	1.8%		
	Adequate	Freq.	44	17		
		%	72.1%	27.9%		
Total			155	19		

n (174); Non-significant at p-value more than 0.05; S, significant at p-value less than 0.05; HS, highly significant at p-value less than 0.01

Table (6) shows that there is a highly significant association between the patients' s Quality of life and dialysis adequacy . at p-value = 0.00

Table (7): *Relationship between Patients' QoL and Their Clinical Characteristics*

Variables	Chi-Square	P-value
Duration of disease	4.855	0.4 NS
Period of session	3.712	0.1 NS
Hypotension	0.191	0.6 NS
Infection	0.305	0.5 NS
Itching	0.002	0.9 NS
Nausea and vomiting	0.615	0.4 NS
Muscle cramps	0.630	0.4 NS

n (174); Non-significant at p-value more than 0.05; S, significant at p-value less than 0.05; HS, highly significant at p-value less than 0.01

The present study described the relationship of the clinical variables with the QOL using linear regression analysis there are NO variable was found to be significant.

Table (8): *Relationship between Patients' QoL and Their Demographic Characteristics*

Variables	Chi-Square	P-value
Age	7.311	0.3 NS
Gender	4.100	**0.04 S**
Level of education	23.159	**0.001 HS**
Monthly income	0.538	0.4 NS
Residency	0.17	0.8 NS
Marital status	2.112	0.5 NS
Occupation	7.438	0.1 NS

n (174); Non-significant at p-value more than 0.05; S, significant at p-value less than 0.05; HS, highly significant at p-value less than 0.01.

Table (8) shows that there is a highly significant association between the patients' quality of life and the level of education at p-value < 0.001, and significance in relation with (gender) at p-value < 0.04, while there is a non-significant relationship with the remaining demographic.

Table (9): *Summary of (person correlation) between Patients' QoL and it Domains and Dialysis Adequacy*

	Statistics	QoL Final Assessment	Domain1	Domain 2	Domain 3	Domain 4	Domain 5	Domain 6	Domain 7	Domain 8
Dialysis Adequacy	Pearson Correlation	.184*	0.060*	.203**	.245**	-0.040	.172*	-0.060*	-0.010*	0.145*
	P-value	0.001	0.3	0.007	0.001	0.5	0.02	0.4	0.8	0.05
		HS	NS	S	HS	NS	S	NS	NS	S

*. Correlation is significant at the 0.05 level (2-tailed)., **. Correlation is significant at the 0.01 level (2-tailed).

DISCUSSION

QOL is described as "an individual's perception of their place in life in relation to their objectives, expectations, standards, and concerns in the context of the culture and value system in which they live." The physical, psychological, and social aspects of health that are impacted by a person's experience, beliefs, expectations, and perceptions are referred to as health-related QOL (HRQOL).(Anees et al., 2014) . renal replacement therapies can maintain and prolong life, but the quality of life is severely affected, not only via disease but also psychosocial factors .(Kim et al., 2018). QOL is emerging as an important outcome parameter to assess patients undergoing hemodialysis and monitor their progress and efficacy of disease management. This study demonstrates QOL in different domains, of patients with CKD undergoing MHD, and the factors responsible for such outcome. (Joshi et al., 2017) . Hemodialysis alters the life style of the patient and family and interferes with their lives. The major areas of life affected by ESRD and its treatment includes employment, eating habits, vacation activities, sense of security, self-esteem, social relationships, and the ability to enjoy life (Mollaoğlu, 2013) . Adequacy Hemodialysis is the adequacy of the hemodialysis dose given to patients with the aim of controlling uremic syndrome symptoms, blood pressure, biochemical markers, providing comfort and the patient has a good nutritional status. This means that adequate hemodialysis is achieved when the patient's quality of life improves (Disease & Work, 2018) . As patients on hemodialysis spend significant amount of time in dialysis center, the satisfaction with care provided there has an important impact on quality of their lives and it improves patient-outcome.(Richardson et al., 2015) . Better communication of staff with patients, plays important role for better results .(Newell & Jordan, 2015) .Adequate hemodialysis will provide great benefits and allow CKD patients to continue their activities as usual. There is a strong relationship between adequate hemodialysis and morbidity and mortality in patients with renal failure. The study results show that majority of the study subjects are Female (53.4 %) , married most of patients about 78.7% were(36.2%) read and write ,77.6% as have sufficient monthly income and about 47.1 % as House wife . From the approach of residency, more than half of the study sample live in urban areas. the result of the current study reveals that the highest percentage of the study participants experience hemodialysis since two to six years.(75.9%),However, the study results showed that height percent the study participants received a three-hour hemodialysis session ,about (54.6 %). this result is agreement with study conducted in Erbil hemodialysis center "Assessment of hemodialysis efficacy in patients with end-stage renal failure in the Erbil hemodialysis center" they found The all other receiving insufficient HD treatment usually on twice weekly around 3 h for each session (64.8%). This may be attributed to various reasons such as economic statues , accessibility to reach to the center of dialysis , patient undesirable , deficiency of machines, time difficult , and difficulty in transportation .The duration of sessions is left to the physician . Regarding the complication of hemodialysis the present study's findings indicate that highest percentage about (80.5%) of participants have hypotension. most of the study subjects Hypotension during HD session is a common problem. Hypotension reported in significant number of patients in this series, especially during the 1st hour of HD session. Several studies have shown that quality of life is impaired in chronic kidney disease at its various stages of treatment. In addition, psychological factors, anxiety, depression and alexithymia may be related to treatment complications and lower quality of life in chronic renal failure patients .(Calia et al., 2015). The significant score in the role limitation of physical function domine In this study, the physical domine was the most affected in CKD .The lowest mean scores were for the Physical Functioning (31.55) and the Role Physical (28.87) domains, suggesting that physical domains were the most affected by the disease. The low QOL score in the social domain may be due to the fact that with increase in the duration of dialysis, patients

have less time and desire to spend with their families and friends which may negatively affect their personal and social relationships. Duration of disease had no effect on any domains of QOL . A number of clinical data that seem to affect QOL in other studies have not been found to be significant predictors of QOL in this study. The study results show that there is a highly significant impact of patients' level of education on their quality of life as $p<0.001$ and significant impact of patient gender as p value = $p<0.04$ .However , In this study, the mean ± SD Kt/V was 1.07 ±0.33 . and about (64.9 %) of patients had a Kt/V less than 1.2 .The measured dialysis adequacy in this study is not desirable and in most patients is lower than the standard rate. these results were in agreement with similar findings in Egypt study there found the present study revealed that around 60% of the study population had Kt/V values less than 1.2, indicating that patients were receiving an inadequate HD dose.(El-Sheikh & Al-Ghazaly, 2015). there are many factor that affective dialysis adequate as duration of session ,type of filtration ,frequency of HD in the week, nutrition statues some patient eating during HD and other. However , In this study, there are showed no significant relationship between patient 'QoL and their Clinical Characteristics. The study results show that there is no significant impact of patients' Age ,gender, level of education, monthly income ,resident , marital status, occupation on their Dialysis Adequacy. There were no statistically significant relationship between Dialysis Adequacy and there Clinical Characteristics in HD patients, ($p > 0.05$) . There was a high significant difference at ($p<0.05$) between quality of life and dialysis adequacy. (Thenmozhi, 2018),He study ''QUALITY OF LIFE OF PATIENTS UNDERGOING HEMODIALYSIS ''that patients on HD were not having adequate QOL in all domains except patient satisfaction due to changes in the physiological, chemical changes occur in the kidney. We conclude from our study that QoL is reduced in all the health domains of HD patients.

Conclusion

Inadequate HD has an impact on quality of life, and enhancing it refines many aspects of it. Hemodialysis adequacy is improved by administering the optimum hemodialysis dosage.

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