

Original article

Physical Health Versus Mental Health in Haemodialysis Patient: Assessment of Health-Related Quality of Life- A Single Centre Experience.

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Abstract:

Objectives: Assessment of health related quality of life (HRQOL) is an essential part of evaluation of end stage renal disease (ESRD) as we have conducted this study on haemodialysis patients to see the HRQOL and to assess and compare the parameters which influence physical and mental health.

Materials and Methods: This was a single centre study on haemodialysis patients using Short Form 36 (SF-36) of Kidney Disease Quality of Life (KDQOL). All the eight domains of HRQOL were assessed individually as well as summary scores for mental health (MCS Mental composite summary) and physical health (PCS Physical composite summary) were also evaluated. The questionnaire was completed by patient themselves and the clinical data was extracted from the medical records with prior consent from the patient.

Results and discussion: The study participants showed a female predominance of 66% with a lower PCS and MCS scores among female participants in comparison to their male counterparts. Overall summary scores showed a lower PCS (38.71±8.15) than MCS (42.79±11.6) which reflects better mental health than physical health in the study population. A multiple regression analysis showed, the presence of residual renal function ($\beta = -0.421, p = 0.02$), duration of dialysis ($\beta = 0.405, p = 0.03$) and haemoglobin less than 12g/dL ($\beta = 0.379, p = 0.02$) were significant predictors of MCS.

Conclusion: HRQOL in haemodialysis patients are influenced by socio-demographic as well as clinical parameters. In our population, kidney disease affects physical health more than mental health and the reasons are multifactorial.

Keywords: End Stage Renal Disease, Haemodialysis, Health Related Quality of Life, Physical Composite Summary, Mental Composite Summary.

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Introduction:

Health Related Quality of Life (HRQOL) assessment in patients with Chronic Kidney Disease (CKD) and End Stage Renal Disease (ESRD) is increasingly

getting attention in order to improve the patient outcome from survival with the disease to have a sense of well-being.^{1,2} The study on prevalence of CKD and ESRD is scarce in Bangladesh but fewer studies are there and according to Das SK et al, from

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their data archive, CKD stage 5 is about 5-9% among 243,187 populations in two point of time. Das SK also stated that the number is increasing day by day and it increased 2.5fold over a period of 10 years from 2006 to 2015.³ The increasing trends of CKD and ESRD also observed similar in this region.^{4,5}

The patient who reaches ESRD, they need renal replacement therapy (RRT) either in the form of dialysis or transplantation. So, it has great impact on economic as well as social status. Those all the factors contribute to the quality of life. HRQOL has been assessed in CKD and ESRD patients using multidimensional measures, assessing function and well-being of a patient with predefined domains relevant to overall HRQOL.⁶ HRQOL reflects wellbeing of a patient in respect of their functional status (physical, mental and social status) and a balance between expectations and new events related to change in health status. Again, it is also important that there might be difference between measured HRQOL and patient perceived QOL.⁷ The potential conflicts may be due to differences between individual values, culture diversity and personal adaptation capability.^{8,9}

There is only one study done to evaluate HRQOL of ESRD patients in Bangladesh where the author divided the patients into 3 diagnostic groups according to their mean haemoglobin level and found better HRQOL in patients with a haemoglobin level more than 11g/dL. They also divided the same study population into 3 therapeutic groups according to management of anemia with blood transfusion only, blood transfusion with erythropoietin and erythropoietin only group. And at the end, they found better HRQOL scores in erythropoietin only group.¹⁰ But their study did not evaluate the influencing factors for HRQOL. For a better understanding of the influencing factors for HRQOL, this study aims to evaluate the influence of socio demographic and clinical parameters on the quality of life in ESRD patients.

Materials and Methods:

This study was conducted in a tertiary care hospital in the Dhaka city of Bangladesh. This study includes ESRD patients who are on maintenance haemodialysis in this centre. All the consecutive patients attended for dialysis were approached for participation in the study. After taking informed written consent, the KDQOL SF36 form was supplied to patients to fill up them. All the demographic and clinical information

were taken from the medical record with prior consent from the participant. Patient with a history of malignancy, psychiatric illness, hearing, speech impairment were excluded from the study. The study was approved by the institutional ethics committee. The study was conducted between May 2019 to August 2019.

The study population was aged 18 years and more with at least on maintenance haemodialysis for 6 months or more in this centre. Among them, 50 patients gave consent for the study and 40 patients completed the questionnaire. Among them one patient were excluded because of inadequate clinical and laboratory information. So finally, 39 patients were enrolled for analysis. We have analyzed the following social, demographic and clinical parameters to assess the factors influencing quality of life in haemodialysis patients: 1) Age; 2) Gender; 3) Educational level; 4) Duration of haemodialysis; 5) Presence of residual renal function; 6) Hospitalization in last 6 months; 7) Serum haemoglobin level; 8) Mineral bone disease status and 9) Serum albumin level.

HRQOL was assessed with KDQOL-36. The Kidney Disease Quality of Life (KDQOL) survey was developed in 1994 by RAND and the University of Arizona. The KDQOL includes the short form of Medical outcome Study (MOS SF36) which is generic for chronic disease and added related items to patient with kidney disease. Currently, the KDQOL-36 uses the SF12 (shorter version of SF-36) and 24 kidney disease specific question.¹¹

SF-36 evaluates QoL on eight dimensions: physical functioning, social functioning, role-functioning emotional, role-functioning physical, vitality, pain, mental health and general health

perceptions. Two summary scores were calculated: (1) *the physical composite summary score* (PCS), as the mean of physical functioning, role-functioning physical, vitality, pain and general health perceptions scores and (2) *the mental composite summary score* (MCS), as the mean of social functioning, role-functioning emotional, mental health, vitality and general health perceptions scores. Scores range from 0 to 100; the higher the score, the better the QoL

Data analysis:

Data analysis was performed using SPSS 24.0 for windows. Pearson correlation analysis was performed between continuous variables and quality of life. Comparisons were made between groups

using either independent *t*-test or ANOVAs. All the socio-demographic and clinical variables were included for multivariate linear regression analysis to predict factors responsible for predicting quality of life. A *p*-value of <0.05 was considered statistically significant.

Results:

Out of 39 participants, 13 patients were male and 26 were female with a ratio of 1:2. The mean age of the study populations were 62.25 ± 10.11 which ranging from 43 to 80 years. The most common cause of ESRD was Diabetes mellitus (44%) followed by Hypertension (10%), Dysplastic kidney (8%) and polycystic kidney disease (3%). Unfortunately, 35% of the patients did not have any etiological diagnosis as they presented at ESRD and the definitive diagnosis was not ascertained. The minimum duration on maintenance haemodialysis was 8 months and maximum 13 years with a mean of 3.7 ± 2.6 years for the study populations (Table-1).

This study showed the mean score for PCS was 38.71 ± 8.15 and MCS was 42.79 ± 11.6 , which reflects that the kidney disease affects more on physical health than mental health (Table-2). The results depict, higher scores of PCS and MCS in patients age less than 60 years (40.93 ± 8.12 vs 36.09 ± 1.62 and 44.43 ± 11.33 vs 39.74 ± 12.02), male gender (39.89 ± 8.16 vs 37.32 ± 8.29 and 44.68 ± 11.30 vs 40.35 ± 12.01), married person to widows but the difference was not statistically significant (Table-3). But the PCS and MCS scores in between patients of different group according to educational level showed surprisingly lower scores among secondary level and higher scores in patients with primary level and graduate or above and the difference was statistically significant (*p* 0.03).

A linear regression analysis was performed to find the predictors of PCS and MCS using variables, presence of residual renal function, duration of dialysis, hospitalization in last 6 months before the study, haemoglobin level less than 12g/dl, calcium phosphate product more than 55 and serum albumin less than 3.5g/dl (Table-4). According to the results, the regression model for PCS revealed only 4% of the variance in PCS (Adjusted $R^2=0.044$) as none of the 6 variables was statistically significant. On the other hand, the regression model was a better fit for MCS (adjusted $R^2=0.235$). Three out of 6 variables had statistically significant predictive capability. Out of the model, presence of residual renal function ($\beta=$

-0.421 , *p*= 0.02), duration of dialysis ($\beta= 0.405$, *p*= 0.03) and haemoglobin less than 12 ($\beta= 0.379$, *p*= 0.02) showed significant predictive capability.

Discussion:

HRQOL in patient with CKD and ESRD is impaired in comparison to general population and is an important factor responsible for further mortality and morbidity. Co-existing conditions like malnutrition, anemia, cognitive dysfunction, depression, decrease social interaction, physical function and other co morbidities like diabetes mellitus, cardiovascular disease interferes with HRQOL and increase chance of mortality.^{12,13}

The most common etiology of ESRD was DM (44%) in our study followed by Hypertension (10%) and Dysplastic kidney (8%). These findings are similar with studies from different neighboring countries and Indian national registry.^{14, 15} Our study also has 35% ESRD patient with a diagnosis of CKD due to unknown or undetermined cause. HRQOL worsen as the disease progress and there is evidence that it is also lower in older age people.^{14, 16} In our study, older people had lower PCS and MCS scores. Older age also has negative impact on HRQOL in a study by Lessan- Pezeshki and Rostami.¹⁷

Previous study by Saha SK et al, comprising 135 dialysis patients from 3 centers of Dhaka city, which reported better HRQOL life among Haemoglobin >11gm/dL.¹⁰ Other studies evaluating HRQOL in CKD patients with clinico-demographic factors showed, impact of factors like Diabetes Mellitus, Cardiovascular Disease, age, hepatitis C virus positivity, female gender, socio economic condition, malnutrition, inflammation and residual renal function.^{14, 18-21}

Lower PCS and MCS were found in females in comparison to male in our study, which were the similar findings in other studies.^{14, 18, 19} The reason for this difference may be due to, women have multiple domestic responsibilities which are different from men and they are unable to get round.²² Some other authors suggested that they have relatively higher prevalence of anxiety and depression related to their domestic responsibility. Another interesting finding of our study was all 13 males are married and there are only 6 widows. The widows have lower PCS score than married people but higher MCS score. As the widows manage most of the things themselves so, that might be a good reason for their better mental

strength and higher MCS.

Patients with higher education were found to have higher HRQOL, but our study participants had lower PCS and higher MCS corresponding higher education.^{18, 23} Among the 14 patients with secondary level education, none of them are working and only 4 out of 16 from the graduate group are working. Rest of them are either housewife or retired from service. So, less activity might be the reason for their lower PCS scores. On the other hand, higher education gives them better idea about their disease condition and they learn better adaptation and have better MCS.

Multivariate linear regression analysis to determine predicting factors for HRQOL showed, absence of residual renal function, duration of dialysis and haemoglobin level less than 12 mg/dL were important predictors for mental health. These findings were similar with other studies except residual renal function.^{24, 25}

Knowing the responsible factors for particular patient group from the similar socio demographic condition, can guide a clinician for the development of intervention tools and help them to improve their well-being. Certainly, there are some modifiable factors including both clinical and psychosocial.^{26, 27} For an example, anemia is an important modifiable factor which can be intervene from early stages of CKD. Patient can be helped by forming support group or peer groups among patient with similar comorbidities. They can also be benefited from regular health care education program and counseling sessions. This represents the importance of support services for dialysis population. Our hospital have psychologist and they conduct regular session with our chronic patients. Moreover that they have a peer group who visits same dietitian and physiotherapist

and work as a group. It is still far beyond our capability to avail those support services at community level. But well equipped centres can provide those facilities.

Limitations of the study:

This study includes small number of samples which represents a portion of dialysis population in our country, so further multicentre studies are required to have the full picture of the quality of life of the population. There is no study on general population and in patients with chronic kidney disease those who were not on renal replacement therapy, so we were unable to compare our data with population data.

Conclusion:

HRQOL in haemodialysis patient is impaired and most of them are physically weaker in comparison to mental strength. The most important socio-demographic factors were age, sex and education. Important clinical parameters include residual renal function and anemia. The important intervention can be a multidisciplinary approach to improve the physical as well as psychosocial domains for haemodialysis patients.

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Author's contribution:

Data gathering and idea owner of this study: MAQ, NAS, RSK, TAN and LF. Study design: MAQ and AKMAM. Methodology and statistical analysis: MAQ and AKMAM. Writing and submission of manuscript: MAQ and AKMAM. Editing and approval of final draft: All authors read and approved the final manuscript.

Table-1: Baseline socio-demographic parameters of study patients.

Demographic parameters	
Age ^a	62.25±10.11
Sex	
Male	13(34%)
Female	26(66%)
BMI(Kg/m ²) ^a	25.33±4.74
Etiology of ESRD	
DM	17(44%)
HTN	4(10%)
Polycystic kidney disease	1(3%)
Dysplastic kidney	3(8%)
Unknown	14(35%)
Dialysis duration (years) ^a	3.7±2.6
Education level	
Primary	9(23.1%)
Secondary	14(35.9%)
Graduation and above	16(41%)
Total	39(100%)

^aData presented as mean±SD (Standard deviation)

Abbreviations: BMI Body mass index, DM Diabetes Mellitus, HTN Hypertension.

Table-2: The eight domains of SF-36 measures of HRQOL and the PCS and MCS scores as a summarized result.

HRQOL	Domains	Score (Mean±SD)
PF	Physical Functioning	42.33±23.16
RP	Role Physical	20.83±23.22
BP	Bodily Pain	60.57±29.46
GH	General Health	46.92±19.07
VT	Vitality	62.17±29.03
SF	Social Functioning	61.21±26.25
RE	Role Emotional	57.05±31.02
MH	Mental Health	55.38±27.91
PCS	Physical Composite	38.71±8.15
MCS	Mental Composite Summary	42.79±11.6

Table-3: Comparison of SF 36 score by demographic variables in between two summarized scores of PCS and MCS.

Study variables	PCS score (Mean±SD)	P value	MCS score (Mean±SD)	P value
Age group				
Less than 60	40.93±8.12	0.89	44.43±11.33	0.51
More than 60	36.09±1.62		39.74±12.02	
Sex				
Male	39.89±8.16	0.91	44.68±11.30	0.65
Female	37.32±8.29		40.35±12.01	
Marital status				
Married	38.84±7.8	0.30	41.46±11.53	0.85
Widow	34.35±10.05		43.04±14.37	
Education level				
Primary	40.64±8.78	0.58	45.05±13.03	0.03*
Secondary	37.15±9.30		35.36±10.90	
Graduation and above	37.54±7		45.64±9.88	

*A *p*-value of <0.05 was considered statistically significant.

Table-4: Multiple regression analysis to see the influence of RRF, duration of dialysis, hospitalization, and biochemical parameters with PCS and MCS.

	PCS		MCS	
	β	<i>p</i>	β	<i>p</i>
Presence of RRF	-0.065	0.74	-0.421	0.02*
Duration of dialysis	-0.130	0.52	0.405	0.03*
Hospitalization in last 6m	0.140	0.46	-0.109	0.51
Haemoglobin<12 (g/dL)	0.180	0.31	0.379	0.02*
Ca X PO4 >55	0.184	0.3	0.256	0.09
Albumin <3.5 (g/dL)	0.004	0.98	0.122	0.44

*A *p*-value of <0.05 was considered statistically significant.

Abbreviations: RRF Residual renal function, Ca Calcium, PO4 phosphate

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