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Original Research Article

Quality of Life of Chronic Kidney Disease Patients Attending Dialysis Unit in a Tertiary Care Centre in Purba Bardhaman District of West Bengal: A Cross Sectional Study

Subhendu Bhuin[1], Raston Mondal[2], Pramit Goswami[3], Sudip Ghosh[4], Mohini Datta[5], Chinmay Nandi[6], Pranita Taraphdar[7]

[1,5]Post Graduate Trainee, Department of Community Medicine, Burdwan Medical College
[2]Associate Professor, Department of Community Medicine, Burdwan Medical College
[3,6]Assistant Professor, Department of Community Medicine, Burdwan Medical College
[4]Statistician, Department of Community Medicine, Burdwan Medical College
[7]Professor and Head, Department of Community Medicine, Burdwan Medical College

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Corresponding Author: Dr.Chinmay Nandi
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Abstract:

Background: Chronic Kidney Disease (CKD) is a growing global health issue, with a profound impact on patients' quality of life (QoL). Haemodialysis, a common treatment for end-stage renal disease, often affects multiple dimensions of health-related quality of life (HRQOL). This study aims to assess the HRQOL of CKD patients undergoing haemodialysis at a tertiary care centre in Purba Bardhaman district, West Bengal.

Methods: This institutional-based cross-sectional study was conducted from 1st March to 30th May 2024, in the dialysis unit of Burdwan Medical College. A total of 144 CKD patients, aged 18 years and above, receiving haemodialysis for at least 3 months, was included using a simple random sampling method. Data were collected through interviews using a semi-structured questionnaire for socio-demographic details and the Kidney Disease Quality of Life (KDQOL™-36) tool. HRQOL was categorized into good, moderate and poor across five domains: Physical Component Summary (PCS), Mental Component Summary (MCS), Burden of Kidney Disease (BKD), Symptom and Problem of Kidney Disease (SPKD), and Effect of Kidney Disease (EKD). Statistical analysis was performed using SPSS version 23, and Chi-Square tests were employed to identify significant factors associated with QoL outcomes.

Results: The mean age of the study population was 48.36 ± 8.63 years, with 41.66% in the 40-49 years age groups. Most patients were male (66.67%), Hindu (77.08%), and from rural areas (50%). Hypertension only (77.8%) and diabetes only (60.4%) were common comorbidities, and 18.1% had all three major comorbidities. A majority (72.9%) underwent haemodialysis twice weekly, and 59.7% had been receiving treatment for more than a year. The mean overall HRQOL score was 97.19 ± 19.06, with PCS, MCS, BKD, SPKD, and EKD subscale means of 18.46 ± 2.95, 13.67 ± 3.43, 13.31 ± 2.60, 28.54 ± 7.90, and 21.21 ± 5.04, respectively. Good HRQOL was observed in 26.38% of patients overall. In individual domains, 38.89% had good QoL in PCS, 31.25% in MCS, 27.78% in EKD and BKD, and 27.08% in SPKD. Significant predictors of QoL included age and education for PCS, and gender, residence, education, employment, and haemodialysis duration for MCS. Factors such as age, residence, socioeconomic status, comorbidities, and frequency of dialysis significantly influenced the BKD domain.

Conclusion: The study highlights the multidimensional impact of CKD and haemodialysis on HRQOL. A significant proportion of patients experienced moderate to poor quality of life, particularly in the mental and physical health domains. Socio-demographic and clinical factors, including age, gender, education, employment, and dialysis frequency, were important determinants of HRQOL. Targeted interventions focusing on these factors may improve the overall well-being of CKD patients undergoing haemodialysis.

Keywords: Chronic Kidney Disease, Haemodialysis, Quality of Life, Health-Related Quality of Life (HRQOL), KDQOL-36.

Introduction

Quality of life (QoL) is increasingly being considered globally as an important measure of how disease affects patients' lives, especially for long-term diseases like chronic kidney disease (CKD).World Health Organization defines Quality of life (QOL) as 'an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns.[1] It is a broad ranging concept affected in a complex way by the person's physical health, psychological state, personal beliefs, social relationships and their relationship to salient features of their environment.[1] Thus Quality of life represents the complex relationship of diseased, disease and environment.

Chronic Kidney Disease(CKD) is a condition which is the end result of various diseases, generally expressed by indicators of kidney damage—imaging or proteinuria (commonly measued by using albumin to creatinine ratio, ACR)—and decreased renal function (below thresholds of GFR estimated from serum creatinine concentration)[2,3]. CKD is defined as abnormalities of kidney structure or function, present for more than 3 months, with implications for health. Albumin Excretion Rate ≥30 mg/24 hours; Albumin to Creatinine Ratio ≥30 mg/g are considered as biochemical markers of CKD. Chronic kidney disease (CKD) is associated with age-related renal function decline, accelerated in hypertension, diabetes, obesity and primary renal disorders[4]. These patients depend on dialysis as a lifesaving treatment for their lives unless they receive kidney transplant. Patients on haemodialysis has double burden of suffering, both from CKD and haemodialysis. CKD has negative effect on HRQOL. Moreover Health Related Quality of Life (HRQOL) of such patients is closely associated with increased mortality and morbidity in patients with CKD/ESRD[5-7]. However it is observed that haemodialysis for ESRD not only prolong life but also sustain quality of life[7].

CKD is considered as an important, chronic, non-communicable disease epidemic that affects the world, including India. Global Burden of Disease collaboration identifies chronic kidney disease (CKD) as a major contributor to global morbidity and mortality[8]. It is also to be noted that renal failure represents a growing but mostly undocumented cause of premature mortality in low-income and middle-income countries. Between 1990 and 2017, the global all-age prevalence and mortality from CKD increased by 29.3 and 41.5%, respectively[8]. Globally, 33,187,000 disability adjusted life years and 956,000 deaths are attributed to CKD each year[9]. In India, there was a 38% increase in the proportion of deaths attributable to kidney failure between 2001–03 and 2010–13[10] In India, CKD, slowly but steadily growing as a major public health concern, presents with a prevalence rate of 0.8%-1.4% as compared to global prevalence rate of approximately 13.4% (11.7%–15.1%), among which almost 4–7 million patients end up progressing to the end-stage renal disease (ESRD), needing a renal replacement therapy[10].

A growing body of literature indicates that various co-morbid conditions related to CKD play a substantial role in the impaired HRQOL in CKD. Hypertension, considered both a cause and complication of CKD, negatively affects HRQOL due to associated co-morbidities, side effects from antihypertensive medications and awareness of the diagnosis. Since HRQOL is related with the morbidity and mortality among haemodialysis patients, HRQOL should be considered in the regular monitoring. The importance of measuring HRQOL in ESRD patients should be considered a mandatory requisite of routine measurement of HRQOL at all dialysis units. HRQOL reflects the contribution of disease to the patients' sense of well-being.

Hence, this study aimed to assess quality of life and it's socio-demographic and treatment related predictors among patients attending dialysis unit of Burdwan Medical College and Hospital in Purba Bardhaman district, West Bengal.

Methodology

This study was an institutional-based descriptive cross-sectional study conducted at the Dialysis Unit of Burdwan Medical College, Purba Bardhaman, West Bengal, India, from 1st March to 30th May 2024. The unit functions under a Public Private Partnership (PPP) model, making it a unique setting for studying the health-related quality of life (HRQOL) of chronic kidney disease (CKD) patients undergoing dialysis. The study aimed to assess the HRQOL of CKD patients by using a standardized tool to explore various physical, mental, and disease-specific health outcomes in this patient group.

The study population included CKD patients attending the dialysis unit during the three-month study period. Patients over 18 years of age, who had been undergoing dialysis for at least three months, were eligible for inclusion. Those who did not give informed consent or were too ill to communicate or respond to the questions were excluded. This ensured that the study focused on patients who could actively participate and provide reliable responses. Considering the lowest mean of physical

domain of HRQOL as 12 from a previous study done by Bedi et al.[11] in New Delhi, standard deviation (SD) as 3.67, level of confidence as 95%, and allowable error as 5% (relative error), using the formula: $n = (Z\alpha/2)^2 \times (\sigma)^2/L^2$, the obtained final calculated sample size was 144

To achieve the target sample size, a simple random sampling technique was employed. Each day, the dialysis unit scheduled approximately 20 patients for treatment and from this pool, six patients meeting the inclusion criteria were selected randomly with replacement. This process was repeated daily throughout the study period, ensuring that the selection process was unbiased and representative of the population.

Data was collected using two tools: a semi-structured questionnaire for socio-demographic information and the Kidney Disease Quality of Life (KDQOL™-36) questionnaire to assess HRQOL. The KDQOL™-36 is a well-validated tool that includes 36 questions covering five subscales: Physical Component Summary (PCS), Mental Component Summary (MCS), Burden of Kidney Disease (BKD), Symptoms and Problems of Kidney Disease (SPKD), and Effects of Kidney Disease (EKD).[12,13] The first two subscales are general measures of physical and mental health, while the remaining three are specific to the experience of living with kidney disease. This comprehensive approach allowed the researchers to capture a wide range of factors that influence quality of life in CKD patients. The KDQOL™-36 was administered as an interview-based questionnaire to improve data quality, with slight modifications made to ensure clarity and transparency for the respondents.

After data collection, all information was reviewed for completeness and consistency before being entered into Excel for further analysis. The statistical analysis was performed using SPSS version 23. Descriptive statistics, such as frequency, percentage, mean, and standard deviation, were used to summarize the baseline characteristics of the study population. Additionally, the Chi-Square test was applied to examine potential predictors of HRQOL, such as age, gender, duration of dialysis, and other demographic or clinical factors.

The main outcome of the study was the overall HRQOL score, along with scores for the individual subscales of the KDQOL-36, including PCS, MCS, BKD, SPKD, and EKD. These scores were reported as mean values with their standard deviations. To categorize the quality of life, the overall HRQOL scores were classified into three categories: good, moderate, and poor, based on standard deviation cut-offs around the mean score. Patients with scores below the mean minus one standard deviation were categorized as having poor HRQOL, those between the mean minus one standard deviation and the mean plus one standard deviation were considered to have moderate HRQOL, and those with scores above the mean plus one standard deviation were categorized as having good HRQOL.[14] This categorization allowed for a more nuanced understanding of the quality of life among the CKD patients studied.

Ethical Considerations: Confidentiality and anonymity was maintained. Permission from Institutional Ethics Committee of Burdwan Medical College was taken vide Memo No BMC/IEC /007 Dated 1/2/2024

Results & Analysis

The output of various categories on the Kidney Disease Quality of Life (KDQOL™-36) scale was classified into good, moderate, and poor. The mean age of the study population was 48.36 years (SD ± 8.63 years), with the youngest patient being 19 years and the oldest 78 years. A significant proportion of the study subjects (41.66%) belonged to the age group of 40–49 years. More than two-thirds (66.67%) of the patients were male, and the majority (77.08%) identified as Hindu. Half (50%) of the study participants resided in villages, 45.83% belonged to a lower socioeconomic class, and about one-third were illiterate. Additionally, more than half of the subjects were unemployed (Table no 1). Regarding comorbidities, most patients (77.8%) had hypertension only, 60.4% had diabetes only, and 18.1% had all three major comorbidities (hypertension, diabetes, and another chronic condition) (Fig 1). A large proportion of the study population (72.92%) underwent haemodialysis twice a week and 59.72% had been undergoing haemodialysis for over a year (more than 12 months).

The Health-Related Quality of Life (HRQOL) scores for the study population had a mean of 97.19 ± 19.06, ranging from 69 to 124. The Physical Component Summary (PCS), which evaluates physical health, had a mean score of 18.46 ± 2.95 (range: 10–28). The Mental Component Summary (MCS), reflecting mental health, had a mean score of 13.67 ± 3.43, with scores ranging from 8 to 22. The Burden of Kidney Disease (BKD) domain, which measures the perceived burden of the disease, had a mean score of 13.31 ± 2.60 (range: 8–19). The Symptom and Problem of Kidney Disease (SPKD) domain, which assesses the severity and frequency of symptoms, had a mean score of 28.54 ± 7.90 (range: 15–41). Finally, the Effect of Kidney Disease (EKD) domain, which evaluates the disease's impact on daily life, had a mean score of 21.21 ± 5.04 (range: 11–30) (table 2). Out of the 144 CKD patients undergoing haemodialysis, 26.3% had good overall HRQOL. Specifically, 38.8% of patients demonstrated good HRQOL in

the PCS domain, 31.3% in the MCS domain, 27.7% in both the EKD and BKD domains, and 27.1% in the SPKD domain. A large number (41.6%) had moderate HRQOL in SPKD and MCS domain (Fig 2). Factors that were statistically significant in the PCS domain included age and education. In the MCS domain, gender, residence, education, employment, and duration of haemodialysis were significant predictors. The BKD domain was significantly associated with age, residence, socio-economic status, comorbidities, and frequency of haemodialysis (Table no 3). These findings highlight the multifactorial nature of HRQOL in patients with CKD undergoing haemodialysis.

Table 1: Socio-demographic characteristics of chronic kidney disease patients attending dialysis unit of Burdwan Medical College and Hospital (n=144)

Age (in completed years)	**Number**	**Percentage (%)**
<20	1	0.69
20-29	12	8.33
30-39	28	19.44
40-49	60	41.66
50-59	33	22.91
>59	11	7.63
Gender		
Male	96	66.67
Female	48	33.33
Religion		
Hindu	111	77.08
Muslim	33	22.92
Residence		
Rural	78	54.17
Urban	66	45.83
Educational Qualification		
Illiterate	47	32.64
Primary	18	12.50
Middle School	13	9.03
Secondary	38	26.38
Higher Secondary	5	3.47
Graduate and above	23	15.97
Monthly Income* (Socio economic status)		
Upper Class (>8763 & Above)	23	15.97
Upper middle Class (4381.5- 8675.3)	30	20.83
Middle Class (2630-4294)	24	16.67
Lower Middle Class(1314.5- 2541.27)	1	0.69
Lower Class (<1314.5)	66	45.83
Employment		
Employed	66	45.83
Unemployed	78	54.17

***Reference: Modified BG Prasad (according to 133.3 CPI (IW) for march-2023)**

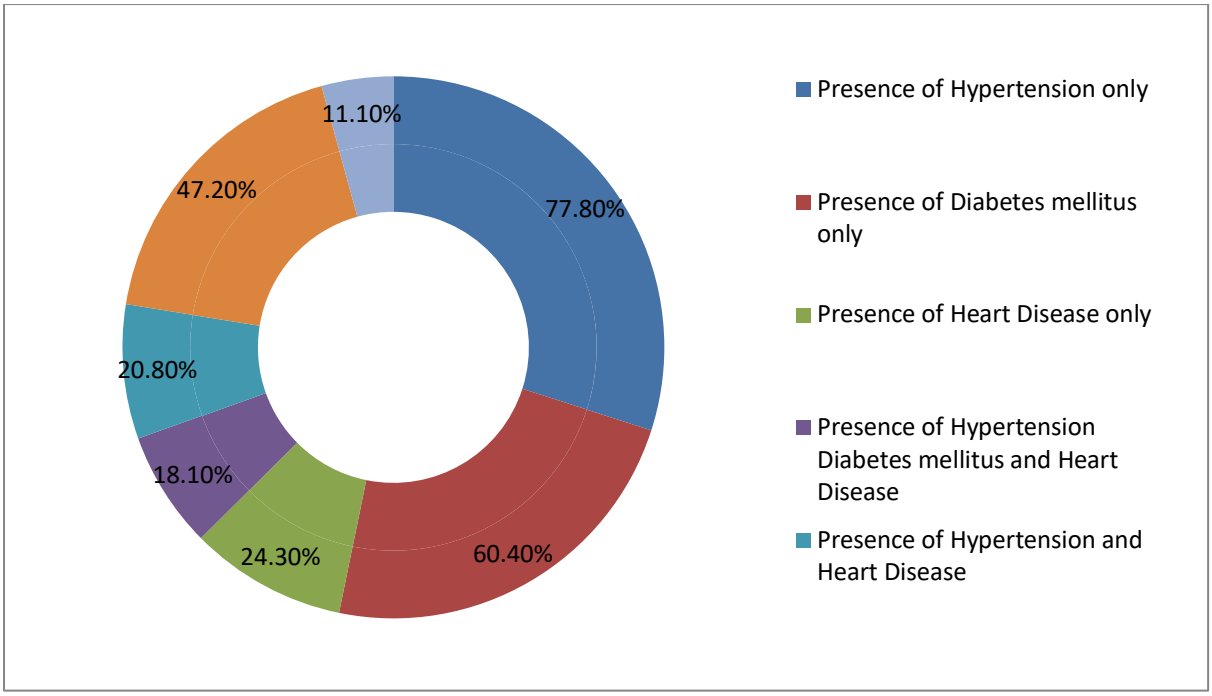

Figure 1: Distribution of study subjects according to presence of co-morbidities (n=144 Multiple responses)

Table 2: Health related quality of life scores according to study Subjects (n=144)

Score Name	Mean ± SD	Maximum	Minimum
Health Related Quality of Life (HRQOL)	97.19 ± 19.06	124	69
Physical Component Summary (PCS)	18.46 ± 2.95	28	10
Mental Component Summary (MCS)	13.67 ± 3.429	22	08
Burden of Kidney Disease (BKD)	13.31 ± 2.60	19	8
Symptom and Problem Kidney Disease (SPKD	28.54 ± 7.90	41	15
Effect of Kidney Disease (EKD	21.21 ± 5.04	30	11

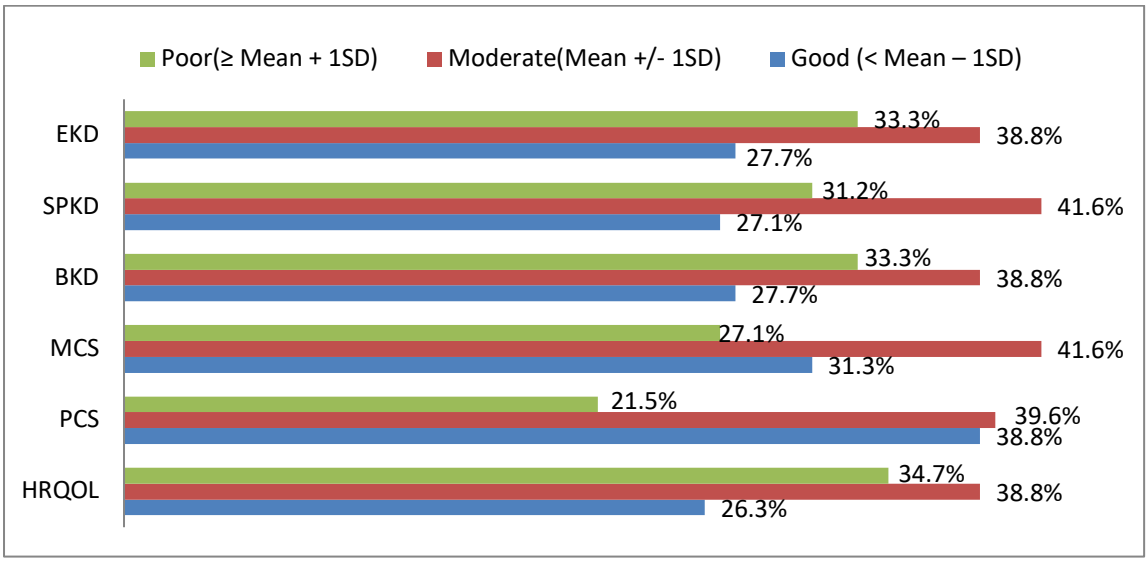

Figure 2: Distribution of study subjects assessment of Quality of life according to various scales of HRQOL (n=144)

Table 3: Association between the socio demographic characteristics, clinical parameters and treatment related factors and various scales of KDQOL™ 36 (n=144)

Variables	HRQOL			PCS			MCS			BKD		
	Good	Mod-erate	Poor	Good	Mod-erate	Poor	Good	Moder-ate	Poor	Good	Mod-erate	Poor
Age												
<49 Yrs.	28	27	9	30	24	10	11	25	28	16	28	20
>=49 Yrs.	10	29	41	26	33	21	28	35	17	24	28	28
Chi Square	6.58,2			4.98,2			3.39,2			7.54,2		
P value	**0.03***			**0.02***			0.35			**0.048***		
Gender												
Male	28	44	24	39	40	17	30	43	23	30	38	28
Female	10	12	26	17	17	14	9	17	22	10	18	20
Chi Square	2.54,2			2.11,2			5.04,2			1.09,2		
P value	0.23			1.04			**0.04***			0.89		
Residence												
Rural	14	31	33	20	36	22	13	32	33	12	36	30
Urban	24	25	17	36	21	9	26	28	12	28	20	18
Chi Square	4.96,2			1.25,2			4.46,2			6.01,2		
P value	**0.03***			0.53			**0.003***			**0.02***		
Education-al Qualifi-cation												
Illiterate	8	9	30	16	16	15	10	14	26	9	18	20
Literate	30	47	20	40	41	16	29	49	19	31	38	28
Chi Square	0.47,2			5.37,2			9.34,2			1.16,2		
P value	0.92			**0.004***			**0.02***			0.71		
Income												
I	6	9	8	10	10	3	11	7	5	11	7	5
II	14	7	9	15	10	5	10	11	9	9	15	6
III	6	8	10	9	9	5	9	8	7	10	6	8
IV	0	1	0	0	1	0	0	1	0	0	1	0
V	12	31	23	22	27	19	9	33	24	10	27	29
Chi Square	1.14,2			1.17,2			2.65,2			8.34,2		
P value	**0.34***			0.41			0.24			**0.02***		
Employ-ment												
Employ-ment	26	32	8	35	25	6	32	24	10	25	16	25
Unem-ployment	12	24	42	21	32	25	7	36	35	15	40	23
Chi Square	9.65,2			2.12,2			5.25,2			0.43,2		
P value	**0.03***			0.31			**0.028***			0.89		
History of Hyperten-sion												
Yes	19	49	44	33	53	26	29	46	37	25	43	44
No	19	7	6	23	4	5	10	14	8	15	13	4
Chi Square	7.51,2			2.65,2			2.46,2			6.94,2		
P value	**0.03***			0.79			0.65			**0.0164***		
History of Diabetes mellitus												
Yes	14	30	31	19	47	21	16	45	26	14	33	40
No	24	26	7	37	10	10	23	15	19	26	23	8
Chi Square	5.37,2			1.65,2			1.98,2			7.55,2		
P value	**0.004***			0.24			0.34			**0.03***		
Duration												

of hemodialysis (Month)												
<12 months	8	26	24	14	24	20	8	30	20	14	26	18
>=12 Months	30	30	26	42	33	11	33	30	25	26	30	30
Chi Square	1.48,2			2.15,2			9.44,2			1.62,2		
P value	0.07			0.81			**0.036***			1.024		
Frequency of hemodialysis (Per week)												
2 times	30	46	29	48	43	14	34	50	21	30	46	29
3 times	8	10	21	8	14	17	5	10	24	10	10	19
Chi Square	7.15,2			2.96, 2			1.37,2			9.43,2		
P value	**0.04***			0.36			0.85			**0.036***		
Education & service												
Illiterate with unemployed	8	10	22	13	10	17	8	10	21	10	20	10
Literate with employed	30	46	28	43	47	14	30	50	24	30	36	38
Chi Square	6.84,2			0.43,2			2.96, 2			2.41,2		
P value	**0.013***			0.89			0.36			0.27		
Hemodialysis & Frequency												
2 Times/wk. >12 months	30	34	16	39	29	12	29	42	9	33	30	17
3 Times/wk. <12 Months	8	22	34	17	28	19	10	18	36	7	26	31
Chi Square	2.42,2			1.65,2			1.98,2			2.96, 2		
P value	0.48			0.25			0.34			0.36		

Discussion

Based the standard Kidney Disease Quality of life (KDQOLTM-36), 38.89% of CKD patients in Purba Bardhaman had good QOL in the domain of PCS and 31.25% had good QOL in domain of MCS. Several factors were associated with good QoL in the domain of PCS, such as age and education. For the domain of MCS, factors associated with good QOL among CKD patients were gender, residence, education, employment, duration of hemodialysis and for the domain of BKD, factors associated with good QOL were age, residency, socio economic status, comorbidities (hypertension, diabetes) and frequency of hemodialysis.

In our study, CKD patients who were younger had better QOL than those who were older in terms of PCS. This finding was consistent with a study conducted in Australia by Brown MA et al[15] and with a few studies performed in the state of Palestine by Zyoud SE et al[16], and Mousa I et al[17]which reported that older age was associated with poor HRQOL but contrary to study in Nepal by Anu VK et al[18], reported that younger have better chance of good QOL than older QOL. Moreover, it was found that educated people had better QOL than illiterate patients in the domain of PCS; several studies[19,20] have reported that the impact of higher education is related to better QOL, this finding is consistent with a study conducted in the United States[21]. But a study from State of Palestine did not reveal any such relationship.[17] Educational background may influence their coping strategy for better survival. However, a study in Greece reported that education had no impact on physical and mental QoL scores[22].

It was found that CKD patients living in cities had better QOL than those living in villages in terms of MCS. He, et al[23] demonstrated that CKD patients living in a city had better QOL than those who were living in remote areas. This finding is consistent with a study conducted in the State of Pales-

tine[16]. Living in cities entitle them with civic and entertainment facilities and facilitates their treatment options.

According to some authors, the duration of treatment can negatively influence QOL. The good quality of life in the domain of MCS were found for people who had spent less time on hemodialysis[24-26] but this study showed that the patients who had undergone hemodialysis for more (12 month) duration, had good quality of life as because people manage to adapt their life to the dialysis and possibly because uraemia levels decrease over time, together with the disease symptoms.

This study shows that men have good quality of life in the domain of MCS than the women. Women had poor quality of life, probably due to psychological aspects and gender inequality. Lack of access to health care may also contribute to this issue. Other studies also described that this relationship does not exit[27,28]. Men scored better than women on the symptoms, effects and mental functioning subscales.

In the further subgroup analysis, elder age (>49 years) patients had higher BKD compared to the younger patients. This finding is consistent with previous studies done in Korea & UAE[29-31] and finding showed that the kidney disease is more burdensome for the elderly patients on maintenance dialysis, compared to younger patients. This finding underscores that there is need for special attentions for the care and reassurance of the elderly patients.

Concerning the place of residence, people living in rural areas scored higher on the disease burden subscale than people living in urban sectors. Burden subscale is probably determined by the distances people need to travel from their place of residence, located in rural areas, to the dialysis centres in the city. Transportation times and conditions and, in some situations, the need for a companion can act as negative factors in the perceived QOL.

In the study, presence of one or more comorbidities had a negative impact on the domains physical component score and also on burden of kidney disease scale. This finding is a consistent with the previous study, showed presence of comorbidities is a major determinant of a decline in QOL[32,33]. Co-morbidity status was not statistically significant associated with HRQOL[34], which were predictors of in various other studies.

Conclusion

It is to be noted that a substantial proportion (34.72%) of the patients with ESKD/CKD on hemodialysis in Purba Bardhaman had poor overall HRQOL which was statistically significant with all the socio demographic parameters except gender and educational qualification. Notably, the demographic distribution showcases a diverse age range, with 41.66% in the 40-49 age group. Elder patients had higher burden of kidney disease but good in mental component scale. Therefore, not only clinical treatment but also quality of life of patients with chronic dialysis should be given special attention during the hemodialysis patients' care. Public health interventions should be developed and implemented to improve QOL among CKD patients in Purba Bardhaman by focusing on older patients who have low education, living in rural areas, belonging to lower socio economic class, unemployed and having one or more comorbidities.

HRQOL measurements may be done routinely on all ESRD patients. The interpretation and use of the information obtained from these HRQOL assessments may help the nephrology care team.

Limitation- The study was conducted in a peripheral district of West Bengal in India at a centre run by Public Private Partnership mode among small sample size. So, the generalibility of results is restricted. Social desirability may be an issue for the patients answering the questiones. A multi centric study involving large sample size is recommended.

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