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Patient-Centered Insights on Vascular Access and Quality of Life in Hemodialysis Care

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Abstract

Quality of life (QoL) has become a crucial, non-medical factor for assessing patient care. In hemodialysis treatment, maintaining functional vascular access is essential, as its performance affects not only therapeutic success but also the patient's overall wellbeing. This underscores the importance of optimizing vascular access care. The present research aimed to determine how patients' perceptions of their vascular access relate to their quality of life. The study involved 202 hemodialysis patients with functioning vascular access. QoL was evaluated using the Kidney Disease Quality of Life Instrument (KDQOL™), while patients' perspectives on their access were measured with the Vascular Access Questionnaire (VAQ). The analysis demonstrated that vascular access has a measurable effect on patients' wellbeing. Both the type of access and the individual's subjective assessment of it significantly influenced their reported quality of life. Perception of vascular access emerged as a key determinant of life quality in patients receiving hemodialysis. Higher levels of access-related complications corresponded with lower reported wellbeing.

Keywords: Life quality, Dialysis, Arteriovenous fistula, Central venous catheter, Patient functioning

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Introduction

Patient feedback is now widely acknowledged as a valuable indicator for evaluating healthcare outcomes. Among those undergoing hemodialysis, the role of vascular access (VA) in maintaining treatment continuity and influencing health-related quality of life (HRQOL) is well recognized. Despite the inclusion of some VA-related aspects in standard QoL instruments like KDQOL™, its true impact on HRQOL remains underexplored, justifying further investigation [1–4].

Standardized evaluation tools—such as patient-reported outcome measures (PROMs) and patient-reported experience measures (PREMs)—have been developed to better understand how vascular access affects patients' health perceptions and daily functioning [3].

Given the technical and physiological demands of hemodialysis, VA plays a major role in shaping patients' daily experiences. The type of vascular access used is among the few modifiable factors affecting HRQOL. While previous studies have linked VA type to differences in life satisfaction, findings have not been fully consistent. In addition to the access type, pain, swelling, bleeding, bruising, thrombosis, and infection contribute to reduced

wellbeing. Likewise, satisfaction with the access site and the patient's social functioning are integral to perceived QoL [5–7].

Considering these elements, this research sought to explore the relationship between how patients perceive their vascular access and their overall quality of life while undergoing dialysis.

Materials and Methods

The investigation was carried out between January 2021 and December 2022. Participants included 120 individuals receiving dialysis at a renal therapy facility in Lublin, Poland, and 112 participants from online patient communities, for a total of 232 subjects. After data screening, 202 responses were included in the final statistical analysis.

Eligibility requirements included: voluntary participation with informed consent, age 18 years or older, confirmed chronic kidney disease treated through hemodialysis, and the presence of functioning vascular access. Ethical approval was granted by the Bioethics Committee of the Medical University of Lublin (Resolution No. KE-0254/178/2021, dated 24 June 2021).

Data were obtained through multiple collection methods, including in-person questionnaires, online surveys, group-administered forms, and individual interviews. The instruments gathered demographic details such as age, gender, and type of vascular access.

The Vascular Access Questionnaire (VAQ) assessed both physical and perceived issues with vascular access. It includes 17 items representing potential access problems, each rated from 1 (no issue during the past four weeks) to 5 (extremely problematic). The cumulative score reflects the extent of vascular access difficulties [8, 9].

Quality of life was measured using the Kidney Disease Quality of Life Instrument—Short Form (KDQOL-SF), a standardized questionnaire specifically designed for renal patients. The instrument comprises 24 questions, organized into categories covering overall health perception, disease impact, and satisfaction with care. The first section incorporates the SF-36 health survey (36 items across 11 domains), while the second focuses on kidney disease–specific concerns and treatment satisfaction [10, 11].

All analyses were performed using R software (version 4.2.2) within the RStudio environment (version 2022.12.0), adopting a significance threshold of $\alpha < 0.05$. Descriptive statistics such as means, standard deviations, medians, skewness, and kurtosis were calculated for continuous variables including VAQ scores, KDQOL-SF scores, dialysis duration, and age. Categorical variables were described through frequency counts and percentages. To evaluate associations between vascular access characteristics and quality of life, Kruskal–Wallis tests were used. Correlations between access issues and QoL domains were verified with Pearson's r and Gamma coefficients.

Results

The analysis comprised 202 individuals receiving hemodialysis, of whom 105 (51.98%) were female and 97 (48.02%) were male. The average age of the participants was 52.78 years (SD = 16.52), with a median of 51 years. The youngest was 21 years old, and the oldest was 92 years old.

The mean duration of dialysis treatment was 5.87 years (SD = 8.75), while the median stood at 2.67 years. The treatment duration extended from less than one month to over 53 years. A summary of age and dialysis duration is provided in **Table 1**.

Table 1. Age and dialysis duration (years)

Characteristic	n	Mean	Standard Deviation	Median	Minimum	Maximum	Skewness	Kurtosis
Age of patients	202	52.78	16.52	51	21	92	0.096	−0.975
Duration of hemodialysis (years)	193	5.87	8.75	2.67	0.08	53.81	2.853	9.203

n—sample size; M—mean; Me—median; SD—standard deviation; Skew—skewness; Kurt—kurtosis.

A large proportion of participants had an arteriovenous fistula (AVF) made from native vessels, while a tunneled central venous catheter (CVC) was also frequently observed. The breakdown of vascular access types is shown in **Table 2**.

Table 2. Categories of vascular access

Vascular Access Type	n	Percentage (%)
Arteriovenous Fistula (AVF)	134	66.34
Tunneled Central Venous Catheter (CVC)	58	28.71
Non-Tunneled Central Venous Catheter (CVC)	5	2.48
Arteriovenous Graft (AVG)	5	2.48

n—sample size; %—percentage.

Vascular access–related issues were measured using the VAQ questionnaire. The average VAQ score for the sample was 13.79 (SD = 11.22), with a median of 11. The scores ranged from 0 to 62, encompassing cases with no difficulties up to those with substantial complications. Statistical testing indicated a significant deviation from the normal distribution, with an overall moderately low level of problems. These findings are summarized in **Table 3**.

Table 3. Intensity of vascular access complications

Characteristic	n	Mean	Standard Deviation	Median	Minimum	Maximum	Skewness	Kurtosis
Severity of issues with vascular access	202	13.79	11.22	11	0	62	1.289	1.755

n—sample size; M—mean; Me—median; SD—standard deviation; Skew—skewness; Kurt—kurtosis.

Patients' quality of life was evaluated via the KDQOL-SF questionnaire, and its association with vascular access difficulties was analyzed. In this instrument, higher scores denote better well-being within each measured domain. The names of certain scales were slightly revised to enhance clarity. **Table 4** outlines the overall quality of life results obtained from the first segment of the KDQOL-SF.

Table 4. General quality of life of participants

Quality of Life Domain	n	Mean	Standard Deviation	Median	Minimum	Maximum	Skewness	Kurtosis
Physical health functioning	202	53.04	29.25	55.00	0	100	−0.312	−1.098
Role performance unaffected by physical health	202	32.05	39.70	0.00	0	100	0.788	−1.035
Pain-free status	202	61.74	28.44	59.50	0	100	−0.279	−0.948
Overall health perception	202	38.32	19.64	40.00	0	97	0.286	−0.215
Energy and vitality	202	45.83	20.66	48.33	0	90	−0.113	−0.350
Social functioning	202	55.63	27.15	50.00	0	100	−0.236	−0.701
Role performance unaffected by emotional health	202	49.34	45.62	33.33	0	100	0.035	−1.831
Mental well-being	202	54.21	20.90	53.50	0	100	−0.239	−0.285

n—sample size; M—mean; Me—median; SD—standard deviation; Skew—skewness; Kurt—kurtosis.

The data distributions diverged considerably from normality, particularly within the domains concerning role limitations due to emotional or physical conditions and physical performance. The second segment of the KDQOL-SF, focusing on kidney disease–specific aspects, is presented in **Table 5**.

Table 5. Quality of life on kidney disease–specific dimensions

Scale	n	Mean	Standard Deviation	Median	Minimum	Maximum	Skewness	Kurtosis
Symptoms and problems	202	69.88	17.34	70.83	6.25	100	−0.612	0.076
Impact of kidney disease	202	49.92	24.42	50.00	0.00	100	−0.123	−0.990
Burden of kidney disease	202	33.26	25.22	25.00	0.00	100	0.558	−0.563
Employment status	202	31.68	40.96	0.00	0.00	100	0.758	−1.097
Cognitive functioning	202	63.96	24.52	66.67	0.00	100	−0.545	−0.206
Social interaction quality	202	60.74	22.20	60.00	0.00	100	−0.475	−0.063
Sleep quality	202	49.20	20.31	50.00	5.00	100	0.079	−0.591
Social support level	202	66.50	24.60	66.66	0.00	100	−0.592	−0.258
Encouragement from dialysis staff	202	74.07	24.37	75.00	0.00	100	−0.822	0.201
Satisfaction with care	202	60.23	23.15	66.67	0.00	100	−0.368	−0.050

n—sample size; M—mean; Me—median; SD—standard deviation; Skew—skewness; Kurt—kurtosis.

Distributions across these scales also differed significantly from normal, most notably within the work status category. **Table 6** summarizes the association between patients' overall quality of life and the type of vascular access used during hemodialysis.

Table 6. Link between total quality of life and vascular access category

Quality of Life Domain	Vascular Access Type	n	Mean	Standard Deviation	Median	Mean Rank	Kruskal–Wallis H Test H	df	p	η^2

Physical Health Functioning	Non-Tunneled Central Venous Catheter	5	26.00	27.70	25.00	50.50	6.335	3	0.096	0.017
	Tunneled Central Venous Catheter	58	48.79	28.83	50.00	93.22				
	Arteriovenous Graft	5	60.00	36.23	60.00	118.50				
	Arteriovenous Fistula	134	55.63	28.81	60.00	106.35				
Role Performance Unimpaired by Physical Health	Non-Tunneled Central Venous Catheter	5	20.00	44.72	0.00	78.20	3.586	3	0.310	0.003
	Tunneled Central Venous Catheter	58	25.00	35.36	0.00	92.87				
	Arteriovenous Graft	5	45.00	51.23	25.00	117.70				
	Arteriovenous Fistula	134	35.07	40.80	25.00	105.50				
Pain-Free Status	Non-Tunneled Central Venous Catheter	5	26.10	17.27	24.50	31.40	8.803	3	0.032	0.029
	Tunneled Central Venous Catheter	58	59.01	28.23	58.25	96.95				
	Arteriovenous Graft	5	58.40	23.57	47.00	90.00				
	Arteriovenous Fistula	134	64.38	28.23	69.00	106.51				
Overall Health Perception	Non-Tunneled Central Venous Catheter	5	37.40	15.61	35.00	97.40	9.687	3	0.021	0.034
	Tunneled Central Venous Catheter	58	32.61	17.07	35.00	84.53				
	Arteriovenous Graft	5	28.80	24.85	22.00	67.20				
	Arteriovenous Fistula	134	41.18	20.15	42.00	110.28				
Energy and Vitality	Non-Tunneled Central Venous Catheter	5	40.00	16.96	40.00	84.10	12.216	3	0.007	0.046
	Tunneled Central Venous Catheter	58	38.25	20.22	40.00	79.91				
	Arteriovenous Graft	5	49.00	13.87	50.00	110.80				
	Arteriovenous Fistula	134	49.22	20.43	50.00	111.15				
Social Functioning	Non-Tunneled Central Venous Catheter	5	52.50	34.69	50.00	95.90	8.611	3	0.035	0.028
	Tunneled Central Venous Catheter	58	46.12	29.91	50.00	82.98				
	Arteriovenous Graft	5	62.50	31.87	62.50	113.80				
	Arteriovenous Fistula	134	59.61	24.62	62.50	109.26				
Role Performance Unimpaired by Emotional Health	Non-Tunneled Central Venous Catheter	5	26.67	43.46	33.33	76.00	3.188	3	0.364	0.001
	Tunneled Central Venous Catheter	58	45.40	45.33	33.33	97.23				
	Arteriovenous Graft	5	26.67	43.46	66.67	76.00				
	Arteriovenous Fistula	134	52.74	45.76	66.67	105.25				
Mental Well-Being	Non-Tunneled Central Venous Catheter	5	52.00	20.59	52.00	95.90	7.020	3	0.071	0.020
	Tunneled Central Venous Catheter	58	47.64	20.61	52.00	84.69				
	Arteriovenous Graft	5	55.20	22.16	56.00	104.20				

	Arteriovenous Fistula	134	57.10	20.57	56.00	108.88

n—sample size; M—mean; SD—standard deviation; Me—median; Mr—mean rank; H—Kruskal–Wallis H statistic; df—degrees of freedom; p—probability value; η^2—effect size (eta squared).

Analysis outcomes pointed to modest yet statistically reliable links between vascular access categories and pain absence. These results reflect empirical measurements only, without any subjective interpretation. The largest proportion of patients without pain were those using an arteriovenous fistula, while the lowest number appeared among individuals with a non-tunneled central venous catheter. Patients fitted with tunneled catheters or arteriovenous grafts reported intermediate results regarding pain experience.

A similar relationship was observed for general health. Autologous arteriovenous fistula users reported the most favorable general health, whereas those dependent on a non-tunneled or tunneled catheter, or a vascular prosthesis, scored lowest in this aspect. The difference reached statistical significance, though its magnitude was small.

When vitality was analyzed, the greatest scores were again recorded in the arteriovenous fistula group, followed by participants with a vascular graft. Lower vitality appeared in those using a non-tunneled catheter, while the lowest vitality values were found among tunneled catheter users. These results arose from objective testing procedures, independent of personal assessments.

With respect to social functioning, individuals with a vascular graft demonstrated the highest functioning, next came those with an arteriovenous fistula, followed by non-tunneled catheter users, while tunneled catheter users scored the lowest. The Kruskal–Wallis test indicated that the observed differences were statistically confirmed, albeit slight.

Table 7 displays how respondents' life quality and kidney-related complications vary according to vascular access type.

Table 7. Relationship between quality of life, renal problems, and vascular access category

Category	Access Type	n	Mean (M)	SD	Median (Me)	Mean Rank (Mr)	Kruskal–Wallis H Test H	df	p	η^2
Symptoms / Complications	Non-tunneled CVC	5	60.83	16.50	56.25	67.50	2.418	3	0.490	0.003
	Tunneled CVC	58	69.03	18.39	70.83	98.69				
	Arteriovenous Graft	5	66.67	17.74	66.67	88.60				
	Arteriovenous Fistula	134	70.71	16.95	72.92	104.47				
Impact of Renal Disorder	Non-tunneled CVC	5	46.25	21.23	57.14	91.30	10.268	3	0.016	0.037
	Tunneled CVC	58	41.29	24.10	40.62	81.71				
	Arteriovenous Graft	5	47.86	20.22	40.62	93.40				
	Arteriovenous Fistula	134	53.86	24.04	56.25	110.75				
Renal Disease Burden	Non-tunneled CVC	5	32.50	24.37	25.00	103.60	9.177	3	0.027	0.031
	Tunneled CVC	58	25.43	23.50	18.75	82.67				
	Arteriovenous Graft	5	30.00	33.48	18.75	89.20				
	Arteriovenous Fistula	134	36.80	25.17	31.25	110.03				
Employment Activity	Non-tunneled CVC	5	20.00	27.39	0.00	91.10	0.833	3	0.841	0.011
	Tunneled CVC	58	31.90	40.50	0.00	102.24				
	Arteriovenous Graft	5	20.00	44.72	0.00	83.70				
	Arteriovenous Fistula	134	32.46	41.70	0.00	102.23				
Cognitive Abilities	Non-tunneled CVC	5	56.00	28.52	73.33	86.90	1.622	3	0.655	0.007
	Tunneled CVC	58	60.23	27.53	63.33	95.32				
	Arteriovenous Graft	5	60.00	27.08	60.00	91.60				
	Arteriovenous Fistula	134	66.02	22.89	66.67	105.09				
Social Relations Quality	Non-tunneled CVC	5	65.33	15.92	73.33	114.70	5.552	3	0.136	0.013

	Tunneled CVC	58	54.60	24.83	60.00	87.43				
	Arteriovenous Graft	5	53.33	23.57	60.00	85.40				
	Arteriovenous Fistula	134	63.51	20.72	66.67	107.70				
Sleep Quality	Non-tunneled CVC	5	46.00	15.37	37.50	91.30	4.574	3	0.206	0.008
	Tunneled CVC	58	44.76	21.61	40.00	88.38				
	Arteriovenous Graft	5	55.50	26.60	65.00	115.60				
	Arteriovenous Fistula	134	51.00	19.53	51.25	107.03				
Support from Others	Non-tunneled CVC	5	73.33	9.13	66.66	110.20	4.273	3	0.233	0.006
	Tunneled CVC	58	63.22	25.89	66.66	96.81				
	Arteriovenous Graft	5	49.99	20.41	49.99	54.90				
	Arteriovenous Fistula	134	68.28	24.34	66.66	104.94				
Encouragement from Dialysis Staff	Non-tunneled CVC	5	57.50	32.60	50.00	68.60	4.921	3	0.178	0.010
	Tunneled CVC	58	73.71	24.30	75.00	100.21				
	Arteriovenous Graft	5	60.00	13.69	50.00	59.10				
	Arteriovenous Fistula	134	75.37	24.23	75.00	104.87				
Satisfaction with Care	Non-tunneled CVC	5	50.00	0.00	50.00	65.00	4.608	3	0.203	0.008
	Tunneled CVC	58	62.64	23.84	66.67	106.78				
	Arteriovenous Graft	5	50.00	0.00	50.00	65.00				
	Arteriovenous Fistula	134	59.95	23.58	66.67	101.94				

n—sample size; M—mean; SD—standard deviation; Me—median; Mr—mean rank; H—Kruskal–Wallis H statistic; df—degrees of freedom; p—significance level; η^2—eta-squared effect size.

Further analysis explored how the type of vascular access influences quality of life among hemodialysis patients. Results demonstrated that those with an arteriovenous fistula reported the highest scores for disease effects, followed sequentially by vascular prosthesis, non-tunneled catheter, and tunneled catheter users, who had the lowest scores. The Kruskal–Wallis results verified these differences as statistically significant but minimal.

In terms of disease burden, the type of vascular access again showed an impact. Autologous fistula users achieved the best results, succeeded by non-tunneled catheter users, then vascular graft recipients, and finally tunneled catheter patients. The Kruskal–Wallis test confirmed statistical significance with low effect strength. **Table 8** outlines the relationship between vascular access problem severity and overall life quality.

Table 8. Degree of vascular access issues versus overall quality of life

Quality of Life Domain	Correlation with Severity of Vascular Access Problems (r/γ)	p-Value
Physical health functioning	−0.139	0.049
Role performance unaffected by physical health	−0.283	0.000
Pain-free status	−0.411	0.000
Overall health perception	−0.382	0.000
Energy and vitality	−0.370	0.000
Social functioning	−0.392	0.000
Role performance unaffected by emotional health	−0.272	0.000
Mental well-being	−0.399	0.000

r—Pearson correlation coefficient; γ—Gamma correlation coefficient; p—probability level.

The extent of vascular access complications was negatively correlated with several life domains. The strongest link appeared with pain absence (r = −0.411; p= 0.000), while moderate negative correlations were detected for emotional well-being (r= −0.399; p=0.000) and social functioning (r = −0.392; p = 0.000). Additional relationships included general health perception (r=−0.392; p=0.000), vitality (r=−0.370; p=0.000), physical health role limitation (r = −0.283; p = 0.000), and emotional role limitation (γ = −0.272; p = 0.000). A smaller association was observed for physical functioning (r = −0.139; p = 0.049).In summary, greater vascular access problems were linked to lower scores in pain relief, emotional and physical well-being, social engagement, vitality, and overall health perception.

Table 9 shows how vascular access complication severity corresponded with kidney-related life quality.

Table 9. Severity of vascular access complications and kidney-focused quality of life

Scale	Correlation with Severity of Vascular Access Problems (r/γ)	p-Value
Symptoms and problems	−0.468	0.000
Impact of kidney disease	−0.515	0.000
Burden of kidney disease	−0.333	0.000
Employment status	−0.098	0.167
Cognitive functioning	−0.432	0.000
Social interaction quality	−0.343	0.000
Sleep quality	−0.353	0.000
Social support level	−0.230	0.001
Encouragement from dialysis staff	−0.323	0.000
Satisfaction with care	−0.358	0.000

r—Pearson correlation coefficient; γ—Gamma correlation coefficient; p—probability value.

The analysis revealed clear negative correlations between vascular access complication level and quality of life within disease effects (r= −0.515; p= 0.000), symptom experience (r=−0.468; p=0.000), and cognitive functioning (r = −0.432; p = 0.000). A moderate negative correlation appeared in relation to satisfaction with dialysis staff care (r= −0.323; p = 0.000). Additionally, sleep quality (r= −0.353; p = 0.000), social relationship quality (r = −0.343; p = 0.000), disease burden (r = −0.333; p = 0.000), support from dialysis personnel (r = −0.323; p = 0.000), and social support (r = −0.230; p = 0.001) all demonstrated negative associations. Conversely, no significant link was identified between vascular access problem severity and work activity (γ= −0.098; p = 0.167). Overall, these results suggest that as vascular access complications increase, patients' well-being decreases across a variety of areas—such as disease effects, symptoms, cognition, care satisfaction, sleep, interpersonal relations, disease load, and support systems.

Discussion

Quality of life (QOL) and health-related quality of life (HRQOL) are widely accepted as fundamental measures of healthcare performance and essential determinants of psychosocial and physiological well-being. For individuals receiving hemodialysis, QOL functions as both a marker of disease trajectory and an evaluative index for treatment outcomes, as well as a predictor of prognosis. Regular assessment of life quality and its influencing factors offers a practical framework for developing personalized care strategies [12-14].

To assess these outcomes, the current study employed the KDQOL-SF survey—one of the most established instruments for evaluating life quality in patients suffering from end-stage renal disease (ESRD). Within the section measuring overall life quality, participants exhibited their lowest ratings in areas concerning physical functioning, limitations in daily routines, and general health perception. Evidence from the international, multicenter Dialysis Outcome and Practice Pattern Study (DOPPS) conducted in the United States demonstrated that diminished scores in the physical domain of HRQOL correlate with a heightened risk of death and hospitalization. Consequently, enhancing patient education and interventions focused on physical health remains a critical clinical priority [4,15,16].

In the portion of the assessment related to disease-specific impacts, respondents reported the weakest QOL levels in categories addressing the perceived burden of kidney disease and work-related performance. Comparable findings from prior studies indicate that altering the form of renal replacement therapy could potentially enhance patients' capacity to maintain occupational functioning and productivity [15, 17].

Another central aspect analyzed in this research was the connection between vascular access and quality of life among hemodialysis participants. This analysis covered the type of vascular access used, number of previous access procedures, complications arising from use, hospitalization incidents, and pain levels associated with vascular access management. From the patient's perspective, the significance of vascular access in influencing daily functioning and satisfaction is considerable. The Standardized Outcomes in Nephrology–Hemodialysis (SONG-HD) project, designed to define global outcome benchmarks for nephrology care, also recognized vascular access as one of the primary contributors to quality of life during dialysis. Despite its importance, only a few specialized tools exist to assess this relationship. In 2021, Richarz *et al.* introduced the Vascular Access–Specific Quality of Life (VASQoL) measure, while Nordyke *et al.* proposed the Hemodialysis Access–Related Quality of Life (HARQ) scale. These instruments may be valuable in future research efforts, including potential follow-up studies extending from the present analysis [18-23].

This study demonstrates that how patients perceive their vascular access has a major effect on their overall quality of life. Results derived from the VAQ and KDQOL-SF

assessments indicated that those facing greater issues or complications with their access generally experienced poorer well-being. In nearly every aspect of life quality—aside from work-related activity—there was a clear relationship between the level of nursing support for vascular access and patient-reported outcomes. The strongest associations appeared in areas concerning symptom load, disease complications, physical and social abilities, and satisfaction with dialysis care. These findings stress the essential contribution of high-quality vascular access management to patient comfort and health. By improving nursing practices focused on access maintenance, many related complications could potentially be minimized.

Certain outcome factors, however, lie beyond direct nursing influence. One key element is the kind of vascular access used. The present results, together with earlier studies, show that access type plays a significant role in shaping the life quality of hemodialysis patients. Because this impact largely reflects patients' personal experiences, various factors must be evaluated when deciding on an access type. Individuals with native arteriovenous fistulas (AVFs) consistently reported higher energy levels and overall health satisfaction.

In a 2019 prospective cohort study by Do Hyoung Kim and colleagues through the Clinical Research Center for End Stage Renal Disease (CRC for ESRD) in Korea, 1,461 patients undergoing hemodialysis at multiple centers were followed. The analysis revealed that participants with AVFs or vascular grafts achieved better quality of life scores in 10 out of 12 measured areas after three months of therapy compared with those using central venous catheters (CVCs). After twelve months, HRQOL results improved further, highlighting the importance of continuous evaluation of HRQOL relative to vascular access type.

By contrast, Natalie Domenick Sridharan and co-researchers studied 77 dialysis patients and detected no statistically meaningful differences in life quality among users of AVFs, arteriovenous grafts (AVGs), or CVCs. Still, those with AVFs tended to express the highest satisfaction in the VAQ results.

Our analysis also found that the duration of dialysis treatment and the individual's access history affected HRQOL outcomes. Patients who had previous access operations, hospital stays caused by access complications, or recent access issues scored lower in both general and kidney disease–specific domains. Similar observations were reported by M. Pole *et al.*, who studied 749 hemodialysis patients in the United Kingdom and noted decreased satisfaction and higher rates of access-related complications, hospital admissions, and interventions.

These results point to the need for improved education and unified nursing standards emphasizing vascular access care. Maintaining reliable and well-functioning access can significantly raise patient life quality. Prior studies consistently confirm that arteriovenous fistulas, when used as the main access, are connected with fewer complications and the most favorable patient-reported outcomes [2,7,9,24–29].

There are, however, several limitations to consider. Participants were recruited solely from dialysis units within one country, which may restrict the broader applicability of these findings. Additionally, only a limited number of patients had AVGs or non-tunneled CVCs compared to AVFs and tunneled catheters. Objective data such as fistula blood flow, laboratory test results, and dialysis adequacy (Kt/V) were not examined. Incorporating these parameters in later studies would provide a more detailed and balanced view of how vascular access affects outcomes.

Conclusions

Both measurable characteristics, such as access type, and personal perceptions shape how vascular access impacts life quality. This study confirms that vascular access is a major determinant of well-being among hemodialysis patients. As the number and seriousness of access-related problems rise, patient quality of life declines accordingly. Perceived access quality appears to be a decisive factor influencing the overall life satisfaction of those receiving hemodialysis.

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