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Comparison of Quality of Life in Twice Weekly versus Thrice Weekly Hemodialysis Populations: A Single Center Cross Sectional study.

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Abstract

Hemodialysis is the preferable mode of treatment for more than 70% of patients with end-stage renal disease (ESRD). Variety of factors influence the QOL among hemodialysis population. Health-related quality of life (HRQOL) is a very important outcome for patients with end-stage renal disease (ESRD). The primary goal of healthcare initiatives is to provide quality care and concurrently rationalize costs. The primary objective of this study was to determine the frequency of adequate quality of life in patients on maintenance hemodialysis undergoing twice versus thrice weekly maintenance hemodialysis.

Method: It was a cross-sectional study conducted over 6 months. HRQOL SF36 questionnaire was administered.

Results: We found mean age of patients was 52.79±10.85 years with 53.7% patients were male and 46.3% patients were female. We also found adequate physical composite score in twice/week and thrice/week as (57.1% vs 39.3%, p=0.018), adequate mental composite score (70.3% vs 39.3%, p=0.0001) and adequate kidney disease component score (78.0% vs 57.1%, p=0.003). Twice/week patients showed better results in quality of life than thrice/week patients.

Conclusion: We concluded that twice per week maintenance hemodialysis patients had better quality of life than thrice per week patients due to various factors.

Keywords: Quality of life, maintenance hemodialysis, tertiary Care Hospital, twice per week, thrice per week.

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Introduction

Renal replacement therapy consists of hemodialysis (HD), peritoneal dialysis (PD), and renal transplant.[1] Hemodialysis is the preferable mode of treatment for more than 70% of patients with end-stage renal disease (ESRD). ESRD has a negative effect on quality of life (QOL), mostly due to impairment and restrictions in all aspects of daily life.

Variety of factors influence the QOL among hemodialysis population namely, the adequacy of dialysis, depression and anxiety, frequent hospital admissions, thrice a week visit to dialysis centers, impairment of physical fitness and increasing age.[2] Health-related quality of life (HRQOL) is a very important outcome for patients with end-stage renal disease (ESRD).[3]

In general, a poor HRQOL is seen in patients of ESRD.[4] Adequate dialysis improves quality of life, nutrition, and leads to lesser uremic symptoms in dialysis patients. However, an increasing amount of evidence suggests that an incremental / infrequent hemodialysis schedule, might be suitable for patients with considerable native kidney function.[5] Thrice weekly maintenance hemodialysis (MHD) is currently the standard but there is increasing interest in twice weekly MHD in certain settings.[6]

In recent years, observational studies of twice weekly HD in Taiwan and China have shown a possible benefit of the slower decline of renal function and acceptable nutritional status.[7] A study done by Arshad et al found that patients on thrice weekly dialysis had better mental composite score (MCS).[8]

Patients presenting for HD in Pakistan are limited by resources and in general end up with twice per HD or sometimes as needed with conservative management. Local studies are few and therefore the object of the study was to compare patients on thrice per week compared to twice per week MHD.

Methods

This study was conducted after approval from College of Physicians and Surgeons Pakistan as a synopsis and further approved for publication by IRB at KRL hospital IRB # KRL-HI-PUB-ERC/Dec24/42, approved on Dec 11,2024. ESRD patients who were on maintenance hemodialysis on a twice or thrice a week schedule (each of 4 hours duration) for more than 6 months duration, at KRL hospital, Islamabad, Pakistan were included in the study.

Quality Of Life: QOL was assessed using Kidney Disease Quality of Life Short Form 36 in patients on maintenance hemodialysis. It analyses QOL on 19 scales, 11 being specific to kidney disease and 8 referring to SF-36. Each domain is marked from zero to hundred, with higher scores reflective of a better QoL. A score of ≥ 43, ≥ 51 and ≥ 65 was used to label as patients having adequate Physical composite score (PCS), adequate Mental composite score (MCS) and adequate Kidney disease component score (KDCS). [1]

Study design: It was a cross-sectional study with non-probability consecutive sampling. The number of patients were calculated using the WHO software, the sample size came out to be 175 patients, with prevalence 8.26%, and margin of error = 4.13%, and confidence level 95%.

Inclusion criteria

1. ESRD patients on maintenance hemodialysis for more than 6 months duration was included.
2. Either gender.
3. Age 30-70 years.

Exclusion criteria

1. Non consenting
2. Patients unable to understand the questionnaire due to cognitive impairment or having difficulty communicating with the researcher.
3. Patients with history of dementia, delirium, mania, bipolar effective disorder or posttraumatic stress.
4. Patients already diagnosed as having depression or prior anti-depressant treatment.
5. Patients with history of congestive cardiac failure, myocardial infarction, chronic liver disease, COPD and stroke.

Data Collection Procedure

Consenting patients fulfilling the inclusion criteria were administered the questionnaire verbally by a single physician. The findings of variables as mentioned above was entered in performa.

Data Analysis.

Data was analyzed on SPSS Version 23 (IBM Corp., Armonk, NY). Demographic data was presented as simple descriptive statistics giving mean and standard deviation for age. Frequency and percentages was calculated for categorical variables like gender, place of residence, family monthly income status, occupational status, marital status, educational status, type of family, hemodialysis frequency, adequate Physical composite score, adequate Mental composite score and adequate Kidney disease component score was presented as frequency and percentages.

Chi square test was used to compare adequate Physical composite score, adequate mental composite score and adequate Kidney disease component score in twice versus thrice weekly hemodialysis. Effect modifiers were controlled through stratification of age, gender, place of residence, family monthly income status, occupational status, marital status, educational status and type of family to see the effect of these on outcome variable. Post stratification chi square test was applied taking p-value of ≤ 0.05 as statistically significant.

Results

We enrolled 175 patients in current study with mean age was 52.79±10.85 years. In twice/week MHD patients frequency the mean age was 53.94±10.94 years and in thrice/week MHD patients frequency was 51.54±10.66 years with non-significant p value (p=0.143). patient characteristics are shown in Table 1.

The results of adequate physical composite score were better in twice/week compared to thrice/week (57.1% vs 39.3%, p=0.018), adequate mental composite score (70.3% vs 39.3%,

p=0.0001) and adequate kidney disease component score (78.0% vs 57.1%, p=0.003) were all better among twice/week MHD compared to thrice/week patients.

Table-1: Patient characteristics of 175 maintenance hemodialysis patients.

Age Groups	Hemodialysis frequency		p value
	Twice/week	Thrice/week	
<45 years,	22 (24.2 %)	26 (31%)	0.315
≥45 years	69(75.8%)	58(69%)	
Male/Female	48(52.7%)/43(47.3%)	46/38(45.2%)	0.789
Urban/Rural	47 (51.6%)/44 (48.4%)	39(46.4%)/45(53.6%)	0.490
Employed/ Unemployed	11 (12.1%)/80(87.9%)	14(16.7%)/70(83.3%)	0.387
Married/ Unmarried	81(89%)/ 10(11%)	74(88.1%)/1011.9%	0.849
Family Type Joint/Nuclear	45 (49.5%)/46 (50.5%)	41(48.8%)/43(51.2%)	0.932
Duration of HD: <2 years/>2 years	41(45.1%)/50 (54.9%)	36(42.9%)/48(57.1%)	0.770
Monthly Income: <50, 000 / >50,000 Pak Rs.	43(47.3%)/ 48(52.7%)	42(50%)/42(50%)	0.716
Illiterate (Never went to school)	19 (20.9%)	30	0.167
Primary (Class 1-5)	23 (25.3%)	15(17.9%)	
Secondary (Class 6-10)	25 (27.5%)	19(22.6%)	
Higher (Intermediate to graduation)	24(26.4%)	20(23.8%)	

Table 2: Results of quality-of-life SF36 questionnaire among 175 patients undergoing maintenance hemodialysis twice or thrice per week.

Quality of Life		Hemodialysis frequency		Total	p value
		Twice/week	Thrice/week		
Adequate Physical Composite Score	Yes	52 (57.1%)	33(39.3%)	85 (48.6%)	0.018
	No	39(42.9%)	51 (60.7%)	90 (51.4%)	
Adequate Mental Composite Score	Yes	64 (70.3%)	33(39.3%)	97(55.4%)	0.0001
	No	27(29.7%)	51(60.7%)	78 (44.6%)	
Adequate Kidney Disease Component Score	Yes	71(78.0%)	48(57.1%)	119(68.0%)	0.003
	No	20 (22.0%)	36 (42.9%)	56 (32.0%)	

Discussion

Mean age of patients was 52.79±10.85 years and 53.7% patients were male. We found better physical composite score in twice/week than thrice/week MHD patients (57.1% vs 39.3%, p=0.018), adequate mental composite score (70.3% vs 39.3%, p=0.0001) and adequate kidney disease component score (78.0% vs 57.1%, p=0.003) thus showing better results in quality of life than thrice/week patients.

Prakash et al. also found compared to thrice weekly hemodialysis, twice weekly hemodialysis does not impair health-related quality of life.[7] Compared to the twice weekly hemodialysis group, infections were more common in the thrice weekly group.

The frequency of MHD and the rates of complications and survival are correlated. It is difficult to strike the ideal balance between medical expenses, quality of life (QOL), and healthcare. Complications, inflammatory state, nutritional condition, and quality of life were studied

amongst individuals with varying frequencies of MHD by Dai et al and found twice weekly dialysis patients had better QOL and BUN predicted preference for Twice weekly MHD.[8]

Table 3: Correlation of Adequate Physical Composite Score and hemodialysis frequency with different variables among 175 maintenance hemodialysis patients.

Variables		Hemodialysis frequency	Adequate Physical Composite Score		p value
			Yes	No	
Age Groups	<45 years	Twice/week	14(66.7%)	8(29.6%)	0.011
		Thrice/week	7(33.3%)	19(70.4%)	
	>45 years	Twice/week	38(59.4%)	31(49.2%)	0.250
		Thrice/week	26(40.6%)	32(50.8%)	
Gender	Male	Twice/week	30 (61.2%)	18(40.0%)	0.040
		Thrice/week	19(38.8%)	27(60.0%)	
	Female	Twice/week	22(61.1%)	21(46.7%)	0.196
		Thrice/week	14 (38.9%)	24(53.3%)	
Place of residence	Urban	Twice/week	26 (68.4%)	21(43.8%)	0.022
		Thrice/week	12 (31.6%)	27(56.3%)	
	Rural	Twice/week	26(55.3%)	18(42.9%)	0.240
		Thrice /week	21(44.7%)	24(57.1%)	
Occupational status	Employed	Twice/week	8(66.7%)	3(23.1%)	0.028
		Thrice/week	4(33.3%)	10(76.9%)	
	Unemployed	Twice/week	44(60.3%)	36(46.8%)	0.097
		Thrice/week	29(39.7%)	41(53.2%)	
Marital status	Married	Twice/week	46(59.7%)	35(44.9%)	0.064
		Thrice/week	31(40.3%)	43(55.1%)	
	Unmarried	Twice/week	6(75.0%)	4(33.3%)	0.068
		Thrice/week	2(25.0%)	8(66.7%)	
Type of family	Joint	Twice/week	23(60.5%)	22(45.8%)	0.175
		Thrice/week	15 (39.5%)	26(54.2%)	
	Nuclear	Twice/week	29(61.7%)	17(40.5%)	0.045
		Thrice/week	18(38.3%)	25(59.5%)	
Family monthly income	<50000 per month	Twice/week	31(67.4%)	12(30.8%)	0.001
		Thrice/week	15 (32.6%)	27(69.2%)	
	>50000 per month	Twice/week	21(53.8%)	27(52.9%)	0.932
		Thrice/week	18 (46.2%)	24(47.1%)	
Educational	Illiterate (Never went to school)	Twice/week	16(51.6%)	3(16.7%)	0.016
		Thrice/week	15(48.4%)	15(83.3%)	
	Primary (Class 1-5)	Twice/week	9(64.3%)	14(58.3%)	0.717
		Thrice/week	5(35.7%)	10(41.7%)	
	Secondary (Class 6-10)	Twice/week	16(72.7%)	9(40.9%)	0.033
		Thrice/week	6(27.3%)	13(59.1%)	
	Higher (Intermediate to graduation)	Twice/week	11(61.1%)	13(50.0%)	0.467
		Thrice/week	7(38.9%)	13(50.0%)	

The maintenance of residual kidney function, preservation of the vascular access longevity, and enhancement of medical resource utilization are the benefits linked to twice-weekly dialysis.[9,10] Zhang et al also concluded in their research that twice-weekly HD during first year of the dialysis treatment seems to be related with the better RKF preservation.[11]

Table 4: Correlation of Adequate Mental Composite Score and hemodialysis frequency with different variables among 175 maintenance hemodialysis patients.

Variables		Hemodialysis frequency	Adequate Mental Composite Score		p value
			Yes	No	
Age Groups	<45 years	Twice/week	16(66.7%)	6(25%)	0.004
		Thrice/week	8(33.3%)	18(75.0%)	
	>45 years	Twice/week	48(65.8%)	21(38.9%)	0.003
		Thrice/week	25(34.2%)	33(61.1%)	
Gender	Male	Twice/week	33(66.0%)	15(34.1%)	0.002
		Thrice/week	17(34.0%)	29(65.9%)	
	Female	Twice/week	31(66.0%)	12(35.3%)	0.006
		Thrice/week	16(34.0%)	22(64.7%)	
Place of residence	Urban	Twice/week	35(67.3%)	12(35.3%)	0.004
		Thrice/week	17(32.7%)	22(64.7%)	
	Rural	Twice/week	29(64.4%)	15(34.1%)	0.004
		Thrice/week	16(35.6%)	29(65.9%)	
Occupational status	Employed	Twice/week	9(69.2%)	2(16.7%)	0.008
		Thrice/week	4(30.8%)	10(83.3%)	
	Unemployed	Twice/week	55(65.5%)	25(37.9%)	0.001
		Thrice/week	29(34.5%)	41(62.1%)	
Marital status	Married	Twice/week	57(64.0%)	24(36.4%)	0.001
		Thrice/week	32(36.0%)	42(63.6%)	
	Unmarried	Twice/week	7(87.5%)	3(25.0%)	0.006
		Thrice/week	1(12.5%)	9(75.0%)	
Type of family	Joint	Twice/week	31(70.5%)	14(33.3%)	0.001
		Thrice/week	13(29.5%)	28(66.7%)	
	Nuclear	Twice/week	33(62.3%)	13(36.1%)	0.015
		Thrice/week	20(37.7%)	23(63.9%)	
Duration of hemodialysis	<2 years	Twice/week	26(65.0%)	15(40.5%)	0.032
		Thrice/week	14(35.0%)	22(59.5%)	
	>2 years	Twice/week	38(66.7%)	12(29.3%)	0.000
		Thrice/week	19(33.3%)	29(70.7%)	
Family monthly income	<50000 per month	Twice/week	32(64.0%)	11(31.4%)	0.003
		Thrice/week	18(36.0%)	24(68.6%)	
	>50000 per month	Twice/week	32(68.1%)	16(37.2%)	0.003
		Thrice/week	15(31.9%)	27(62.8%)	
Educational	Illiterate (Never went to school)	Twice/week	15(53.6%)	4(19.0%)	0.014
		Thrice/week	13(46.4%)	17(81.0%)	
	Primary (Class 1-5)	Twice/week	14(73.7%)	9(47.4%)	0.097
		Thrice/week	5(26.3%)	10(52.6%)	
	Secondary (Class 6-10)	Twice/week	21(72.4%)	4(26.7%)	0.004
		Thrice/week	8(27.6%)	11(73.3%)	
	Higher (Intermediate to graduation)	Twice/week	14(66.7%)	10(43.5%)	0.123
		Thrice/week	7(33.3%)	13(56.5%)	

A twice-weekly plan has been shown in several studies to have a greater survival rate than a three-times-weekly timetable.[12] According to a Shanghai research, individuals who had received dialysis for less than five years and belonged to a twice-weekly plan fared better overall, although overall survival was identical for both schemes.[13]

Table 5: Correlation of Adequate Kidney Disease Component Score and hemodialysis frequency with different variables among 175 maintenance hemodialysis patients.

Variables		Hemodialysis frequency	Adequate Kidney Disease Component Score		p value
			Yes	No	
Age Groups	<45 years	Twice/week	17(56.7%)	5(27.8%)	0.052
		Thrice/week	13(43.3%)	13(72.2%)	
	>45 years	Twice/week	54(60.7%)	15(39.5%)	0.028
		Thrice/week	35(39.3%)	23(60.5%)	
Gender	Male	Twice/week	39(62.9%)	9(28.1%)	0.001
		Thrice/week	23(37.1%)	23(71.9%)	
	Female	Twice/week	32(56.1%)	11(45.8%)	0.396
		Thrice/week	25(43.9%)	13(54.2%)	
Place of residence	Urban	Twice/week	37(61.7%)	10(38.5%)	0.047
		Thrice/week	23(38.3%)	16(61.5%)	
	Rural	Twice/week	34(57.6%)	10(33.3%)	0.030
		Thrice/week	25(42.4%)	20(66.7%)	
Occupational status	Employed	Twice/week	10(62.5%)	1(11.1%)	0.013
		Thrice/week	6(37.5%)	8(88.9%)	
	Unemployed	Twice/week	61(59.2%)	19(40.4%)	0.032
		Thrice/week	42(40.8%)	28(59.6%)	
Marital status	Married	Twice/week	63(60.0%)	18(36.0%)	0.005
		Thrice/week	42(40.0%)	32(64.0%)	
	Unmarried	Twice/week	8(57.1%)	2(33.3%)	0.329
		Thrice/week	6(42.9%)	4(66.7%)	
Type of family	Joint	Twice/week	32(59.3%)	13(40.6%)	0.094
		Thrice/week	22(40.7%)	19(59.4%)	
	Nuclear	Twice/week	39(60.0%)	7(29.2%)	0.010
		Thrice/week	26(40.0%)	17(70.8%)	
Duration of hemodialysis	<2 years	Twice/week	29(58.0%)	12(44.4%)	0.255
		Thrice/week	21(42.0%)	15(55.6%)	
	>2 years	Twice/week	42(60.9%)	8(27.6%)	0.003
		Thrice/week	27(39.1%)	21(72.4%)	
Family monthly income	<50000 per month	Twice/week	36(62.1%)	7(25.9%)	0.002
		Thrice/week	22(37.9%)	20(74.1%)	
	>50000 per month	Twice/week	35(57.4%)	13(44.8%)	0.265
		Thrice/week	26(42.6%)	16(55.2%)	
Educational	Illiterate (Never went to school)	Twice/week	18(47.4%)	1(9.1%)	0.022
		Thrice/week	20(52.6%)	10(90.9%)	
	Primary (Class 1-5)	Twice/week	16(61.5%)	7(58.3%)	0.851
		Thrice/week	10(38.5%)	5(41.7%)	
	Secondary (Class 6-10)	Twice/week	21(75.0%)	4(25.0%)	0.001
		Thrice/week	7(25.0%)	12(75.0%)	
	Higher (Intermediate to graduation)	Twice/week	16(59.3%)	8(47.1%)	0.429
		Thrice/week	11(40.7%)	9(52.9%)	

However, compared to a three-times-weekly plan, a twice-weekly MHD program has several drawbacks, such as inadequate dialysis, malnourishment, anemia, interdialytic weight gain and electrolyte imbalance. Increasing the frequency of dialysis might lead to more comprehensive and sufficient dialysis, which would enhance the clinical outcome. For instance, compared to twice weekly dialysis, a better clinical outcome was seen with three- or four-times weekly dialysis.[14]

The results of this research showed that a twice-weekly MHD schedule improved QOL more than a three-times-weekly plan. Numerous investigations, as reviewed by Yan et al, Rhee et al and Kalantar-Zadeh et al corroborate this.[10,15,16] However, Bieber et al.'s research found no differences between the two methods.[9] To overcome this problem, further research is required. Several variables, such as the research population, the questionnaires utilized, and insurance coverage, might be the cause of discrepancies.

Importantly, the study's findings indicate that, in comparison to three times a week MHD, twice a week MHD will result in lower financial costs for patients, their families, and society at large. This is especially true for developing nations like Pakistan where access to equipment may be a constraint.

According to Obi et al., some individuals could begin on a twice-weekly schedule and transition to a three times-weekly schedule as needed.[17] For the time that the patients do not need more frequent therapy, this would save money and resources. Ten criteria were proposed by Kalantar-Zadeh et al to choose patients for twice-weekly HMD.[16] A twice-weekly plan would be more suitable for patients who fit the requirements than a three-times-weekly timetable since it would result in comparable clinical results, greater quality of life, and reduced medical expenses.

Our study has some limitations like study was based on a single center study, sample size was also limited and time was limited. We recommend a comprehensive study with larger sample size may be conducted to at multiple centers to see details effect of twice/week vs thrice/week hemodialysis frequency on the patient’ s quality of life.

Conclusion

After determining the frequency of adequate quality of life in patients on maintenance hemodialysis presenting at KRL Hospital, Islamabad and comparing in terms of twice versus thrice weekly maintenance hemodialysis, we concluded that twice/week maintenance hemodialysis patients had better quality of life than thrice/week patients.

Conflict of interest: None

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