

Dialysis-Related Factors Affecting Quality of Life in Patients on Hemodialysis

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Introduction. Treatment modalities for end-stage renal disease affect quality of life (QOL) of the patients. This study was conducted to assess the QOL of patients on hemodialysis and compare it with caregivers of these patients. Cause of ESRD and dialysis-related factors affecting QOL were also examined.

Materials and Methods. This cross-sectional study was conducted on patient on maintenance hemodialysis for more than 3 months at 3 dialysis centers of Lahore. Fifty healthy individuals were included as controls from among the patients' caregivers. The QOL index was measured using the World Health Organization QOL questionnaire, with higher scores corresponding to better QOL of patients.

Results. Eighty-nine patients (71.2%) were men, 99 (79.2%) were married, 75 (60.0%) were older than 45 years, and 77 (61.6%) were on dialysis for more than 8 months. Patients on hemodialysis had a poorer QOL as compared to their caregivers in all domains except for domain 4 (environment). There was no difference in the QOL between the three dialysis centers of the study, except for domain 3 (social relationship) of the patients at Mayo Hospital (a public hospital), which was significantly better. Nondiabetic patients had a better QOL in domain 1 (physical health) as compared to diabetic patients. Duration of dialysis had a reverse correlation with the overall QOL.

Conclusions. We found that QOL of hemodialysis patients was poor as compared to caregivers of the patients, especially that of diabetics. Also, duration of dialysis had a reverse correlation with QOL.

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INTRODUCTION

Data from community-based studies in Pakistan reveal an alarmingly high burden of chronic kidney disease. Approximately, 15% to 20% of persons 40 years of age or older have a reduced estimated glomerular filtration rate.¹ Such a high burden is consistent with high prevalence of diabetes and hypertension, the leading causes of end-stage renal disease (ESRD). Pakistan has an estimated

150 patients with ESRD per annum per million population; therefore, each year, we shall have 16 000 patients with ESRD.² The cost of dialysis is about Rs 150 000 to Rs 200 000 per patient per annum (US \$ 2300), as compared to per capita income of US \$ 700, ie, US \$ 2 per day. This spends only 0.6% of gross national product on health as compared with 10% to 15% in developed countries.³

As Pakistan is a developing country, nephrology

services are in the state of establishment. In this decade, there is improvement in the awareness about kidney diseases in Pakistan. There are only about 80 formally trained nephrologists for a population of 163 million (compared to the United States with more than 5000 nephrologists for a population of about 300 million).¹ According to the Dialysis Registry of Pakistan 2008 report, there are about 6000 patients who are receiving dialysis in Pakistan. Thus, only about 40% of the patients have access to dialysis services. Even most of the patients who receive dialysis are “underdialyzed” (about 67% get dialysis twice per week). Underdialysis affects not only survival of the patients (1- to 2-year survival is 40.5%), but even quality of life (QOL) is also poor in these patients. Health-related QOL (HRQOL) represents the “physical, psychological, and social domains of health that are influenced by a person’s experience, beliefs, expectations, and perceptions.”⁴ Kidney failure impairs the QOL of these patients.⁵⁻⁷

We know that there are many factors that affect QOL of these patients. Causes of ESRD are of the influencing factors on QOL.⁸⁻¹⁰ Mode of the dialysis (hemodialysis versus peritoneal dialysis) affect QOL of the patients.¹¹ Adequacy of dialysis, daily dialysis, and nightly home hemodialysis affect QOL.¹² However, there is very limited data in our dialysis patients. This study was conducted to assess the HRQOL of dialysis patients and dialysis-related factors affecting it.

MATERIALS AND METHODS

Patients

Patient with ESRD on maintenance hemodialysis for more than 3 months were included from 3 dialysis centers (Shalimar Hospital, n = 48; Mayo Hospital, n = 56; and Doctors Hospital and Medical Center, n = 21) of Lahore. Fifty individuals, matched for gender, age, and socioeconomic status, with a normal kidney function were included as controls from among caregivers of the patients. All of the patients and controls were informed and consented to participate in the study.

Assessments

Data were collected by trained investigators. Demographic data, including age, gender, residence, cause of ESRD, socioeconomic status, education, dialysis data (initiation of dialysis,

vascular access, frequency of dialysis, and duration of dialysis), mode of traveling for dialysis, total time consumed in getting dialysis, and number of attendants were collected by the investigators of each patient to determine any variation in outcomes affected by these factors using a specifically designed questionnaire. The QOL index was measured using a validated Urdu version of the 26-item World Health Organization QOL BREF (WHOQOL-BREF).¹³ Four domains are defined for the WHOQOL-BREF, based on its 24 items: domain 1, physical health, is on activities of daily living, dependence on medicinal substances and medical aids, energy and fatigue, mobility, pain and discomfort, sleep and rest, and work capacity. Domain 2, psychological health, includes bodily image and appearance, negative feelings, positive feelings, self-esteem, spirituality, religion, personal beliefs, thinking, learning, memory, and concentration. Domain 3, social relationships, covers personal relationships, social support, and sexual activity. Domain 4, environment, assesses financial resources, freedom, physical safety and security, health and social care (accessibility and quality), home environment, opportunities for acquiring new information and skills, participation in and opportunities for recreation and leisure activities, physical environment (pollution, noise, traffic, and climate), and transport. The raw score of each domain was then transferred to standardized score of 4 to 20, in order to maintain uniformity in the scores. The method of inferring the score is available elsewhere.¹³ Higher scores mean the better quality of life of patients. The QOL index of each domain and their associations with demographic factors were assessed. The QOL index of each domain was compared with each other, so to determine which domain is better with regards to QOL of ESRD patients.

Statistical Analyses

Data obtained from the WHOQOL-BREF questionnaire was analyzed using the SPSS software (Statistical Package for the Social Sciences, version 16.0, SPSS Inc, Chicago, Ill, USA). Descriptive analysis was done using mean $\pm$ standard deviation for the QOL index. The Pearson correlation coefficient was used to calculate the relationship between demographic factors and the QOL index. The Student t test for independent samples and the

1-way analysis of variance were used to compare the QOL index between patient subgroups and between patients and controls. A *P* value less than .05 was considered significant.

RESULTS

Amongst 125 patients on hemodialysis, 89 (71.2%) were men, 99 (79.2%) were married, 84 (67.2%) were literate, 103 (82.4%) were unemployed, and 75 (60.0%) were older than 45 years. The mean age values of the patients and controls are demonstrated in Table 1. One hundred patients (80.0%) were residents of urban areas and 77 (61.6%) were on dialysis for more than 8 months. Monthly income was less than US \$ 90 in most of the patients (60.8%).

Table 2 depicts the QOL scores. There was no difference in the QOL between the three centers of the study except for domain 3 (social relationship) of Mayo Hospital whose score was significantly higher (*P* = .001; Table 2). Nondiabetic patients on hemodialysis had better QOL in domain 1 (physical health) as compared to diabetics (*P* = .04). Duration of dialysis had a negative correlation with QOL. In domain 1 (physical health), QOL was better in patients with a dialysis duration less than 8 months than patients with a duration more than

Table 1. Mean Age of Patients on Hemodialysis and Controls

Participants	Number (%)	Mean Age, y	<i>P</i>
Study group			
Controls	50	59.46 ± 12.56	
Hemodialysis patients	125	47.57 ± 9.89	.001
Hemodialysis Patients			
Dialysis Center			
Mayo Hospital	56 (44.8)	49.52 ± 10.56	
Shalamar Hospital	48 (38.4)	46.56 ± 8.74	
Doctor's Hospital and Medical Center	21 (16.8)	44.67 ± 9.98	.04
Kidney failure cause			
Diabetes mellitus	48 (38.4)	45.46 ± 10.94	
Others	77 (61.6)	48.80 ± 9.03	.07
Duration of Dialysis, mo			
> 8	72 (57.6)	45.68 ± 9.47	
≤ 8	53 (42.4)	50.13 ± 9.956	.02
Vascular access			
Catheter	12 (9.6)	49.33 ± 7.65	
Arteriovenous fistula	113 (90.4)	47.38 ± 6.12	.30
Dialysis per week			
1	9 (7.2)	48.44 ± 6.65	
2	97 (77.6)	47.0 ± 9.54	
3	19 (15.2)	50.05 ± 12.66	.45

8 months (*P* = .03). Vascular access and frequency of dialysis did not affect QOL of these patients.

Table 2. Mean Domain Scores of Quality of Life Analysis in 125 Patients on Hemodialysis

Participants	Domain 1: Physical Health	<i>P</i>	Domain 2: Psychological Health	<i>P</i>	Domain 3: Social Relationship	<i>P</i>	Domain 4: Environment	<i>P</i>
Study group								
Controls	14.96 ± 3.04		14.08 ± 2.85		14.64 ± 3.74		12.76 ± 2.93	
Hemodialysis patients	10.30 ± 3.48	< .001	12.22 ± 2.83	.003	12.18 ± 4.22	.007	12.18 ± 4.22	.51
Hemodialysis Patients								
Dialysis Center								
Mayo Hospital	10.57 ± 3.82		12.36 ± 3.19		13.64 ± 4.29		12.95 ± 2.51	
Shalamar Hospital	10.02 ± 3.21		12.35 ± 2.45		11.38 ± 3.65		12.81 ± 2.52	
Doctor's Hospital and Medical Center	10.19 ± 3.25	.72	11.52 ± 2.60	.47	10.10 ± 4.02	.001	12.86 ± 1.83	.96
Kidney failure cause								
Diabetes mellitus	9.63 ± 3.62		11.78 ± 2.79		11.63 ± 4.66		13.02 ± 2.35	
Others	10.91 ± 3.26	.04	12.62 ± 7.73	.10	12.68 ± 3.78	.17	12.75 ± 2.44	.54
Duration of Dialysis, mo								
> 8	11.11 ± 3.40		12.77 ± 3.017		13.64 ± 3.76		13.21 ± 2.468	
≤ 8	9.69 ± 3.44	.02	11.81 ± 2.63	.58	11.54 ± 4.44	.05	12.64 ± 2.32	.19
Vascular access								
Catheter	10.33 ± 4.37		12.42 ± 2.87		13.08 ± 3.94		10.50 ± 1.88	
Arteriovenous fistula	10.29 ± 3.39	.97	12.11 ± 2.83	.80	12.08 ± 4.25	.44	12.81 ± 2.433	.47
Dialysis per week								
1	11.10 ± 2.759		12.78 ± 1.78		13.0 ± 3.93		11.56 ± 1.59	
2	10.06 ± 3.39		12.10 ± 2.81		11.95 ± 4.22		12.89 ± 2.34	
3	11.11 ± 4.17	.38	12.53 ± 3.35	.69	12.95 ± 4.67	.54	13.47 ± 2.77	.14

DISCUSSION

End-stage renal disease has serious effects on the patient's QOL, negatively affecting their social, financial, and psychological well-being.^{14,15} It affects the QOL more intensely than heart failure, diabetes mellitus, chronic lung disease, and arthritis. In addition, patients who have low HRQOL are more likely to withdraw dialysis treatment.

This is the first report of HRQOL of patients on hemodialysis in Pakistan, where ESRD patients have a higher annual mortality than patients in western countries.¹⁶ Quality of life of patients on hemodialysis is poor as compared to caregivers of them in all domains except for the environment domain. It means patients on hemodialysis have poor a QOL in physical health, psychological health, and social relationship domains than their caregivers. Since caregivers of the patients live with them in same socioeconomic conditions, availing same transport, residing in same home and physical environment, it is reasonable that they have the same level of QOL in the environment domain. A similar pattern of QOL was observed by Sathvik and colleagues and Vasilieva among hemodialysis and control healthy subjects.^{17,18}

There was no difference in the QOL score of the patients between the three centers we studied except for the score of domain 3 (social relationship) of patients at Mayo Hospital which was higher on average. Mayo Hospital is a public hospital, while the two other hospitals are not. Recently, the government has started free dialysis services in public hospitals and perhaps this may be the reason for better the QOL in the patients who enjoyed the newly established facilities of these hospitals. However, there is a need to do more research on how social relationship of patients at Mayo Hospital affected QOL. It could be due to the joint family system or that patients are coming from nearby areas. Most of the patients receiving dialysis at Mayo Hospital belong to a poor class as compared to other hospitals. Only 2 patients of Mayo Hospital and 4 patients of Shalamar Hospital had an income more than US \$ 350 per month compared to 10 patients of Doctor Hospital and Medical Center. Usually, it is observed that people of low income class have a stronger family bond.

Depression is an important factor effecting QOL, affecting mortality in hemodialysis patients.^{19,20} According to our previous studies,²¹ frequency

of depression is 73% and most of the patients are in the moderate to severe category of depression.

In this study, the major cause of ESRD was diabetes mellitus followed by hypertension, which is similar to other national and international studies.^{22,23} The prevalence of diabetes mellitus in countries of the Indian subcontinent (about 20% among persons aged 40 years or older) is two to three times higher than that reported in Western countries and is projected to triple over the next two decades. Undiagnosed, untreated, and poorly controlled diabetes mellitus is known to exhort a considerable toll on individuals, communities, and the healthcare system. According to the National Health Survey of Pakistan, about one-third of Pakistanis aged 45 years or older were affected with hypertension between 1990 and 1994. In this study, the QOL of diabetic dialysis patients was poor as compared to nondiabetic. Nondiabetic patients on hemodialysis had a better QOL in domain 1 (physical health) as compared to diabetics. Diabetes mellitus affects multiple organs in the body from head to toe. It causes eyes causing vision problem, cardiac problem, kidney failure, cerebrovascular events, and peripheral vascular disease, leading to amputation and impaired physical health. All these problems lead to limited daily activities and work capacity, dependence on antidiabetic drugs for many years, and disturbed sleep due to pain affecting physical health. A similar pattern of poor QOL is seen in other studies.²⁴⁻²⁶ Sorensen and coworkers compared QOL of diabetic dialysis patients and nondiabetic dialysis patients. Self-rated physical health was significantly worse in diabetic dialysis patients as compared with nondiabetic dialysis patients, diabetic patients with normal kidney function, and the matched group from the general population.²⁵

Duration of dialysis plays an important role affecting QOL in dialysis patients. According to Vasilieva, in linear regression analysis, duration of dialysis was a significant independent predictors of the low physical component score (PCS) in hemodialysis patients.¹⁸ A similar observation was made in this study; duration of dialysis had a reverse correlation with QOL. As duration of dialysis increases, QOL of dialysis patients deteriorates. In domains 1, 2 and 3, QOL was better in hemodialysis patients with a duration less than 8 months than patients with a dialysis duration more than 8 months. Initially, when patients start

dialysis, they think that their kidney will recover very soon and dialysis will be stopped, but with passage of time, when they maintain their life on dialysis, their worries increase and impair QOL. Along with start of dialysis, patients go for homeopathic, herbal, and spiritually-based methods of treatment for improvement of kidney function. However, when kidney function does not improve even with those methods, they are more worried and stressed. Hallinen and colleagues,²⁷ however, had a different observation in which QOL remained constant during the 1st year after dialysis.

In the present study, most of the patients were on once or twice weekly dialysis as compared to the thrice weekly dialysis which is recommended internationally. Technically, if the patients receive more frequent dialysis sessions, their QOL is supposed to be better, but this was not observed in this study. Although we have not measured adequacy of dialysis in these patients, there is a need to do a prospective study on this aspect. A similar observation was made by Salim from Saudi Arabia.²⁸ According to him, there was no significant difference in the QOL of the patients who are on twice and thrice weekly dialysis. Even there was no difference in QOL in patients receiving dialysis with a Kt/V less than 1.12 and those with more than 1.12. This is different as compared to the international literature. According to Manns and colleagues,¹² patients on hemodialysis with an average Kt/V value greater than or equal to 1.3 had better QOL using the KDQOL-SE, Short Form-36, and the Euro QOL EQ-5D. The adjusted EQ-5D scores increased 0.036 points for each 0.1 increment in Kt/V. Dialysis membranes and dialysis buffer did not affect QOL.

Arteriovenous fistula is considered the optimal form of vascular access for patients who have ESRD and receive hemodialysis. The National Kidney Foundation's Kidney Disease Outcomes Quality Initiative (NKF-KDOQI) clinical practice guidelines for vascular access recommends early placement and use of arteriovenous fistula among at least 50% of incident patients on hemodialysis.^{29,30} In Pakistan, referral of pre-ESRD patients to nephrologists is late, and temporary access catheter is used as the primary access for dialysis. We showed elsewhere that there was a 100% late referral in dialysis patients and temporary access catheter was used for dialysis in these patients.²² When the catheters are used as primary access for dialysis, they affect not only

the QOL, but also mortality,³¹ because they are a continuous source of infection in the body. In this study, vascular access for hemodialysis was not associated with QOL. Perhaps, it may be due to the small number of patients or other confounding factors which mask the effect of temporary access catheter on QOL.

A limitation of the study was that our patient population was relatively small; there is a need to do further study to compare health-related domains of QOL in a much larger and broader sample of ESRD patients. We found the correlation of QOL with dialysis-related factors. However, other variables like hemoglobin and serum albumin should be studied as well. The HRQOL questionnaire was filled by patients when they came for dialysis, where they feel more secure and friendly to dialysis staff, which affects their feelings. The cross-sectional design precludes comparison with QOL before dialysis which has been shown to impair it.

CONCLUSIONS

Our results provided evidence that QOL of the hemodialysis patients was poor as compared to caregivers of the patients. Health-related QOL of the patients at public hospitals was better as compared to private hospitals. Diabetics had a poor QOL than nondiabetics, duration of dialysis had a reverse correlation with QOL, and frequency of dialysis and vascular access for dialysis did not affect QOL.

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CONFLICT OF INTEREST

None declared.

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