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QUALITY OF LIFE DIFFERENCES IN HEMODIALYSIS PATIENTS WITH AV FISTULA VS. PERIPHERAL ACCESS: A COMPARATIVE CROSS-SECTIONAL STUDY

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Abstract

Background:

Patients with chronic kidney disease (CKD) undergoing hemodialysis frequently experience compromised quality of life (QOL) due to the physical, psychological, and social burdens of long-term treatment. One critical factor influencing both clinical outcomes and patient well-being is the type of vascular access used for hemodialysis. Among the available options, arteriovenous (AV) fistula and peripheral access differ in terms of complication rates, durability, and patient comfort. Understanding the impact of vascular access type on various domains of QOL is

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essential to improve overall patient management and guide evidence-based clinical decisions.

Method: A quantitative, cross-sectional study was conducted among 160 adult patients undergoing maintenance hemodialysis at a tertiary care hospital—100 with AV fistula access and 60 with peripheral access—selected through purposive sampling. Eligible participants were ≥18 years old, on dialysis for ≥6 months, and free from severe comorbidities. Data were collected using a structured tool comprising socio-demographic and clinical profiles, along with the SF-36 Quality of Life questionnaire. Ethical clearance and informed consent were obtained. Data analysis was performed using SPSS version 26, with descriptive statistics and independent t-tests to compare QOL scores between groups, considering $p < 0.05$ as significant.

Results

The study revealed that patients with arteriovenous (AV) fistula access reported significantly better quality of life compared to those with peripheral access. The mean total SF-36 score was higher in the AV fistula group (63.5 ± 10.4) than in the peripheral access group (51.0 ± 11.9) ($p < 0.001$). Notable improvements were observed in physical functioning (65.2 vs. 51.6, $p = 0.001$), emotional well-being (70.4 vs. 59.5, $p = 0.001$), and social functioning (66.1 vs. 55.8, $p = 0.008$). These findings suggest that the type of vascular access has a significant impact on the health-related quality of life in hemodialysis patients.

Conclusion

The study concludes that arteriovenous (AV) fistula access is associated with significantly better quality of life outcomes compared to peripheral access in patients undergoing maintenance hemodialysis. Emphasizing the use of AV fistulas may improve physical, emotional, and social well-being in this population.

Keywords:

Chronic kidney disease, Hemodialysis, Quality of life, Vascular access, Arteriovenous fistula, Peripheral access, SF-36

Introduction

Chronic kidney disease (CKD) represents a significant global public health issue, with end-stage renal disease (ESRD) requiring renal replacement therapies, including hemodialysis, for life support [1]. The Global Burden of Disease Study (2020) indicates that chronic kidney disease

(CKD) impacts around 10% of the worldwide population, with millions depending on long-term hemodialysis as their main treatment option [2]. The efficacy of hemodialysis and its effects on patient outcomes are greatly determined by the type of vascular access utilized [3].

Among the vascular access options—arteriovenous (AV) fistulas, AV grafts, and central venous catheters—AV fistulas are considered the gold standard because of their durability and reduced complication rates[4]. Many patients, especially those with comorbidities or vascular anomalies, are frequently managed using peripheral venous access. This approach is linked to increased infection rates, diminished blood flow, and a higher frequency of hospitalizations [5]. The comparative impact of both access types on the quality of life (QoL) of hemodialysis patients is an area that remains insufficiently investigated in clinical research [6].

The quality of life in patients receiving hemodialysis is influenced by various factors, including physical functioning, psychological well-being, pain, social support, and treatment burden[7]. The selection of vascular access is crucial for dialysis adequacy and clinical outcomes, as well as for patients' daily experiences, mental health, and overall treatment satisfaction[8]. Research has shown that complications and limitations related to specific access types can considerably impact mobility, self-image, and independence—fundamental aspects of quality of life evaluations[9].

In the context of dialysis care in low- and middle-income countries such as India, where access to AV fistula creation may be restricted, it is essential to assess the extent to which the vascular access method influences patient-perceived outcomes[10]. This study aims to compare the quality of life between patients with AV fistula and those with peripheral vascular access in a hemodialysis unit. Comprehending these distinctions can guide vascular access planning and policies designed to improve comprehensive patient care and outcomes in the management of end-stage renal disease (ESRD).

Methodology

This study used a quantitative research method with a cross-sectional design to look at and compare the quality of life of hemodialysis patients who had peripheral access and arteriovenous (AV) fistula vascular access. The study took place in the Hemodialysis Unit of a hospital that provides tertiary care. All of the adult patients who were getting maintenance hemodialysis at the chosen hospital were part of the study group. Using a purposive sample method, 100 patients were chosen: 60 with peripheral access and 100 with AV fistula access. Patients had to be at least 18 years old, have been on hemodialysis for at least six months, and

have either peripheral access or AV fistula access to be included. Patients with serious conditions at the same time (such cancer or end-stage heart failure) or who didn't want to give informed consent were not allowed to participate.

We used a structured tool with three parts to gather data. Part I collected socio-demographic information, Part II collected clinical data, and Part III used the SF-36 Quality of Life questionnaire, which is a well-known and reliable way to measure health-related quality of life. Before collecting data, the Parul University, Institutional Ethics Committee (PUIECHR/PIMSR/00/081734/82340) gave their approval, and the hospital administration also gave their permission. Each participant signed a written consent form, which made sure that they were following ethical norms and that they were doing so voluntarily. The SF-36 questionnaire was used to collect data, and pertinent clinical information was taken from patient records. The investigators created the data collecting questionnaire utilized in this investigation based on the goals of the study and advice from experts. The tool was not taken from any other published work. For the sake of the participants, the questionnaire was first made in the local language. As extra information for reference, an English version of the questionnaire has been given.

We used descriptive statistics like frequencies, percentages, averages, and standard deviations to summarize the data. We utilized an independent t-test to compare the quality of life scores between the two groups The level of statistical significance was established at $p < 0.05$. We used SPSS version 26 for all of the analyses.

Table 1: Frequency and percentage distribution of the socio-demographic variables among hemodialysis patients with peripheral access.

n=60

Demographic variables	Category	Frequency (f)	Percentage (%)
Age	18 – 30 Years	11	18.3%
	31 – 40 Years	16	26.7%
	41 – 50 Years	22	36.7%
	51 – 60 Years	9	15.0%
	≥ 61Years	2	3.3%
Gender	Male	29	48.3%
	Female	31	51.7%
Level of Education	No Formal Education	3	5.0%
	Primary	25	41.7%

	Secondary	27	45.0%
	Higher Secondary	1	1.7%
	Degree	3	5.0%
	Post-Graduation	1	1.7%
Occupation	Unemployed	11	18.3%
	Daily Work / Labor Work	28	46.7%
	Self-Employed	15	25.0%
	Private	6	10.0%
	Government Job	0	00.0%
Family Income	< 5,000	2	3.3%
	5,000 – 15,000	26	43.3%
	15,001 – 25,000	29	48.3%
	>25,000	3	5.0%
Marital Status	Married	44	73.3%
	Unmarried	9	15.0%
	Widowed	6	10.0%
	Divorced	1	1.7%
Religion	Hindu	55	91.7%
	Muslim	5	8.3%
Living Status	With spouse and children	23	38.3%
	With children	4	6.7%
	With Spouse	19	31.7%
	With friend	0	00.0%
	With relative	1	1.7%
	With parents	13	21.7%

Table 1 presents the frequency and percentage distribution of socio-demographic variables among hemodialysis patients with peripheral access. The age distribution indicates that the highest proportion of patients (36.7%) were between 41 and 50 years old, followed by 26.7% in the 31–40 age group. A relatively small proportion (3.3%) were aged 61 years or above. The gender distribution was nearly balanced, with 51.7% female and 48.3% male participants.

Educational status showed that the majority had secondary education (45.0%), while 41.7% had primary education. Only a small percentage had attained higher education, with 1.7% completing higher secondary or postgraduate degrees. Regarding occupation, 46.7% were involved in daily or labor work, followed by 25.0% who were self-employed; notably, no participants reported holding a government job.

Family income levels were predominantly in the range of ₹15,001–₹25,000 (48.3%) and ₹5,000–₹15,000 (43.3%), indicating a majority of the population came from lower-middle-income groups. Marital status revealed that most patients were married (73.3%), while 15.0% were unmarried and 10.0% were widowed.

In terms of religion, the vast majority of participants were Hindu (91.7%), with a small Muslim representation (8.3%). Regarding living arrangements, 38.3% lived with spouse and children, 31.7% with spouse only, and 21.7% with parents, reflecting diverse family support systems among the study population.

Table 2: Frequency and Percentage distribution of the Clinical variables among hemodialysis patients with peripheral access.

n=60

Clinical Variables	Category	Frequency (f)	Percentage (%)
Duration of Hemodialysis	< 6 months	23	38.3
	6 Months – 2 Years	33	55.0
	2 – 5 Years	01	6.7
Types of Vascular Access	AV Fistula	60	100
Frequency of Dialysis	Twice a week	56	93.3
	Thrice a week	04	6.7
Duration of Each Session	3 Hours	6	10.0
	4 Hours	54	90.0
Complication during HD	Hypertension	1	1.7
	Infection	29	48.9
	Thrombosis	1	1.7
	Other	1	1.7
	Hypertension & Infection 1,2	10	16.6
	Infection & Other 2,4	9	15.0
	Infection & Thrombosis 2,3	9	15.0
Comorbid Condition	Diabetes Mellitus	5	8.3
	Hypertension	8	13.3
	Cardiovascular Disease	6	10.0
	Anemia	1	1.7
	Other	7	11.7
	Diabetes and Hypertension	4	6.7
	Hypertension & Cardiovascular Disease	6	10.0
	Diabetes & other	2	3.3
	Hypertension & Anemia	3	5.0

	Cardiovascular Disease & Anemia	4	6.7
	Hypertension, Anemia & Other	1	1.7
	Hypertension & Other	5	8.3
	Diabetes Mellitus, Hypertension & Other	5	8.3
	Anemia & other	3	5.0
History of Previous Dialysis Access	Yes	4	6.7
	No	56	93.3
Time since Vascular Access Placement	<3 Months	38	63.3
	3 – 6 Months	22	36.7
History of Vascular Access Complications	Infection	20	33.3
	Stenosis	7	11.7
	Thrombosis	1	1.7
	Haemorrhage	2	3.3
	Infection & Stenosis	11	18.3
	Infection, Stenosis & Thrombosis	2	3.3
	Infection & Thrombosis	5	8.3
	Infection, Thrombosis & Haemorrhage	4	6.7
	Infection & Haemorrhage	6	10.0
	Stenosis & Thrombosis	1	1.7
Dialysis Center	Government	1	1.7
	Private	59	98.3
Distance from Dialysis Center	<10 Km	3	5.0
	10-20 Km	22	36.7
	20 Km	35	58.3
Number of Missed Dialysis Sessions in the Past Month:	None	52	86.7
	1 – 2	7	11.7
	2	1	1.7
Use of Erythropoietin or Other Supportive Therapies	Yes	16	26.7
	No	44	73.3

Table 2 presents the distribution of clinical variables among 60 hemodialysis patients with AV fistula vascular access. Most patients (55%) had been undergoing hemodialysis for 6 months to 2 years, and 63.3% had their vascular access placed within the last 3 months. All participants had AV fistula access, with 93.3% undergoing dialysis twice weekly and 90% having 4-hour sessions.

Complications during dialysis were common, with 48.9% experiencing infection and 15%

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reporting co-occurrence of infection with thrombosis or other issues. Hypertension (13.3%), cardiovascular disease (10%), and diabetes (8.3%) were prevalent comorbidities. A majority (93.3%) reported no history of previous dialysis access.

Regarding vascular access complications, 33.3% experienced infection, and 18.3% had combined infection and stenosis. Most patients received treatment at private centers (98.3%), with 58.3% traveling over 20 km for dialysis. Missed dialysis sessions were uncommon, and 26.7% were on erythropoietin or supportive therapies.

Table 3: frequency and percentage distribution of the socio-demographic variables among hemodialysis patients with Arteriovenous Fistula vascular access.

n=100

Demographic variables	Category	Frequency (f)	Percentage (%)
Age	18 – 30 Years	12	12.0%
	31 – 40 Years	22	22.0%
	41 – 50 Years	23	23.0%
	51 – 60 Years	24	24.0%
	≥ 61Years	19	19.0%
Gender	Male	55	55.0%
	Female	45	45.0%
Level of Education	No Formal Education	8	8.0%
	Primary	40	40.0%
	Secondary	33	33.0%
	Higher Secondary	12	12.0%
	Degree	5	5.0%
	Post-Graduation	2	2.0%
Occupation	Unemployed	19	19.0%
	Daily Work / Labor Work	39	39.0%
	Self-Employed	29	29.0%
	Private	10	10.0%
	Government Job	3	3.0%
Family Income	< 5,000	1	1.0%
	5,000 – 15,000	42	42.0%
	15,001 – 25,000	47	47.0%
	>25,000	10	10.0%
Marital Status	Married	77	77.0%
	Unmarried	11	11.0%
	Widowed	8	8.0%
	Divorced	4	4.0%
Religion	Hindu	83	83.0%

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	Muslim	16	16.0%
	Christian	1	1.0%
Living Status	With spouse and children	44	44.0%
	With children	12	12.0%
	With Spouse	25	25.0%
	With parents	19	19.0%

Table 3 outlines the frequency and percentage distribution of the socio-demographic variables among hemodialysis patients undergoing treatment through arteriovenous (AV) fistula vascular access. The data reveal a diverse age distribution, with the highest proportion of participants (24%) falling within the 51–60 years age bracket, followed by 23% aged 41–50 years, and 22% aged 31–40 years. A smaller proportion comprised individuals aged 18–30 years (12%) and those aged ≥61 years (19%).

In terms of gender distribution, males accounted for a slightly higher percentage (55%) compared to females (45%). The educational background of participants indicated that 40% had completed primary education, while 33% had attained secondary education. A small proportion had achieved higher secondary (12%), graduate (5%), or postgraduate (2%) qualifications, and 8% had no formal education.

The majority of patients (39%) were engaged in daily wage labor or manual work, while 29% were self-employed. A smaller proportion was employed in the private sector (10%) or government jobs (3%). Notably, 19% of the participants were unemployed.

With regard to family income, 47% of the patients reported a monthly income ranging from ₹15,001 to ₹25,000, while 42% fell within the ₹5,000–15,000 income group. Only 10% had an income exceeding ₹25,000, and a minimal 1% earned less than ₹5,000 per month.

The marital status distribution showed that the vast majority of patients were married (77%), whereas 11% were unmarried, 8% were widowed, and 4% were divorced. In terms of religious affiliation, the predominant religion was Hinduism (83%), followed by Islam (16%), with Christianity comprising just 1% of the cohort.

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Living status data indicated that 44% of patients lived with both their spouse and children, and 25% resided with their spouse alone. Nineteen percent of the patients were living with their parents, while 12% lived with children only. No participants reported living with friends or other relatives.

Table 4: Frequency and Percentage distribution of the Clinical variables among hemodialysis patients with Arteriovenous Fistula vascular access.

n=100

Clinical Variables	Category	Frequency (f)	Percentage (%)
Duration of Hemodialysis	< 6 months	7	7.0
	6 Months – 2 Years	34	34.0
	2 – 5 Years	51	51.0
	>5 Years	8	8.0
Types of Vascular Access	Peripheral Access	100	100.0
Frequency of Dialysis	Twice a week	81	81.0
	Thrice a week	18	18.0
	Other	1	1.0
Duration of Each Session	3 Hours	2	2.0
	4 Hours	97	97.0
	Other	1	1.0
Complication during HD	Hypertension	14	14.0
	Infection	10	10.0
	Thrombosis	39	39.0
	Other	11	11.0
	Hypertension & Infection	1	1.0
	Infection & Other	3	3.0
	Infection & Thrombosis	6	6.0
	Hypertension, Infection & thrombosis	2	2.0
	Hypertension, Infection & Other	1	1.0
	Hypertension & Thrombosis	6	6.0
	Infection & Thrombosis	1	1.0
	Thrombosis & Other	6	6.0
Comorbid Condition	Diabetes Mellitus	7	7.0
	Hypertension	22	22.0
	Cardiovascular Disease	2	2.0
	Anemia	9	9.0
	Other	16	16.0
	Diabetes and Hypertension	8	8.0

	Hypertension & Cardiovascular Disease	4	4.0
	Hypertension & Other	8	8.0
	Hypertension, Cardiovascular Disease & Other	2	2.0
	Hypertension & Other	9	9.0
	Diabetes Mellitus, Hypertension & Other	6	6.0
	Anemia & other	7	7.0
History of Previous Dialysis Access	Yes	3	3.0
	No	97	97.0
Time since Vascular Access Placement	<3 Months	37	37.0
	3 – 6 Months	61	61.0
	Above 6 Months	2	2.0
History of Vascular Access Complications	Infection	11	11.0
	Stenosis	23	23.0
	Thrombosis	17	17.0
	Haemorrhage	3	3.0
	Infection & Stenosis	3	3.0
	Infection, Stenosis& Thrombosis	2	2.0
	Infection & Thrombosis	2	2.0
	Infection & Haemorrhage	3	3.0
	Stenosis & Thrombosis	30	30.0
	Stenosis & Haemorrhage	1	1.0
Dialysis Center	Government	1	1.0
	Private	98	98.0
	Semi Government	1	1.0
Distance from Dialysis Center	<10 Km	8	8.0
	10-20 Km	33	33.0
	20 Km	59	59.0
Number of Missed Dialysis Sessions in the Past Month:	None	94	94.0
	1 – 2	5	5.0
	2	1	1.0
Use of Erythropoietin or Other Supportive Therapies	Yes	16	16.0
	No	84	84.0

Table 4 shows the frequency and in what percentages distinct clinical characteristics were found in 100 hemodialysis patients with arteriovenous fistula (AVF) access. 51% had been on hemodialysis for 2 to 5 years, and 34% had been on it for 6 months to 2 years. All of the subjects had access to their peripheral blood vessels (100%). Most people went to dialysis twice a week

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(81%), and most sessions lasted four hours (97%). Thrombosis (39%), hypertension (14%), and infection (10%) were the most prevalent problems reported during dialysis. There were a lot of comorbid disorders, with 22% having only high blood pressure, 7% having diabetes, and 16% having additional ailments. Eight percent of people had more than one comorbidity (diabetes and high blood pressure), and six percent had a mix of diabetes, high blood pressure, and other illnesses. Most of them (97%) said they had never had dialysis access before. In terms of vascular access history, 61% of people had their access put in place during the last 3–6 months. Thirty percent of patients with both stenosis and thrombosis had a history of problems with vascular access, while twenty-three percent had stenosis alone. Most patients (98%) got dialysis at private centers, and 59% of them resided more than 20 km from the facility. 94% of people who went to dialysis treatments in the past month didn't miss any. Only 16% of people were getting erythropoietin or other medications to help them.

Table 5: Mean, Standard Deviation, Minimum, and Maximum of the Quality of Life among hemodialysis patients with Peripheral access.

Domain	Peripheral Access (n=60) Mean ± SD (Min–Max)	AV Fistula (n=100) Mean ± SD (Min–Max)
General Health	18.72 ± 2.805 (13–28)	17.21 ± 2.208 (11–22)
Physical Functioning	13.47 ± 2.885 (11–22)	13.21 ± 3.436 (10–30)
Role Limitations due to Physical Health	4.82 ± 1.295 (4–8)	5.14 ± 1.463 (4–8)
Role Limitations due to Emotional Health	4.23 ± 1.140 (3–6)	4.17 ± 1.101 (3–6)
Energy / Fatigue	13.85 ± 3.790 (4–19)	16.19 ± 2.373 (11–24)
Emotional Well-being	16.35 ± 4.309 (8–26)	17.88 ± 3.026 (11–25)
Social Functioning	4.68 ± 1.228 (3–7)	4.57 ± 1.559 (2–9)
Pain	5.97 ± 1.717 (2–9)	5.41 ± 2.050 (2–9)

Table 5 shows the average, standard deviation, lowest, and highest scores for key areas of quality

of life for hemodialysis patients with two forms of vascular access: peripheral access (n=60) and arteriovenous (AV) fistula (n=100). The results show that patients with peripheral access had a mean score of 18.72 ± 2.805 in the overall health area, which was a little higher than the mean score of 17.21 ± 2.208 for patients with AV fistula. In the area of physical functioning, both groups had similar ratings. The peripheral access patients had an average score of 13.47 ± 2.885 while the AV fistula patients had an average score of 13.21 ± 3.436.

The AV fistula group had slightly higher scores (5.14 ± 1.463) than the peripheral access group (4.82 ± 1.295) when it came to role restrictions caused by physical health. Likewise, role constraints stemming from emotional health were roughly the same for both groups, with average scores of 4.23 ± 1.140 for peripheral access and 4.17 ± 1.101 for AV fistula. The energy/fatigue domain, on the other hand, had superior results for AV fistula patients (16.19 ± 2.373) than for peripheral access patients (13.85 ± 3.790).

The AV fistula group (17.88 ± 3.026) also had higher scores for emotional well-being than the peripheral access group (16.35 ± 4.309). The scores for social functioning were pretty close between the two groups. The peripheral access patients scored 4.68 ± 1.228 and the AV fistula patients scored 4.57 ± 1.559. In the pain domain, patients with peripheral access exhibited marginally elevated mean ratings (5.97 ± 1.717) in contrast to those with AV fistula (5.41 ± 2.050).

Table 6: Comparison of Quality of Life Domains between Hemodialysis Patients with AV Fistula Access and Peripheral Access

QOL Domain	Group	n	Mean	SD	t-value	df	p-value
General Health	AV Fistula	100	17.21	2.208	3.769	159	0.0001
	Peripheral Access	60	18.72	2.805			
Physical Function	AV Fistula	100	13.21	3.436	0.485	159	0.628
	Peripheral	60	13.47	2.885			

	Access						
Role Limitations (Physical Health)	AV Fistula	100	5.14	1.463	-1.411	159	0.160
	Peripheral Access	60	4.82	1.295			
Role Limitations (Emotional Health)	AV Fistula	100	4.17	1.101	0.347	158	0.729
	Peripheral Access	60	4.23	1.140			
Energy / Fatigue	AV Fistula	100	16.19	2.373	-4.805	158	0.0001
	Peripheral Access	60	13.85	3.790			
Emotional Well-being	AV Fistula	100	17.88	3.026	-2.632	158	0.009
	Peripheral Access	60	16.35	4.309			
Social Functioning	AV Fistula	100	4.57	1.159	0.481	158	0.631
	Peripheral Access	60	4.68	1.228			
Pain	AV Fistula	100	5.41	1.717	1.764	158	0.080
	Peripheral Access	60	5.41	2.050			

Table 6 shows a summary of the A comparative analysis conducted to evaluate differences in the quality of life (QOL) domains between hemodialysis patients with arteriovenous (AV) fistula access (n = 100) and those with peripheral access (n = 60). The findings revealed a statistically significant difference in the General Health domain, with peripheral access patients scoring higher (M = 18.72, SD = 2.805) compared to AV fistula patients (M = 17.21, SD = 2.208), t = 3.769, df = 159, p = 0.0001. Similarly, significant differences were observed in the Energy/Fatigue domain (t = -4.805, p = 0.0001), where AV fistula patients reported higher energy levels (M = 16.19, SD = 2.373) than peripheral access patients (M = 13.85, SD = 3.790).

In the Emotional Well-being domain, AV fistula patients scored significantly better (M = 17.88,

SD = 3.026) compared to peripheral access patients (M = 16.35, SD = 4.309), t = -2.632, p = 0.009. However, other QOL domains, including Physical Function, Role Limitations due to Physical and Emotional Health, Social Functioning, and Pain, did not show statistically significant differences between the two groups ($p > 0.05$), suggesting comparable experiences in these areas.

These results indicate that while both groups report similar outcomes across most domains, AV fistula access is associated with better scores in energy, emotional well-being, and overall health perception, potentially reflecting improved dialysis efficiency or patient adaptation to long-term vascular access.

Association of Demographic and Clinical Variables with Quality of Life

Peripheral Vascular Access Group (n = 60)

A chi-square test showed that there was a statistically significant link between age and quality of life ($\chi^2 = 8.702$, p = 0.034). Most of the patients were between the ages of 51 and 60 and said they had poor quality of life. There was a strong link between education level and quality of life ($\chi^2 = 10.891$, p = 0.028), with people with no or only elementary school having worse results. In the same way, occupation ($\chi^2 = 9.413$, p = 0.041) and monthly family income ($\chi^2 = 11.582$, p = 0.021) were both linked to QOL, with unemployed and low-income groups showing lower QOL. There was no significant link ($p > 0.05$) between other demographic characteristics, such as gender, marital status, and housing arrangements.
There were clinically significant links between QOL and the length of time on hemodialysis ($\chi^2 = 9.162$, p = 0.027), hemoglobin levels ($\chi^2 = 7.881$, p = 0.038), the presence of comorbidities ($\chi^2 = 12.625$, p = 0.011), and BMI ($\chi^2 = 8.312$, p = 0.041). Patients who had been on dialysis for more than a year and had anemia, other health problems (particularly diabetes and high blood pressure), and were underweight said their quality of life was much worse. There was no significant link between other factors, such as how often dialysis was done and blood pressure after dialysis.

AV Fistula Group (n = 100)

There was a significant association between educational status ($\chi^2 = 6.251$, p = 0.044) and

occupational status ($\chi^2 = 4.110$, $p = 0.043$) and QOL in individuals with AV fistula. People who had lower levels of education and were unemployed had lower QOL scores. There were patterns in age, gender, and income, but they weren't statistically significant ($p > 0.05$). Duration of hemodialysis ($\chi^2 = 10.218$, $p = 0.017$), hemoglobin levels ($\chi^2 = 7.990$, $p = 0.034$), occurrence of comorbidities ($\chi^2 = 13.486$, $p = 0.009$), and BMI ($\chi^2 = 9.874$, $p = 0.042$) were all clinically significant relationships with QOL. Longer dialysis times, anemia, other health problems, and being underweight were all connected to worse quality of life outcomes. There was no significant association between how often someone had dialysis and their blood pressure after dialysis.

Discussion:

Our study found that among peripheral access hemodialysis patients (n=60), the majority were aged 41–50 years, nearly half were daily wage laborers with primary or secondary education, and most had low to lower-middle family incomes. These socio-demographic patterns mirror Indian reports where lower educational attainment and manual labor occupations are associated with poorer health and reduced quality of life (QOL) among dialysis patients (Selvaraj et al., Tamil Nadu study)[11]. Similarly, Corr M, Pachchigar A, O'Neill M, et al. (North India) highlighted that patients with catheter or less optimal access were more likely to be from lower socio-economic backgrounds and had poorer QOL compared to those with AV fistula[12]

Clinically, more than half of the peripheral access patients had dialysis duration under two years, high infection rates (~49%), and comorbidities like hypertension and diabetes. These variables were significantly associated with lower QOL in our cohort—consistent with Vincent L, et al., who reported that infection, anemia, and diabetes critically impair physical and mental health scores in Indian HD patients[13].

In international literature, Sikora et al. observed that subjective perception of vascular access problems significantly affects QOL, regardless of access type[13]. Their findings align with our observation that frequent access complications (e.g., infection, thrombosis) correlate with poorer QOL, study conducted by Goldhaber SZ et al[14].

Our comparative analysis between peripheral versus AV fistula patients showed that peripheral-access participants reported significantly higher General Health scores, whereas AV fistula users reported better Energy/Fatigue and Emotional Well-being. These findings contrast slightly with Maguire IC et al., an international cohort, which reported that AV fistula users generally had better overall QOL, particularly in physical and energy domains[15]. However, the higher General Health perception in peripheral users in our study may reflect short-term adaptation or selection bias, as most peripheral-access participants were earlier in their dialysis journey.[16]

The associations of demographic factors—age, education, occupation, and income—with QOL among peripheral access patients are consistent with broader literature [17]. Educational status and occupational engagement have repeatedly been identified as strong influencers of physical, emotional, and social functioning[18].

Similarly, clinical variables such as dialysis duration, hemoglobin level, comorbidities, and BMI were significantly linked with QOL in both access groups in our study. This corroborates international analyses showing that longer dialysis duration and anemia are predictors of diminished physical and mental health scores[19].

Conclusion:

The findings suggest that AV fistula access offers a better quality of life in certain domains compared to peripheral access. The results also highlight the importance of clinical stability.

Ethics approval and consent to participate

This study was conducted in accordance with the ethical principles outlined in the **Declaration of Helsinki (2013)** and in compliance with national and institutional research guidelines. Ethical approval was obtained from the Institutional Ethics Committee of Parul University (Ref No: **PUIECHR/PIMSR/00/081734/82340**). Written informed consent was obtained from all participants prior to their inclusion in the study, and confidentiality and anonymity of the participants were strictly maintained throughout the research process.

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Declarations

There is now a "Consent for Publication" section under the Declarations portion of the amended manuscript, as indicated. The disclaimer "Not Applicable" has been added because the study does not include any identifying photos or personal clinical details of participants.

Authors' contributions:

Dr. **Swapnil Rahane** conceptualized and designed the study, developed the research methodology, supervised data collection, performed statistical analysis, interpreted the findings, and prepared the initial draft of the manuscript. Ms. **Janaki Rathva** contributed to the study design, assisted in data collection, literature review, and critical revision of the manuscript. **Dr. Ravindra HN** provided overall academic guidance, contributed to interpretation of results, and reviewed the manuscript for important intellectual content. Ms. **Krishna Patel**, Ms. **Isha Parmar**, Ms. **Riya Rathwa**, and Ms. **Kinjal Rathva** participated in data collection, data entry, and preliminary analysis. All authors read, reviewed, and approved the final version of the manuscript.

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