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Research Article

Assessment of Health Related Quality of life in End Stage Renal Disease (ESRD) Undergoing Twice and Thrice weekly Hemodialysis

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Abstract

Hemodialysis is most effective maintenance therapeutic technique used in patients with End-Stage Renal Disease (ESRD). However, it is lifelong therapy and requires frequent hospital or dialysis centres visits hampering the patient's overall quality of life. So, the aim of our study is to assess Health Related Quality of life in End-Stage Renal Disease (ESRD) Undergoing Twice and Thrice weekly Haemodialysis. A prospective observational, cross-sectional study was carried out from August 2016 to July 2017 in patients undergoing hemodialysis. WHOQOL-BREF questionnaire was used to access Health Related Quality of Life. Majority of respondents were male (71.55%), married (88.62%), employed (58.54%), belonging to middle class (69.92%) and residing in rural areas (62.61%). Average mean age was 51.61 ± 15.67 years. Average Quality of Life scores observed in twice weekly and thrice weekly hemodialysis was 51.49 ± 2.52 and 52.87 ± 4.17 respectively. Patients undergoing thrice weekly hemodialysis had improved haemoglobin, serum urea, serum creatinine, blood pressure (10.28 gm/dL, 95.85 mg/dL, 8.32 mg/dL,150 ± 24.31 mmHg and 78 ± 14.87 mmHg) as compared to twice weekly hemodialysis (9.23 gm/dL, 104.94 mg/dL and 8.68 mg/dL, 154 ± 22.77 mmHg and 87 ± 16.38 mmHg). Our study concluded that there was no significant difference between overall Health Related Quality of Life in Twice weekly and Thrice weekly Hemodialysis. Frequent hemodialysis was associated with improved control of hypertension, serum urea, serum creatinine levels.

Keywords: Health Related Quality of Life; Twice and Thrice Weekly Hemodialysis; End Stage Renal Disease; WHOQOL-BREF Ques-

Introduction

Chronic renal failure is an irreversible progressive condition responsible for high morbidity and mortality [1]. Hemodialysis (HD) is viable safe and efficient method for maintenance of patient with Chronic Kidney Disease (CKD) progressing to End Stage Renal Disease (ESRD) who cannot undergo renal transplantation. In developed countries usually hemodialysis (HD) is done thrice a week, however in India, most patients are given HD only twice a week and remaining 20% of patients undergo dialysis thrice a week [2]. Long term hemodialysis often results in a loss of financial income, loss of freedom, dependence on health care personnel and caregivers and negative impact on marital status, family, social activities, hampering the overall patients and their families quality of life [3].

Quality of life (QOL) is an important indicator of health care, patient experience and measures of effectiveness in various chronic diseases, that help assess the patient's functioning and well-being (FWB), therefore it becomes mandatory as an outcome measure in evaluation of adverse events and treatment effectiveness in patients with various diseases, such as ESRD, cardiovascular disease, malignancy, chronic obstructive pulmonary disease and human immunodeficiency virus infection [4].

Quality of life provide strategies to health workers that allow them to measure physical, psychological, social and environmental necessities in a way that help meet the real needs of patients with ESRD. It is well-known that increasing the frequency of dialysis improves the quality of life (QoL) [2]. There are limited studies available on Health related quality of life in thrice weekly haemodialysis.

Aim of the Study

The aim of this study is to assess the Health Related Quality of life in patients with End Stage Renal Disease (ESRD) undergoing twice weekly and thrice weekly Hemodialysis.

Materials and Methods

A prospective observational, cross-sectional study was carried out from August 2016 to July 2017 in end stage renal disease patients undergoing hemodialysis. Ethical approval was obtained from the Institutional ethics committee. Patient's informed consent was taken at the time of patient recruitment. End stage Renal Disease (ESRD) patients who are aged 18 years and above of either sex on regular twice and thrice weekly hemodialysis for at least three months or more prior to the interview were included in the study. ESRD patients who have Lack of mental or physical capacity to communicate with interviewer were excluded from the study. The socio-demographic details like age, gender, educational and employment status, physical activity, social history, past medical history, past medication history, current medications and laboratory investigations were collected from patients medical records and were noted in the self-pre-designed Patient Proforma. Quality of life was assessed by World Health Organisation Quality of Life (WHOQOL-BREF) [5,6]. The WHOQOL-BREF consists of 24 facets and provides a profile of scores on four dimensions of quality of life: physical health, psychological, social relationships and the environment. Patient was interviewed using the WHOQOL-BREF questionnaires and the results were scored as raw scores which converted to transformed scores. The first transformation converts scores to a range of 4 - 20 and the second transformation converts domain scores to a 0 - 100 scale. Higher scores reflect a better quality of life. Descriptive statistics i.e. standard deviation, mean and percentage were used to describe socio-demographic, clinical characteristics and other related variables. The statistical significance of Quality of Life score of Twice weekly and Thrice weekly hemodialysis was obtained by Kruskal Wallis H. Test. The p-value < 0.05 was considered to be significant.

Results

Out of 123 hemodialysis patients, seventy two were on twice weekly hemodialysis and fifty one patients were on thrice weekly hemodialysis. The mean ages in the patient undergoing twice weekly and thrice weekly hemodialysis were 51.89 ± 15.64 years and 51.33 ± 15.70 years respectively. In both group (twice weekly and thrice weekly hemodialysis) majority of the participants were males (75.00%, 66.67%), married (91.67%, 84.32%), employed (59.72%, 56.86%) and belonging to low-middle socio-economic class (87.50%, 86.27%) with minimum primary education (51.39%, 37.26%). In twice weekly hemodialysis11.11% were alcoholic and 37.50% smokers while in thrice weekly 29.42% were alcoholic and 35.30% were smokers. 27 (52.94%) of twice weekly group were found to be residing in urban area while 53 (73.61%) of thrice weekly group were found to be residing in rural area.

Maximum reported co-morbidities in twice weekly and thrice weekly hemodialysis participants were hypertension and diabetes mellitus (79.16%, 88.23%). In both group, duration of hemodialysis were > 24 months (36.11%, 58.82%) and number of dialysis were > 100 days (55.55%, 84.32%). The mean BMI for twice weekly and thrice weekly hemodialysis patients was found to be 22.87 ± 4.80 and 23.14 ± 5.59 respectively.

Hematology was performed in all twice weekly and thrice weekly hemodialysis patients. Hemoglobin of thrice weekly hemodialysis patients were slightly high (10.28 gm/dL) as compared to twice weekly (9.23 gm/dL). The mean of serum urea and serum creatinine for twice weekly dialysis and thrice weekly dialysis patients were 104.92 mg/dL, 8.68 mg/dL and 95.85 mg/dL, 8.31 mg/dL respectively whereas the mean for serum phosphorous for thrice weekly dialysis was found to be under-controlled i.e. 5.43 mg/dL (Normal range - 1.20 - 12.00 mg/dL). *Kt/V* values in patients undergoing twice-weekly HD (1.38 ± 0.25) were significantly lower than those in patients those who undergoing thrice-weekly HD (1.63 ± 0.09).

In thrice weekly hemodialysis, the highest QOL score was observed in the social domain with average scores of 56.58 ± 13.56 and minimum scores in physical domain 48.94 ± 14.05 indicating poor physical health. General quality of life score in thrice hemodialysis patients were 52.87 ± 4.17. Similarly, in twice weekly hemodialysis patient's highest score was reported in social domain 54.09 ± 12.16. The average quality of life score in twice weekly dialysis was 51.49 ± 2.52.

Discussion

End Stage Renal Disease (ESRD) is the chronic diseases which possess great threat globally and increase burden in healthcare system. Globally, the number of CKD stage G5 patients receiving renal replacement therapy (RRT) is estimated to be > 1.4 million, with an annual growth rate of 8% [7].

In this study majority (71.545%) of the respondents were males, similar result was reported from a study conducted in Nepal by V K Anu., *et al.* [8] where 72% of the subjects were males. Reason for

Characteristics	Number of Patients (%)		
	Twice weekly hemodialysis (n = 72)	Thrice weekly hemodialysis (n = 51)	Total Number of Patients (n = 123)
Age in years			
20 - 29	7 (9.72)	7 (13.72)	14 (11.38)
30 - 39	12 (16.67)	5 (9.80)	17 (13.82)
40 - 49	7 (9.72)	9 (17.65)	16 (13.00)
50 - 59	20 (27.78)	9 (17.65)	29 (23.58)
≥ 60	26 (36.11)	21 (41.18)	47 (38.22)
Gender			
Male	54 (75)	34 (66.67)	88 (71.55)
Female	18 (25)	17 (33.33)	35 (28.45)
Marital Status			
Married	66 (91.67)	43 (84.31)	109 (88.62)
Unmarried	4 (5.55)	8 (15.69)	12 (9.76)
Widow	2 (2.78)	0	2 (1.62)
Employment Status			
Employed	43 (59.72)	29 (56.86)	72 (58.54)
Unemployed	22 (30.56)	15 (29.41)	37 (30.08)
Retired	7 (9.72)	7 (13.73)	14 (11.38)
Socioeconomic Classes			
Low	9 (12.50)	12 (23.53)	21 (17.08)
Middle	54 (75.00)	32 (62.74)	86 (69.92)
High	9 (12.50)	7 (13.73)	16 (13.00)
Education			
Illiterate	6 (8.33)	3 (5.88)	9 (7.32)
Primary	37 (51.39)	19 (37.26)	56 (45.53)
Secondary	17 (23.61)	6 (11.76)	23 (18.69)
Graduate	11 (15.28)	15 (29.42)	26 (21.14)
Post Graduate	1 (1.39)	8 (15.68)	9 (7.32)
Smoking status			
Smokers	27 (37.50)	18 (35.30)	45 (36.58)
Alcoholic status			
Non Alcoholic	64 (88.89)	36 (70.58)	100 (81.31)
Alcoholic	8 (11.11)	15 (29.42)	23 (18.69)
Residential area			
Urban	19 (26.39)	27 (52.94)	46 (37.39)
Rural	53 (73.61)	24 (47.06)	77 (62.61)

Table 1: Socio-demographic characteristic of study subjects.

Characteristics	Number of Patients (%)		
	Twice weekly hemodialysis (n=72)	Thrice weekly hemodialysis (n=51)	Total Number of Patients (n=123)
Co-morbidities of ESRD			
Hypertension+ Diabetes	57 (79.16)	45 (88.23)	102 (82.92)
Other causes	15 (20.84)	6 (11.77)	21 (17.08)
Duration of Hemodialysis			
3-6 months	16 (22.22)	5 (9.80)	21 (17.08)
6-9 months	5 (6.95)	1 (1.97)	6 (4.87)
9-12 months	7 (9.72)	4 (7.84)	11 (8.95)
12-18 months	3 (4.16)	7 (13.73)	10 (8.13)
18-24 months	15 (20.84)	4 (7.84)	19 (15.44)
More than 24 months	26 (36.11)	30 (58.82)	56 (45.53)

Number of Dialysis			
< 50	17 (23.61)	3 (5.88)	20 (16.26)
50 - 100	15 (20.84)	5 (9.80)	20 (16.26)
> 100	40 (55.55)	43 (84.32)	83 (67.48)
Pills per day			
0 - 1	0	5 (9.80)	5 (4.08)
1 - 2	23 (31.94)	7 (13.73)	30 (24.38)
2 - 3	18 (25.00)	13 (25.49)	31 (25.22)
3 - 4	16 (22.22)	13 (25.49)	29 (23.56)
≥ 5	15 (20.84)	13 (25.49)	28 (22.76)
Body Mass Index	22.87 ± 4.80	23.14 ± 5.59	
Underweight < 18.50	11 (15.28)	10 (19.61)	21 (17.08)
Normal 18.50 - 24.99	48 (66.67)	24 (47.06)	72 (58.54)
Overweight ≥ 25	9 (12.50)	9 (17.65)	18 (14.63)
Obese ≥ 30	4 (5.55)	8 (15.68)	12 (9.75)
Supine Blood pressure			
Systolic (mmHg)	154 ± 22.77	150 ± 24.31	
Diastolic (mmHg)	87 ± 16.38	78 ± 14.87	

Table 2: Clinical Characteristics of study subjects.

Laboratory Test	**Twice weekly hemodialysis**					**Thrice weekly hemodialysis**				
	n = 72 (%)	**SD**	**Mean**	**Min**	**Max**	**n = 51 (%)**	**SD**	**Mean**	**Min**	**Max**
Hb (g/dl)	72 (100)	1.34	9.23	6	12.1	51 (100)	1.22	10.28	6.6	12.3
Sr.Urea (mg/dL)	72 (100)	38.12	104.94	18	191	50 (98)	16.41	95.85	51.3	120
Sr.Cr (mg/dL)	72 (100)	9.93	8.68	2.5	89	50 (98)	2.01	8.32	2.72	13.6
Sr. Sodium (mEq/L)	70 (97.22)	15.94	136.18	7.33	144	47 (92.15)	3.63	136.27	126	143
Sr. Potassium (mEq/L)	70 (97.22)	0.88	5.34	3.4	7.5	47 (92.15)	0.49	5.22	3.34	5.9
Sr. Calcium (mEq/L)	68 (94.44)	0.095	1.09	0.82	1.42	47 (92.15)	1.63	8.38	1.1	9.89
Sr. Chloride (mEq/L)	16 (22.22)	3.51	103.52	99	110	0	0	0	0	0
Sr. Phosphorous (mEq/L)	0	0	0	0	0	45 (88.23)	1.13	5.43	2.79	10.3
Kt/V	1.38 ± 0.25					1.63 ± 0.09				
P-value	0.000*					0.000*				

Table 3: Laboratory characteristics of hemodialysis.

Kruskal Wallis H Test *P < 0.05 is considered to be statistically significant.

Domain	**WHOQOL-BREF questionnaire score**							
	Twice weekly hemodialysis				**Thrice weekly Hemodialysis**			
	Mean	**SD**	**Min**	**Max**	**Mean**	**SD**	**Min**	**Max**
I (Physical)	47.45	12.31	25	75	48.94	14.05	31	88
II (Psychological)	49.00	13.62	25	88	51.78	12.34	31	94
III (Social)	54.09	12.16	14	75	56.58	13.56	25	94
IV (Environmental)	53.94	10.01	15	75	55.66	12.23	38	88
General QOL	51.49 ± 12.52				52.87 ± 4.17			
P-value	0.0037*				0.0004*			

Table 4: Scores of the WHOQOL-BREF questionnaire Of CKD patients receiving twice weekly and thrice weekly Hemodialysis

Kruskal Wallis H Test *P < 0.05 is considered to be statistically significant.

male prevalence may be high prevalence of smoking, alcohol consumption and higher incidence of cardiovascular diseases among males [9]. In this study majority of respondents were in the age group of ≥ 60 years (38.22%), this indicates that the prevalence of end stage renal disease (ESRD) is high especially among older people. The reason for high prevalence of CKD in elderly is attributed to ageing. Ageing is associated with a build-up of co-morbidities, increased medication use, which may lead to a reduction in incidence of GFR and albuminuria [10]. Majority of participants were married (88.62%) and employed (58.54%). In our study 62.61% of the subjects was from rural area. Similar result was found in a study from A Suja., *et al.* [11] where 86% were from rural area.

In our study majority (58.5%) were undergoing dialysis twice weekly, similar results were reported in Santosh A., *et al.* [12] where 66% were undergoing dialysis twice weekly. Another study from Bapat U., *et al.* [13] reported majority of patients (56%) were undergoing dialysis thrice weekly.

The exact cause of ESRD is still unknown and accompanied by various co-morbidities among which diabetes and hypertension are the most common. In the present study maximum patients (89.92%) were with Hypertension with Diabetes. In this study, majority of the subjects were undergoing hemodialysis for more than 2 years (45.53%), which resembles with study conducted by Murali., *et al.* [14] (48%). 67.48% patients were found to be complete more than 100 sessions. As long as ESRD getting worsens by multiple co-morbidities such as hypertension, diabetes, hyperurecemia, kidney stone and other CVS conditions hence it requires poly pharmacy and multiple drug regimen treatment which could be one of the burdens to the patients. Nevertheless, patients participated in our study mainly were taking 2 - 3 pills/day (25.22%) for their co-morbid conditions.

Anaemia commonly occurs in people with chronic kidney disease (CKD).It is an ordinary complication of CKD because erythropoietin, involved in the process of erythropoiesis, is normally produced by the kidney [15]. Due to the damage or loss of the function of kidney in chronic renal failure, there is a reduction in the number of Red Blood Cells count [15]. The mean hemoglobin value with twice weekly dialysis was 9.22 gm/dL and 10.28 gm/dL with thrice weekly dialysis patients.

Apart from hemoglobin, serum creatinine is another vital indicator of accuracy of hemodialysis. The normal range for serum creatinine level is between 0.06 and 0.12 mmol/L. Serum/plasma urea concentration reflects the balance between urea production in the liver and urea elimination by the kidneys, in urine; so increased plasma/serum urea can be caused by increased urea production, decreased urea elimination, or a combination of both. Kidney disease is associated with reduced urea excretion and consequent rise in blood concentration. We found that the patients with ESRD undergoing thrice weekly hemodialysis had a lower serum creatinine and serum urea (8.31 mg/dL, 95.85 mg/dL) as compared to twice-weekly HD patients (8.68 mg/dL, 105.70 mg/dL). Hence, thus emphasizing the similar finding describe by Noor Ul Amin., *et al*. [16] which states dialysis has positive impact on serum creatinine and serum urea level by reducing its level towards normal value.

Dialysis dose is a good marker of dialysis quality. Kt/V is very important for the assessment of dialysis quality and adequacy. It is thus essential to know the actual dialysis dose that is being delivered at each session. According to the DOQI guidelines, the minimum value recommended for three sessions a week is a Kt/V over 1.2 [17]. In our study Kt/V value was found to be higher in thrice weekly hemodialysis as compared to twice weekly hemodialysis.

ESRD is a disastrous disease with serious impact on the patient's QOL life, negatively affecting their physical, psychological, social environmental relationship, which is becoming an important outcome measure after the initiation of renal replacement therapies. The major therapeutic goal is to improve the functioning ability of these patients so that they can enjoy life to its fullest possible extent. This study illustrates how physical, psychological, social, environmental health, were affected in hemodialysis patients by using WHO-BREF questionnaire to evaluate QOL in hemodialysis patients. The four domain scores of WHO-QOL with 0 score representing worst QOL and 100 score representing best QOL. We also determined the effect of frequency (twice and thrice weekly) on QOL in hemodialysis patents.

HD was initially used once weekly however, uremic symptoms became more severe before the next dialysis [18]. Additionally, the accumulation of significant extravascular volume and the development of peripheral neuropathy forced a change to a twice weekly schedule. Further increase in the frequency of dialysis to thrice weekly occurred because of the persistence of neuropathy and a gout-like syndrome [18]. Thrice weekly HD was eventually accepted and has remained the standard for more than four decades [19,20].

Per contra, extending the duration of hemodialysis even for few patients is difficult task. The problem in increasing dialysis time and/or frequency is largely due to barriers to adoption of these alternative modalities rather than genuine disadvantages. The main barrier is the fact that no randomized controlled trial has yet demonstrated the clinical advantage of these strategies over conventional hemodialysis. Convincing patients to increase their session time and/or frequency is not easy, especially in India, as patients often live far from dialysis canters and have to spend extra money

from their meagre economic resources. Patient education and financial support is crucial to bring about understanding and acceptance of prolonged or more frequent dialysis sessions [2].

In our study, we found no statistically significant difference in QOL in thrice weekly vs. twice weekly HD patients and interestingly both twice and thrice weekly groups scored higher in social domain. However, QOL of patients undergoing thrice weekly HD seems to be slightly higher in all four domains than twice weekly (52.78, 51.49 respectively), resembling to study done by Saeed A., *et al.* reporting no statistically significant difference in HRQOL for patients dialysing twice weekly versus thrice weekly [21].

Conclusion

The result of our study suggests that the patients undergoing hemodialysis had moderate level of Quality of Life (QOL). There was no significant difference in Health Related Quality of Life (HRQOL) in patients undergoing Twice weekly and Thrice weekly hemodialysis. However, the clinical characteristics of patients undergoing thrice weekly hemodialysis were better as compared to twice weekly dialysis. Frequent hemodialysis was associated with improved control of hypertension, serum urea; serum creatinine levels. Hemoglobin level was improved in patients undergoing thrice weekly hemodialysis.

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