

EFFECT OF EDUCATIONAL INTERVENTION ON QUALITY OF LIFE & KNOWLEDGE OF ANEMIA AMONG CKD PATIENTS ON MAINTENANCE HEMODIALYSIS: A QUSAI EXPERIMENTAL STUDY

Faiza Parveen^{*1}, Nausheen Abdullah²

^{*1}Student of MSN at AFGMI, NUMS, Post RN Bsc, Charge Nurse at Institute of Urology & Transplantation, Rwp

²Post RN Bsc, Charge Nurse at Institute of Urology & Transplantation, Rwp

ABSTRACT

Purpose: The purpose of this study to analyze the knowledge of participants with CKD on maintenance hemodialysis related to anemia and their quality of life and to implement an educational intervention regarding disease and complication management and to evaluate its effect so the further recommendations can be suggested to decrease the burden of complications.

Method: This study was conducted by using the one group pretest –posttest Qusai experimental study design between July 2024- Aug 2024 with the sample size of 34. Permission was taken from the institutional review board and informed consent was taken from the participants before the pretest. Randomization done by the third party not aware of objectives and study question. Educational interventions developed from the National Kidney Foundation and KIDGO Clinical practice guidelines were given according to the language feasibility of the participants in three phases.

Result: Participants were suffering from anemia and with decrease quality of life due to multiple factors and after educational intervention participant had increase score in their posttest which indicated significant difference in pretest and posttest.

Conclusion: Significant improvement in posttest indicated that participants with hemodialysis should be monitored for quality of life and interventions will be effected to increase awareness regarding the complications of hemodialysis in CKD patients.

Key words: Anemia; Anxiety; CKD; Educational intervention; Quality of life

INTRODUCTION

CKD is the 7th most common cause of death in worldwide as approx. 10% of the world population²¹ and Anemia is a more prevalent complication in CKD patients compared to general population as with the percentage of 15.4 % vs 7.6% respectively according to the National Health and Nutrition Examination Survey (NHANES) III study and in Stage 1 this percentage is 8.4% and rises to 53.4% in stage-5 due to multiple contributing factors.⁶ In patients on MHD are more prone to this condition related to iron deficiency, decrease intake and disease process of CKD because of compromise kidney function of erythropoiesis. As a study conducted in china related to anemia and QOL in CKD patients indicated a higher trend of anemia in patients of CKD stage 1 to 5 and also this trend effects all the dimensions of KDQOL of these patients.¹⁷ Thus these findings indicated a higher burden of anemia in CKD patients.

Pakistan is a low middle income country with limited resources have a high burden of non-communicable diseases and high prevalence of anemia in Hemodialysis.¹² A study conducted in Lahore in 2021, indicated that anemia is 24.2% prevalent in hemodialysis patients because of the frequent blood sampling, leftover blood in dialyzer and mismanagement of dialysis tubing.¹¹ Polypharmacy related to multiple comorbidities in

The Research of Medical Science Review

CKD is a major contributor in decrease self-management in patients and leads to poor prognosis in hemodialysis patients.⁷ During Hemodialysis, patients with decrease Hb are advised to take oral & Iv iron, ESA therapy and also multiple blood transfusion are given to these patients but still there is suboptimal control of anemia with <50%.⁹ A study concluded that multiple factors such as < iron, dialysis, Hb level, erythropoiesis dose, mal nutrition and also systemic infection can contribute to the response of these agents.¹³

A study conducted in Iran indicated a positive relationship between treatment adherence and quality of life so emphasized the importance of an educational intervention to increase the patient's understanding regarding the management of disease and prevention of complications.¹⁶ So, the objective of this study to analyze the effectiveness of educational intervention on anemia management among CKD patients on maintenance hemodialysis.

Null Hypothesis: There is no significant difference between the mean of pretest and posttest.

Alternative Hypothesis: There is a significant difference between the mean of pretest and posttest.

Methodology:

Study Design: One group pre-posttest Quasi experimental study design was used to evaluate the effectiveness of educational intervention for anemia management and quality of life in CKD patients on MHD.

Study population & Setting: Target study population was all patients diagnosed with CKD and on maintenance hemodialysis suffering from anemia due to multiple reasons and it was conducted in a dialysis center of tertiary care hospital, Rawalpindi after getting the permission from the Institutional review board of the hospital for ethical review of the study, Risk benefit ratio was analyzed and also the informed consent from all the participants has been taken before data collection.

Eligibility criteria: Inclusion criteria for this study was 1) patients ≥ 18 years of age 2) Clinically stable patients 3) Willing to participate and those participants unable to attend educational sessions and unwilling to participate were excluded.

Study tool: Data was collected by using the KDQOL-SF36 questionnaire³ a valid and reliable tool with Cronbach alpha higher than 0.80 to assess the quality of life in CKD patients and anemia was assessed by using the Food & Agriculture document titled "Guidelines for assessing nutrition-related knowledge, attitudes and practices" to analyze the knowledge of participant and their nutritional practices (Food & Agriculture Organization, 2014)²⁰. Anemia was defined as Hb below 13.5 gm/dl in a man or less than 12.0 gm/dl in a woman.

Sample Size & Strategy: Sample size was 34 which was calculated by using the G Power which is a reliable tool for sample size calculation and power analysis⁸ after estimating the Effect size of 0.5 & Power 0.80. This sample was collected by using a convenient sampling technique at dialysis center according to sample size.

Recruitment Procedure: Participants were recruited in the study after getting the full list of the patients from the designated department and then consecutively selected from the list and to avoid the biasness participants were randomly allocated by a colleague not aware of objectives and without providing any prior information related to patients.

Data Collection procedure: Data was collected after determining the anemia by the CBC report then after taking informed consent from participant's data was collected for the pretest and then the educational session for the educational intervention was designed and after this posttest data was collected from the participants by the researcher of the study.

The Research of Medical Science Review

Intervention guide: This semi structured guide was developed by using the National Kidney Foundation guidelines, KDIGO Clinical Practice Guideline for Anemia in Chronic Kidney Disease ¹¹ and the online available brushers of Agha Khan university related to anemia in CKD patients which are officially freely available at their website.

Intervention: Educational sessions were given at the dialysis center after the inclusion of all the participants. Pretest was done at the time of 1st session & this session was based on overall knowledge of CKD and hemodialysis to develop awareness in participants regarding the disease management. 2nd session was done after 3 days and in this session Teaching sessions was given to participants related to complications and outcomes of the disease and treatment modalities. 3rd session was done at the 6th day and in that session participants related to anemia and its management, iron intake, dietary intake, prevention and warning signs and also they were encourage to share their learning and if they have any concerns or query and at the end of this session posttest was taken from the participants.

Study Design	Pre test	Intervention	References	Post Test
One group Pretest-Posttest Qusai experimental study	1: KDQOL-SF36 Questionnaire 2: Food & Agriculture document titled "Guidelines for assessing nutrition-related knowledge, attitudes and practice	Specific designed educational interventions were given to participants include; Session I: 30min <ul style="list-style-type: none"> ✚ Detail description of CKD ✚ Consequences of CKD ✚ Treatment modalities of CKD ✚ Hemodialysis and its benefits Session II: 30 min <ul style="list-style-type: none"> ✚ Hemodialysis access and its management ✚ Complications of Hemodialysis Session III: 30 min <ul style="list-style-type: none"> ✚ Anemia & CKD ✚ Consequences of Anemia ✚ Dietary intake for prevention of anemia ✚ Iron supplements need ✚ Warning signs to be monitor and report to healthcare provider 	<ul style="list-style-type: none"> ✚ National Kidney Foundation: Anemia and CKD ✚ KDIGO Clinical Practice Guideline for Anemia in Chronic Kidney Disease ¹¹ ✚ Agha Khan University brochure: Anemia and CKD in Urdu 	1: KDQOL-SF36 Questionnaire 2: Food & Agriculture document titled "Guidelines for assessing nutrition-related knowledge, attitudes and practice

Table :1

Results Analysis: Data analysis was done by using the SPSS-26 and in descriptive statistics frequency, percentages for categorical variables & mean and S.D were used for continuous variables and in inferential statistics t-test to compare the mean of dependent group was used to assess the difference after intervention.

Demographic variables:

This study involved the diverse group of participant of different ages to assess the quality of life and knowledge status to get a comparison between them. As shown in Table-2 17.6% participants were between 20-30 yrs. and 35.3 % were between 31-40yrs and 41.2% between 41-50yrs. & 5.9% above 50yrs with the Mean 38.73, S.D- 7.28. From these 44.1% were female & 55.9% were male participants with Mean 1.44, S.D 0.50. 38.2 % participants were getting hemodialysis for < 5 yrs. 47.1% between 10-15 yrs. and almost

The Research of Medical Science Review

14.7% above 15yrs. with Mean 1.764 & S.D. 0.698. According to their socioeconomic status 44.1% had low socioeconomic status and 41.2% lower middle class & 14.7% were middle class with the mean-1.7059 & S.D- 0.718. In comorbidities Diabetes and Hypertension were leading cause in CKD patients with 44.1 & 32.4% respectively.

Demographic data		
Class	Frequency	Percentage
20-30	6	17.6
31-40	10	35.3
41-50	14	41.2
51-60	2	5.9
Gender		
Female	15	44.1
Male	19	55.9
Educational level		
Matric	18	52.9
FA	13	38.2
BS & more	3	8.8
Income Level		
Lower class	15	44.1
Lower middle class	14	41.2
Middle class	5	14.7
Duration on Hemodialysis		
< 5 yrs	13	38.2
5-10 yrs	16	47.1
> 10 yrs	5	14.7
Comorbid		
DM	15	44.1
HTN	11	32.4
CVD	7	20.5
No Comorbid	1	2.94

Table :2

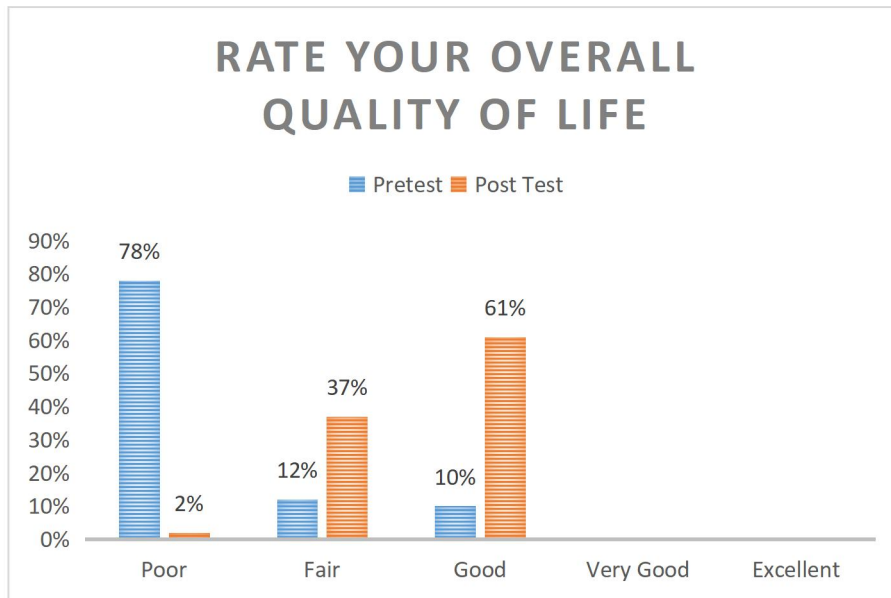
Anemia & CKD:

Participants were suffering from anemia and mostly of them were unaware of anemia its contributing factors and its prevention as this knowledge was tested by the use of Food & Agriculture document titled “Guidelines for assessing nutrition-related knowledge, attitudes and practices” and in pretest participants had less score of (Mean- 30.6765, S.D- 2.836) and limited knowledge and after educational intervention a significant improvement in post test score with t-statistics (Mean 35.67, S.D- 1.224: $p < 0.05$) with more consistent result had been observed.

QOL and CKD:

Participants were also observed for quality of life in CKD by using the KDQOL Questionnaire-SF 36. First, for rating for their overall health & 78% rated their overall health poor and after the educational sessions 37% rated it fair and 61% as good (Fig:1). This was due to their increase energy after getting knowledge about how they can manage their disease and can minimize complications. Participants also observed for activity level and indicated poor and limited activity. Participant were also observed for their feeling and in pretest 81% indicated some significant feelings of downhearted and blue and in posttest this number was significant decrease which shows a significant improvement in their thinking and increase of energy.

The Research of Medical Science Review



(Fig:1)

They were also observed for their kidney disease effects and mostly 89% indicated that their kidney disease affects their daily routine and they feel that they are burden on their family and this increase their frustration as well. But in posttest they have significant decrease in their frustration due to their willingness to manage their disease process and improvement in knowledge.

Next, for the problems related to Chronic disease and hemodialysis mostly of them indicated a higher burden of issues related to CKD. At last, almost 83% indicated that they are bothered by the dietary and fluid restrictions they are also suffering from loss of appetite and they felt like washout and drained. In their educational intervention they have provided all the information related to their disease process so they can manage their daily life and their symptoms can be minimized so, in posttest they were more energetic and prepared to cope with all the shortcomings of disease. Quality of life in Hemodialysis patient was also less as in pretest and posttest respectively (Mean 67.7, S.D-2.276: Mean 79.4706, S.D- 2.41504) and in t-test statistics for the difference of paired sample interventions had a significant effect of .000 which is less than $p < 0.05$. These all findings indicated a high impact with positive effect.

T- Test Statistic for anemia knowledge

Pretest- Posttest	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
	-5	2.83912	0.48691	-5.99062	-4.00938	-10.269	33	.000

Table-3

T-Test statistic for Quality of life

Pretest- Posttest	Paired Differences					t	df	Sig.(2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
				Lower	Upper			
	-11.76471	2.66355	.45679	-12.69406	-10.83	-25.755	33	.000

Table-4

The Research of Medical Science Review

Discussion:

Findings of this study indicated that mostly participants with CKD on MHD were unaware the consequences of CKD specifically for anemia related to multiple factors in hemodialysis patients and also decrease level of QOL due to poor management and high frustration level as they have going through hemodialysis on weekly schedules and these findings were in line with the different studies^{1,15} as these studies also identified that patients on hemodialysis have many complications like anemia and infections, weakness and generalized body aches after dialysis sessions and they also have depressive symptoms which directly affect their quality of life. A multicenter study done in France, Brazil, Japan & Germany also indicated that severity of anemia directly affect the quality of life in patients and high mortality rate is directly related to complications of CKD.⁶ Participant reported low mood during data collection and this was also indicated in patients on long term dialysis are more prone for depression & anxiety.⁴ Some findings of this study are contrary to a study² which indicated that with increased age patient have decrease quality of life but in this current study indicated that at young age patients also suffering from decrease QOL and depressive symptoms which leads to poor management of disease and increase the incidence of complications.

Anemia is a more frequent complication of hemodialysis associated CKD as indicated in a retrospective cohort study that only 14% had no anemia and 86 % were diagnosed with anemia.¹⁸ This complication is due to decrease production of erythropoietin and blood losses during dialysis and frequent infections and iron deficiency which may be due to decrease level of circulation iron, decrease iron stores, decrease absorption or increased level of hepcidin due to systemic inflammation as discussed in a study.⁵ Iron therapy with Erythropoietin Stimulating Agents can improve the Hb level in CKD patients as indicated in a study that this will ultimately decrease the infectious complications¹⁹ which can ultimately improve the outcomes in Hemodialysis patients.

Educational interventions in this study positively influenced and motivated the participants by sensitizing them with the drawbacks of this complication and to decrease the undesirable outcomes in hemodialysis patients as an interventional study conducted in Sri Lanka by use of educational intervention indicated that these interventions improved the fluid management in CKD patients.¹⁴

Clinical implication:

This study is highly related with the clinical outcomes of dialysis patients so the finding of this study indicated that these education interventions can be used to enhance the clinical outcomes. From these educational interventions, patients will be more empower to minimize the complication of anemia by using the appropriate nutrition and also their adherence to ESA and iron supplements, overall management of CKD, their routine life with adequate activity and dialysis access management.

Limitation:

This study has some limitations as this study was a single center study with one group pre-posttest design with no comparison group. The time period for educational intervention was short and also the sample size was not enough to generalized the findings to all CKD patients.

Conclusion:

In conclusion, the findings from this study demonstrate a significant affect between educational interventions, CKD QOL and Knowledge of anemia thus, highlighting its impact in CKD patients with MHD also rejecting the null hypothesis and accepting that there is significant effect of intervention. This data indicated that this intervention not only improve the outcome but also a sustained and feasible option for clinical practice. Thus this study provided a valued evidence for nursing practice and also provide direction for future research to be done on larger scale to generate more evidence and modify our policies for the recruitment of manpower in healthcare system so more individualized care can be plan for the betterment of the patients.

The Research of Medical Science Review

REFERENCES:

- Aggarwal, H., Jain, D., Dabas, G., & Yadav, R. K. (2017). Prevalence of Depression, Anxiety and Insomnia in Chronic Kidney Disease Patients and their Co-Relation with the Demographic Variables. *PRILOZI*, 38(2), 35–44. <https://doi.org/10.1515/prilozi-2017-0020> (Aggarwal et al., 2017)
- Barzegar, H., Jafari, H., Charati, J. Y., & Esmaeili, R. (2017). Relationship Between Duration of Dialysis and Quality of Life in Hemodialysis Patients. *Iranian Journal of Psychiatry and Behavioral Sciences*, 11(4). <https://doi.org/10.5812/ijpbs.6409> (Barzegar et al., 2017)
- Cohen, D. E., Lee, A., Sibbel, S., Benner, D., Brunelli, S. M., & Tentori, F. (2019). Use of the KDQOL-36™ for assessment of health-related quality of life among dialysis patients in the United States. *BMC nephrology*, 20, 1-9
- Ganu, V. J., Boima, V., Adjei, D. N., Yendork, J. S., Dey, I. D., Yorke, E., Mate-Kole, C. C., & Mate-Kole, M. O. (2018). Depression and quality of life in patients on long term hemodialysis at a national hospital in Ghana: a cross-sectional study. *Ghana Medical Journal*, 52(1), 22. <https://doi.org/10.4314/gmj.v52i1.5> (Ganu et al., 2018)
- Gutiérrez, O. M. (2021). Treatment of iron deficiency anemia in CKD and end-stage kidney disease. *Kidney International Reports*, 6(9), 2261-2269
- Hoshino, J., Muenz, D., Zee, J., Sukul, N., Speyer, E., Guedes, M., Lopes, A. A., Asahi, K., Van Haalen, H., James, G., Dhalwani, N., Pecoits-Filho, R., Bieber, B., Robinson, B. M., Pisoni, R. L., Lopes, A., Pecoits-Filho, R., Combe, C., Jacquelinet, C., . . . Zee, J. (2020). Associations of Hemoglobin Levels With Health-Related Quality of Life, Physical Activity, and Clinical Outcomes in Persons With Stage 3-5 Nondialysis CKD. *Journal of Renal Nutrition*, 30(5), 404–414. <https://doi.org/10.1053/j.jrn.2019.11.003> (Hoshino et al., 2020)
- Kamath N, Iyengar AA. Chronic Kidney Disease (CKD): An Observational Study of Etiology, Severity and Burden of Comorbidities. *Indian J Pediatr*. 2017 Nov;84(11):822-825. doi: 10.1007/s12098-017-2413-2. Epub 2017 Jul 15. PMID: 28711960.
- Kang, H. (2021). Sample size determination and power analysis using the G* Power software. *Journal of educational evaluation for health professions*, 18.
- Khan, A., Ghulam Hussain, S., Mushtaq, S., Abbas, S., Dong, Y., Feng, W., & Fang, Y. (2024). Prevalence and management of anemia and impact of treatment burden on health-related quality of life in chronic kidney disease and dialysis patients. *Journal of Pharmaceutical Policy and Practice*, 17(1), 2427779.
- Khan A, Cheema MF, Fatima R, Cheema SS, Butt Z, Gillani S, Ahmad A, Subhan Ullah M, Jalal U, Cheema S. Prevalence of Chronic Kidney Disease in a High-Risk Population in Urban Lahore, Pakistan: A Cross-sectional Study. *Cureus*. 2024 Jun 27;16(6):e63296. doi: 10.7759/cureus.63296. PMID: 39077231; PMCID: PMC11284504
- Kidney Disease: Improving Global Outcomes (KDIGO) Anemia Work Group. KDIGO Clinical Practice Guideline for Anemia in Chronic Kidney Disease. *Kidney inter., Suppl*. 2012; 2: 279–335 <https://kdigo.org/guidelines/anemia-in-ckd/>
- Mazhar, R. ., Das, B. ., Kumar, S. ., Khan, M. T. ., Bai, S. ., & Hinduja, B. . (2023). Prevalence of Anemia in End Stage Renal Disease Patients on Maintenance Hemodialysis: Anemia in End Stage Renal Disease. *Pakistan Journal of Health Sciences*, 4(06), 130–133. <https://doi.org/10.54393/pjhs.v4i06.860>
- Nafar, M., Samavat, S., Khoshdel, A., & Alipour-Abedi, B. (2017). Anemia evaluation and erythropoietin dose requirement among hemodialysis patients: a multicenter study. *Iranian journal of kidney diseases*, 11(1), 56.
- Piyasena, H. P. T. U., Sandeepani, W. G. P., Ruwanthika, M. P. S., Wijesinghe, S. G. C. D., Sriyani, K. A., & De Silva, D. K. M. (2024). Impact of Health Education Intervention on Fluid Management and Quality of Life Among Patients with Chronic Kidney Disease Undergoing Hemodialysis. *Sri Lankan Journal of Nursing*, 3(1).
- Pretto, C. R., Winkelmann, E. R., Hildebrandt, L. M., Barbosa, D. A., Colet, C. D. F., & Stumm, E. M. F. (2020). Quality of life of chronic kidney patients on hemodialysis and related factors. *Revista latino-americana de enfermagem*, 28, e3327

The Research of Medical Science Review

- Rahdar, Z., Haghighi, M. J., Mansouri, A., Siasary, A., Alahyari, J., & Jahantigh, F. (2019). Probing the Relationship Between Treatment Regimen Compliance and the Quality of Life in Hemodialysis Patients: A Descriptive-Analytic Study. *Medical - Surgical Nursing Journal*, 8(2). <https://doi.org/10.5812/msnj.95599> (Rahdar et al., 2019)
- Shen, Y., Wang, J., Yuan, J., Yang, L., Yu, F., Wang, X., ... & Zha, Y. (2021). Anemia among Chinese patients with chronic kidney disease and its association with quality of life-results from the Chinese cohort study of chronic kidney disease (C-STRIDE). *BMC nephrology*, 22, 1-10.
- Toft, G., Heide-Jørgensen, U., Van Haalen, H., James, G., Hedman, K., Birn, H., Christiansen, C. F., & Thomsen, R. W. (2019). Anemia and clinical outcomes in patients with non-dialysis dependent or dialysis dependent severe chronic kidney disease: a Danish population-based study. *Journal of Nephrology*, 33(1), 147–156. <https://doi.org/10.1007/s40620-019-00652-9> (Toft et al., 2019)
- Walther CP, Triozzi JL, Deswal A. Iron deficiency and iron therapy in heart failure and chronic kidney disease. *Curr Opin Nephrol Hypertens*. 2020 Sep;29(5):508-514. doi: 10.1097/MNH.0000000000000630. PMID: 32701598
- Wiafe, M. A., Apprey, C., & Annan, R. A. (2021). Knowledge and practices of dietary iron and anemia among early adolescents in a rural district in Ghana. *Food Science & Nutrition*, 9(6), 2915-2924.
- Wong G, Bernier-Jean A, Rovin B, Ronco P; Editors of Kidney International. Time for action: recognizing chronic kidney disease as a major noncommunicable disease driver of premature mortality. *Kidney Int*. 2024 Jun;105(6):1144-1146. doi: 10.1016/j.kint.2024.03.020. Epub 2024 Apr 4. PMID: 38579988

