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Health-related quality of life of anemic patients undergoing dialysis

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Abstract

Background and aim: Anemia are one of the long-term consequences of chronic renal disease, which is characterized by abnormalities in kidney structure or function. This study aims to investigate the impact of the quality of life among anemic patients with chronic kidney disease undergoing renal dialysis in Kirkuk City.

Objective: to Identify the health-related quality of life of anemic patients undergoing dialysis.

Methods: The study used a quantitative/descriptive design from November 2023 to December 2024. Purposive (non-probability) samples were chosen from Kirkuk Teaching Hospital and Al-Amal Center 1 for renal dialysis. 341 samples participated in the research. Data was gathered through an interview and a questionnaire. Both inferential and descriptive statistical techniques were applied.

Results: Men more than women (58.1%), more of the samples were aged 50 years and more (67.2%). Most of them had low education levels (61.9%), more than three-quarters of the studied sampled were assigned "Housewife, Not working, and Retired"(78.01%), most of them were assigned an insufficient, and barely sufficient financial status (84.75%). Almost all laboratory tests that indicate there is anemia were (abnormal). The HRQoL has declined in physical, and psychological domains.

Conclusion and Recommendation: Anemic individuals with chronic kidney disease (CKD) experience a significant decline in health-related quality of life (HRQoL), particularly in the physical and psychological domains, where most aspects are rated at high to moderate impact levels. The independence domain shows a relatively low impact, while the social domain has moderate to low impact levels. Effective management of anemia is crucial to enhance HRQoL, job productivity, and overall well-being, with social support and psychological care playing essential roles in addressing the diverse needs of these patients.

Keywords: Anemia, patient, health-related quality of life, chronic kidney disease

Introduction

Fatigue, weakness, shortness of breath, dizziness, headaches, and depression are among the crippling symptoms of anemia, a frequent consequence of chronic kidney disease (CKD) that is caused by a reduction in the hemoglobin (Hb) contained by red blood cells. Hb < 12 g/dL in women and < 13 g/dL in males are considered anemia. A relative lack of erythropoietin, a hormone that is mostly generated by the kidneys in adults, is the main cause of anemia in chronic kidney disease (CKD), however functional iron shortage and shorter red blood cell half-life also play a role. In patients with CKD, anemia is also known to be associated with increased cardiac output, development of left ventricular hypertrophy, angina and congestive heart failure, which in turn are associated with increased morbidity and mortality. Analysis of data from the US National Health and Nutrition Examination Survey indicated the proportion of CKD patients with anemia, using the Kidney Disease Improving Global Outcomes definition, was 15.4%; double that in the general population (7.6%), increasing from 8.4% at stage 1 to 53.4% at stage 5. In addition, several other studies have shown that mean Hb levels decline with deteriorating kidney function. (Van Haalen *et al.*, 2020)^[11]. The presence of kidney damage and a decline in kidney function, most usually measured by estimated glomerular filtration rate (eGFR), are the hallmarks of chronic kidney disease (CKD), a progressive illness. (Mohammed & Hassan, 2023)^[6]. Globally, the prevalence of CKD is between 11 and 13 percent; estimates vary by location, ranging from 3.9 to 15.3%. China has been given the highest estimate, while Europe has been given the lowest. Over 20 million Americans were expected to have chronic kidney disease (CKD) in 2015. The majority of these individuals had stage 3 illness, with just a tiny percentage reaching stage 4.

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(Soni *et al.*, 2020) [10]. Health-related quality of life (HRQoL) is known to be reduced in patients with CKD, and the presence of anemia appears to be associated with exacerbation of HRQoL impairment. However, the incidence of anemia increases with deteriorating kidney function, as do other complications of CKD (Kumait, 2024) [4]. It can therefore be very difficult to separate the impact of anemia on HRQoL from the impact of other factors using observational data, although data from large patient cohorts with multiple variables can aid understanding of how patients are affected and provide new insights. Moreover, there are few reports of analysis of data from large cohorts of patients across various geographical areas, using a disease-specific instrument to assess HRQoL. The objective of the current survey was to evaluate the impact of anemia on HRQoL in patients with CKD at varying stages of disease using real-world data from different geographical locations. (Fishbane & Spinowitz, 2018) [2].

Subject (Materials and Methods)

Through the employment of an approach for the participant group, a quantitative/descriptive design was employed in the current study from November 2023 to December 2024. The Kirkuk Teaching Hospital and Al-Amal center1 in the Iraqi city of Kirkuk served as the study's site. Data was gathered from 341 patients who were receiving hemodialysis for longer than four months duration using a non-probability (purposive) sample approach. Questionnaire to assess the quality of life of anemic patients receiving hemodialysis in Kirkuk City Each patient required around 20 to 25 minutes to complete the questionnaire, which included closed-ended questions. The total number of items in the questionnaire was 70. The data collection process took place between January 1st and March 30th. The questionnaire was

constructed and the interview technique was used to collect data; it took each patient 20 to 25 minutes to complete the questionnaire. and the interview was performed for each patient individually. The questionnaire was designed to collect information about the patient demographic characteristics, General information, Laboratory blood tests, and health-related quality of life domains. Experts in various fields evaluate the content, and changes are made based on their recommendations and suggestions. the researcher creates a questionnaire interview form for data collection, which includes five sections: The questionnaire consists of (70statements), questions and took approximately 20-25 minutes to complete for each patient. A panel of experts evaluates the study instruments and program's content validity; the tools' dependability was assessed using a test-retest methodology and data from the evaluation of 10 patient. for assesses the degree to which items in a questionnaire or scale are interrelated and measure the same construct, the reliability coefficient was 0.70. The Statistical Package (SPSS) ver. 26.0 was used to analyse and evaluate the study's findings using statistical data analysis methods: Frequencies, percentages, the mean of the score (MS), the standard deviation (SD), are used in descriptive analysis of data. Inferential data analysis is used to draw conclusions. The Independent-Samples t-test and Matched Paired-Samples t-test are used to compare means for two groups of cases.

Statistical Analysis

Utilizing the statistical software (SPSS) ver. (26.0), the following statistical data analysis techniques were employed to analyses and evaluate the study's findings.

Results

Table 1: Summary Statistics of Percentile Scoring Scale of an Overall HRQoL studied domains for anemic patients with KCD's (N=341)

Studied Domains	No.	Min.	Max.	PGMS	PSD	Impact Ass.
Physical domain	341	6.67	93.33	54.62	16.20	M
Independence domain	341	0.00	68.75	35.30	13.89	M
Social domain	341	0.00	100	37.51	21.06	M
Psychological domains	341	0.00	100	50.62	20.20	M
Adaptation of life	341	0.00	68.75	32.64	11.96	L
Overall Health-Related Quality of life	341	5.08	69.50	42.14	10.46	M

PGMS: Percentile Grand Mean of Score; PSD: Pooled Standard deviation; r, Impact assesses by: (Low, Moderate, and High) according to [(0.0 - 33.33), (33.34 - 66.66), and (66.67 - 100)] intervals respectively.

Regarding to subjects of the studied assess domains, results showed that a moderate level of assess were accounted mostly for the anemic patients with CKD's, as well as an overall assessing, but according to what achieved by estimating of PGMS, results shows that "Independence,

Social, and Adaptation of life" domains, as well as an overall assessment, which were registered {Percentile Grand Mean of Score-PGMS} border to low impact level, which reflects the fact that the HRQoL has decline toward physical, and psychological domains indeed.

Table 2: Simple Pearson's Correlation Coefficients among different responses of the studied Domains

Simple Pearson's Correlation Coefficients for HRQoL		Independence Domain	Social Domain	Psychological Domain	Adaptation of life Domain
rho	Physical	0.0080	0.1800	0.4100	0.1900
	Independence		0.2750	0.1730	0.2120
	Social			0.2450	0.2550
	Psychological				0.3170
P-value	Physical	0.441	0.000	0.000	0.000
	Independence		0.000	0.001	0.000
	Social			0.000	0.000
	Psychological				0.000

(*) HS: Highly Sig. at $p < 0.01$; S: Sig. at $p < 0.05$; NS: No Sig. at $p > 0.05$; Statistical hypothesis are based on Pearson's Coefficient test.

Regarding of simple correlation coefficients (Person's coefficients) of studied domains table (2) shows in term, there are a conventional significant levels for extracted correlation coefficients among the studied domains in light

of observing strong relationships at $P < 0.01$ mostly, and that indicated a meaningful limited interaction (Covariance) that should be presented indeed.

Table 3: Extracted Factors matrix in Rotated method with the suggested named for the studied group (N=341)

Component Matrix	Components	
	1	2
Physical domain		0.854
Independence domain	0.82	
Social domain	0.675	
Psychological domains		0.745
Adaptation of life	0.538	
Initial Eigen values out of Total = 9.00	1.928	1.076
% of covariance	64.18	35.82
Suggested Named of extracted Factors (*)	Objectivity Environment Factor	Self-Individual Factor

(*) Cogitation and implementation by Emeritus Prof. (Dr.) Abdulkhaleq A Ali Ghalib Al-Naqeeb

Rotation Method: Varimax with Kaiser Normalization.

Regarding of That extracted factors for studied groups in Table (3) deals with studied domains, which were extracted in two meaningful and significant interactions, and has a suggested named "Objectivity Environment Factor, and Self Individual Factor". That extracted factors ordered in more powerful significant, with advantage at the first factor in (38.558%) of total variance explained, then followed by second factor in (21.520%), and that led to be recorded (64.18%) of covariance explained for first factor, and (35.82%) of covariance explained for the second factor. And according to manage and analyzed of an extracted factors

which were defined of creating new scoring scale with reference to relationships among truly affectedness by anemic patients with CKD's whose responses related by five domains, and based on the results of extracted two factors formed the basis structure depends on measurement and evaluation of the core of the analytical process, which is the fruit of this thesis through the importance point of marketing these factors for studying phenomenon issue and a similar cases subject in the future studies, either for cross sectional design, or for an intervention of applying a proposed program for improvement HRQoL for anemic patients with CKD's.

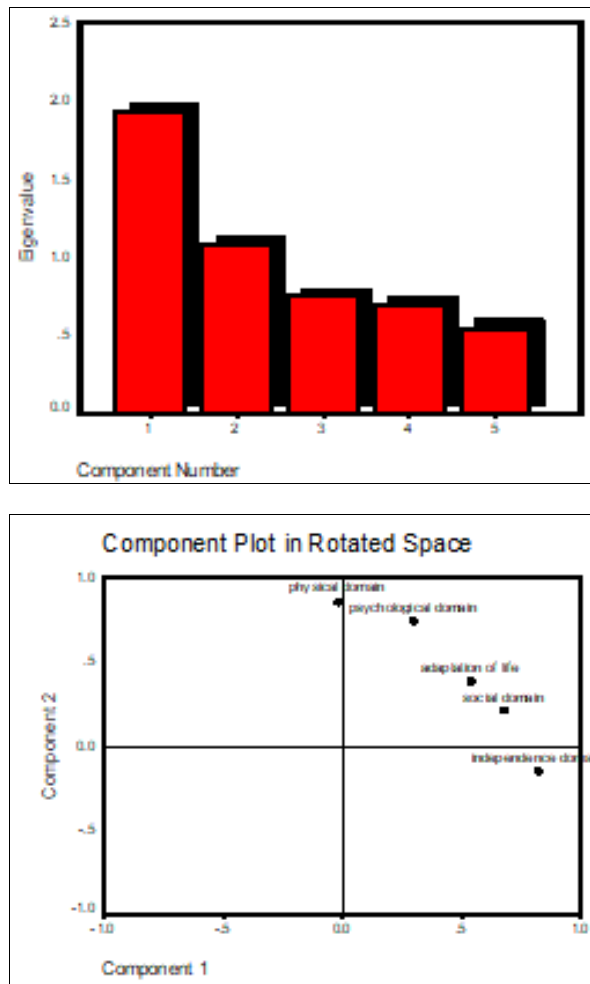


Fig 1: Screening Plot & Component Plot in rotated Space for Studied Main Domains

Regarding in rotated Space for Studied Main Domains Figure (1) represented graphically screening plot, Typically the plot shows a distinct break between the steep slope of the large factor and the gradual trailing of the rest (the screening)

Discussion

The HRQoL related to the physical domain for the examined anemic individuals with CKD is predominantly rated at high to moderate levels, with 9 things (60.0%) assessed as high and 5 items (33.33%) as moderate, while only 1 item (6.67%) is rated at a low impact level. It may be concluded that anemic individuals with chronic kidney disease experience a decline in health-related quality of life, since most examined aspects of the physical domain exhibited high to moderate degrees of influence on health-related quality of life. The study conducted by Van Haalen *et al.* (2020) ^[11] across Europe, which collected data from France, Germany, Italy, Spain, the UK, the USA, and China, dramatically deteriorated HRQoL across several domains, including physical health. Patients experiencing less sleep and discomfort The presence of lower limb issues and reduced hemoglobin levels adversely affected the patient's physical functioning, resulting in significant to moderate detriments to their quality of life The table presents the health-related quality of life concerning the independence domain items for the examined anemic patients with chronic kidney disease, indicating that the majority, namely 6 (75.0%) items, were assessed at a low impact level, while only 2 (25.0%) things were evaluated at a moderate level. Consequently, it can be concluded that anemic individuals with chronic kidney disease have a little impact on the independence domain of health-related quality of life, since the majority of the assessed items in this domain had a low impact level. These results align with the prior study conducted by Dasgupta *et al.* (2024) ^[1] in Europe. Van Haalen *et al.* (2020) ^[11] reported in Europe that the independence domain, encompassing items linked to everyday functioning and autonomy, had lower scores in anemic patients relative to non-anemic patients. Anemic individuals had worse overall health-related quality of life, significantly affecting physical functioning, energy, and social functioning. Anemia was associated with reduced job productivity and heightened absenteeism. Anemia in chronic kidney disease patients significantly adversely affects health-related quality of life, especially in the domain of independence. Effective management of anemia may enhance health-related quality of life (HRQoL) and job productivity, since anemic individuals with chronic kidney disease (CKD) often have low impact levels in the independence domain of HRQoL. The social domain items for the study of anemic patients with chronic kidney disease are categorized as having moderate to low effect levels, with 3 (60.0%) items reported at a moderate impact level and 2 (40.0%) items reported at a low impact level. The results indicate that anemic patients with chronic kidney disease (CKD) experience moderate to low impact levels in the social domain related to health-related quality of life (QoL). Specifically, two-thirds of the assessed items in the social domain were recorded at a moderate level, while the remainder were noted at a low impact level. This conclusion aligns with recent studies conducted by Safi *et al.* (2024) ^[8] in Lodz, Poland, and Mokhtari-Hessari & Montazeri (2020) ^[7] in the United States, which emphasized the research

identified a favorable and substantial correlation between patients' self-efficacy and the social support they get from family and friends. This assistance is essential for patients' general well-being and enhances their self-management and resilience. The results indicate that augmenting social support can improve health outcomes and quality of life for persons with chronic kidney disease (CKD). The research underscores that social support and interpersonal ties profoundly influence patients' quality of life. Establishing positive relationships with family and friends, together with access to leisure activities, is essential for sustaining a high quality of life. This corresponds with your data indicating elevated relative sufficiency percentages for statements such as "I maintain positive relationships with my family members and others" and "I have access to recreational opportunities." The psychological domain items for the examined anemic patients with chronic kidney disease are categorized as high to moderate, since they are considered significant. Three (60.0%) items were reported at a high impact level, while one (20.0%) item was reported at both moderate and low levels. It can be concluded that anemic patients with chronic kidney disease (CKD) experience a decline in health-related quality of life (QoL) in the psychological domain, as the majority of assessed items in this domain indicated a high impact level, while only one item was reported at moderate and low levels, respectively. This result aligns with the prior study conducted by Seery and Buchanan (2022) ^[9] across Asia and Africa, which emphasized Patients articulated a substantial demand for education linked to chronic kidney disease to enhance their quality of life and self-management. Connections with healthcare teams, colleagues, and family were essential for emotional support and decision-making. Patients frequently experienced a deficiency of agency about their condition and treatment alternatives, resulting in sensations of powerlessness. Patients encountered anxiety and apprehension over their forthcoming therapy and illness advancement, adversely affecting their mental health and quality of life. These findings underscore the necessity of addressing both medical and psychological requirements to enhance patient outcomes. I concur with the study conducted by Mathias *et al.* (2020) ^[5] in North America, which identified strong correlations between reduced hemoglobin levels and diminished scores on many psychological and physical health assessments, underscoring a substantial effect on the psychological domain. The adaption of life items for the study of anemic patients with chronic kidney disease (CKD) is predominantly classified at a low effect level, with 5 items (62.5%) reported as having low impact, while the remaining items are categorized at a moderate impact level. It can be concluded that anemic patients with chronic kidney disease exhibit a low to high borderline moderate impact level concerning the adaptation of life domain items related to health-related quality of life, as two-thirds of the examined items regarding life adaptation were at a low impact level, while the remaining items were at a borderline high moderate level. This conclusion aligns with the study conducted by Krantz *et al.* (2019) ^[3] in Sweden, which emphasized The study revealed that individuals with elevated scores on this index demonstrated superior adaptation to life changes and stressors, highlighting a significant correlation between psychological support and overall life adaptation. Participants with robust social

networks and support systems exhibited enhanced adaptation to health challenges. Individuals who assessed their health favorably had superior adaptation abilities and a more hopeful outlook on their future; these findings underscore the complex nature of life adaptation, which includes psychological, social, and physical elements. They emphasize the significance of a comprehensive approach to comprehending and enhancing HRQoL in patients.

Conclusion

Health-related quality of life (HRQoL) in the physical category significantly declines in anemic people with chronic kidney disease (CKD). 33.33% of the analyzed elements were assessed at moderate impact levels, while the majority (60.0%) were ranked at high effect levels. Just 6.67 percent of them received a low effect rating. This suggests that anemia significantly impairs CKD patients' ability to operate physically. The impact of anemia on the independence domain of HRQoL is relatively low. Most items (75.0%) were assessed at a low impact level, while 25.0% were evaluated at a moderate level. This suggests that anemic individuals with CKD have a relatively low impact on their independence and daily functioning. Anemic patients with CKD experience moderate to low impact levels in the social domain of HRQoL. Specifically, 60.0% of the assessed items were recorded at a moderate level, while 40.0% were noted at a low impact level. This indicates that social support and interpersonal relationships play a crucial role in the well-being of these patients. The psychological domain is significantly affected by anemia in CKD patients. The majority of assessed items (60.0%) indicated a high impact level, while 20.0% were reported at both moderate and low levels. This highlights the importance of addressing both medical and psychological needs to improve patient outcomes. The adaptation of life domain items for anemic patients with CKD is predominantly classified at a low impact level (62.5%), with the remaining items categorized at a moderate impact level. This suggests that while anemia affects life adaptation, the impact is generally low to moderate.

Conflict of Interest

Not available

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Not available

Reference

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