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Original Article

Evaluation of Anemia Management in Hemodialysis Patients at Nephrology Diagnostic and Treatment Hospital

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ABSTRACT

Purpose: This research aimed to evaluate how anemia is handled in hemodialysis patients and identify risk factors.

Methods: This study involved analyzing the current approach to managing anemia in a nephrology hospital, comparing it to KDOQI guidelines. It was conducted in a hospital specializing in the diagnosis and treatment of kidney diseases. In Tripoli, Libya, documents were randomly selected between October 2023 and May 2024. There were 89 patients receiving hemodialysis in total. Analysis of data was performed using SPSS Version 26.

Results: Data on age distribution revealed that the largest age group consisted of individuals aged 56-65 years, comprising 39 patients (43.8%), closely trailed by the age range of 36-55 years, with 37 patients (41.6%). The average age was 53.56 years and there was a male to female ratio of 1.7:1. The results of the study showed that most patients (59.6%) had a mean Hgb value below 10, while 21.3% had a mean Hgb value between 10 and 10.9. Additionally, only ≥11 cases reported a percentage of 19.1% and also stated that the average Hgb value was 9.716.

Conclusions: This study reveals that anemia isunsatisfactorily controlled in hemodialysis patients. ESA hyporesponsivness played a critical role in lowering hemoglobin levels in the current therapeuticstrategies used.

Keywords: Pharmacies, Pharmacists, Patient Safety, Dispensing, Libya.

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INTRODUCTION

In Libya, Chronic Kidney Disease (CKD) claimed the lives of 1,186 individuals, accounting for 4.72% of all deaths, as reported in the most recent 2020 WHO data, placing Libya at the 66th position globally.[1] The total number of patients with end-stage renal disease (ESRD) receiving hemodialysis (HD) is reported as the main and essential treatment for ESRD patients unable to have a kidney transplant.[2]

Anemia commonly occurs in CKD patients undergoing hemodialysis (HD).[3] Effective treatment includes giving iron supplements and ESA therapy, as well as monitoring the patient's response. This study intended to assess the management of anemia in individuals with hemodialysis (HD) and explore the factors linked to it, along with its impact on health-related quality of life(HRQOL).

Numerous Libyan CKD patients receiving hemodialysis experience anemia as a common issue, which has the potential to be avoided. Our research focused on the adequacy of anemia treatment in hemodialysis patients and evaluated how anemia is currently being managed at a nephrology hospital by comparing it to KDOQI guidelines.

Anemia in CKD patients has a variety of significant clinical consequences. Certain symptoms previously thought to be caused by decreased kidney function are actually results of anemia. These consist of decreased physical ability, tiredness, breathing difficulties, lack of hunger, sleep problems, sexual and cognitive function issues, and weakened immune response.[3] Anemia leads to higher blood flow from the heart, the growth of the left ventricle, chest pain, and congestive heart failure.[3]

Chronic renal disease-related anemia is caused by various factors such as a decrease in EPO, inhibitors of erythropoiesis induced by uremia, the shortened lifespan of red blood cells, and disrupted iron balance.[4]

MATERIALS AND METHODS

The current study was conducted at a hospital specializing in diagnosing and treating kidney diseases. In Tripoli, Libya, files were selected randomly between October 2023 and May 2024. A total of 89 patients were receiving hemodialysis treatment. The information contained in the files was meticulously reviewed and inputted into a data collection form (a duplicate is included).

The data collection form was divided into two parts: the first part included demographic and clinical details like age, gender, weight, dialysis duration, and coexisting conditions. The second part documented the last three hemoglobin levels for each patient along with details on anemia treatment, weekly ESA dosage, and hematopoietic response assessed through the ERI.

The ERI is determined using the formula provided below:

ERI is calculated by dividing the ESA dose (in IU/week) by the bodyweight (in kg) and the average hemoglobin value (in g/dL).[5]

The ESA dose mentioned is the average weekly dose used in the past month during data collection. The average of the three-month laboratory values in the most recent follow-up was used to record the hemoglobin value for each patient.

Statistical Analysis: Analysis of data is performed using SPSS Version 26. Data is analyzed by running descriptive statistics such as means, frequencies, and percentages. Additionally, the ANOVA test is utilized to assess if there is a significant statistical variation between categorical groups by examining mean differences. Compare mean Hgb levels in ERI groups, comorbidity groups, and various treatment groups. A P-value less than 0.05 is classified as statistically significant.

RESULTS

The distribution of hemodialysis patients according age group. Figure 1 shows ages profile of hemodialysis patients at nephrology diagnostic and treatment hospital ranging from 16 to 79 years old. The results showed that the major age group was 56–65 years old, with 39 patients (43.8%); this was closely followed by the age subgroup (36–55 years old), with 37 patients (41.6%). then followed by the age subgroup (16–35) years with 11 cases (12.4%)

of the patients, and the (≥ 76) years subgroup with 2 patients (2.2%). The mean age of the assessed patients was 53.56 years.

Figure 2 gender distribution showed that hemodialysis cases were 57 males (64%) of patients, then females (36%), 32 patients, and a 1.7:1 male:female ratio.

Figure 3 showed that the majority of patients had been receiving hemodialysis for two or more years with mean duration 2. 54 ± 0.13years.

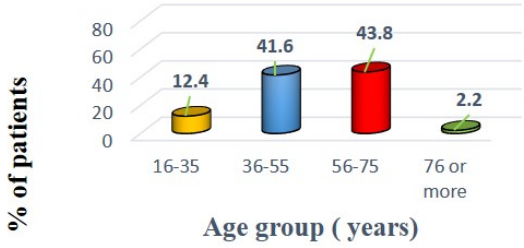

Fig 1. The distribution of hemodialysis patients according age group.

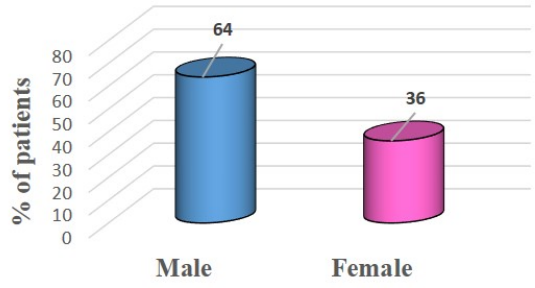

Fig 2. The distribution of hemodialysis patients according to gender.

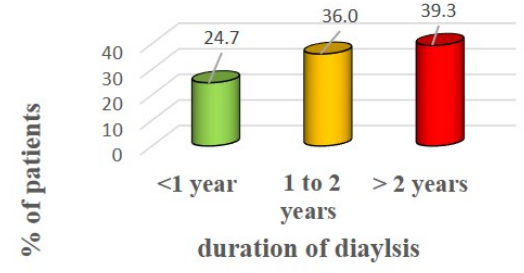

Fig 3. Mean duration of hemodialysis for patients sample.

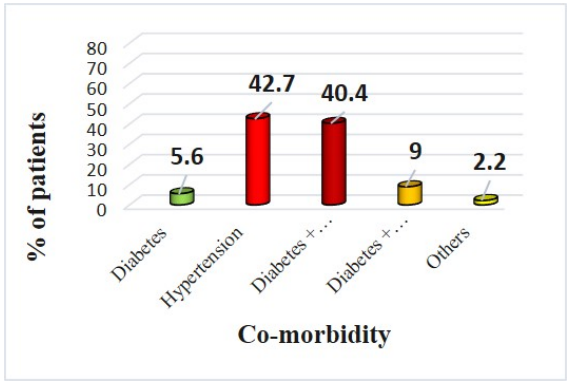

Fig 4. Distribution of the co-morbidities among the patients.

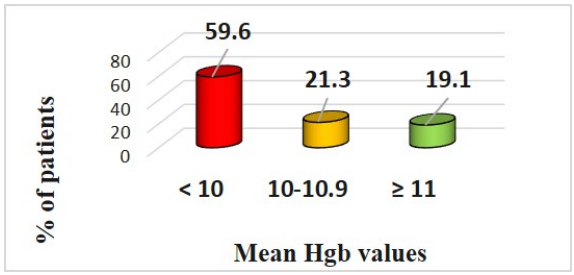

Fig 5. Distribution of hemoglobin level among the hemodialysis patients

DISCUSSION

Anemia in HD patients is a major risk factor for cardiovascular comorbidity, negatively impacting quality of life and cognitive function,[6-9] making it an important indicator for improving treatment and minimizing complications related to HD.

According to the results of the present research, the vast majority of HD patients (80.9%) had an average Hgb level that fell short of the recommended KDOQI guidelines. Hemoglobin levels are equal to or greater than 11 grams per deciliter. The average hemoglobin level was 10 in over half of the patients. However, our findings indicated that the average Hgb level (9.71 g/dl) was lower compared to data from studies conducted in Palestine (10.63 g/dl)[10] and Saudi Arabia (11.16 g/dl).[11]

This outcome showed a noticeable lack of control over anemia in hemodialysis patients, but this discovery is not specific to Libyan patients. Results from a study involving 187 patients receiving dialysis in HD centers in Lebanon in 2017

indicated that only 26% of patients had their Hgb level within the desired range.[12] Furthermore, Luis Fernando and colleagues (2021) examined factors associated with anemia prevalence using data from HD patients in Mexico City's HD centers, revealing anemia in 56% of patients with an average Hgb value of 9.7 g/dl.[13]

The decrease in hemoglobin levels in our study may be due to resistance to ESA. Group C patients with ERI levels >10 had the lowest mean hemoglobin value (8.41 g/dl) and lacked responsiveness to ESA. Patients in group C with the highest level of ERI >10 had the worst mean value of hemoglobin (8.41 g/dl) and poor ESA responsiveness. Moreover, a significant proportion of patients (59.7%) treated with ESA showed a mean Hgb level of 9.37 g/dl with moderate response and ERI between 5.1-10. Additionally, the ANOVA analysis showed a significant discrepancy in average Hgb levels within the ERI group (p = 0.000), even though the ESA doses given closely followed the KDOQI guidelines for hemodialysis patients (50–100 mg/kg). Moreover, the lack of significance was found when comparing mean Hgb values across various co-morbidity and treatment protocol groups.

In relation to accompanying illnesses, 42.7% of our sample consists of patients with hypertension, making it the most prevalent comorbidity. A group of individuals experienced both diabetes and high blood pressure, making it the second most common medical condition in HD patients after high blood pressure at a rate of 40.4%.

We recommend studying all clinical variables and factors that have significant correlations with the Hgb level and ESA hyporesponsiveness, such as parathyroid hormone level, infection, inflammation, and vitamin D deficiency, that may be affected; therefore, we could increase the validity of our findings. Also, another study is needed to diagnose the type of anemia and screen causes of anemia to increase the opportunity to improve anemia management in HD patients.

Table 1. Hemoglobin mean value for HD patients.

	N	Minimum	Maximum	Mean
Mean Hgb	89	6.3	14.2	9 .7g/dl

Table 2. ANOVA test to compare hemoglobin means among different co-morbidity groups.

		Sum of Squares	df	Mean Square	F	Sig.
Mean Hgb * Comorbidity	Between Groups (Combined)	15.162	4	3.791	2.043	0.096
	Within Groups	155.856	84	1.855		
	Total	171.018	88			

Table 3. ANOVA test to compare hemoglobin means between treatment groups.

		Sum of Squares	df	Mean Square	F	Sig.
Hgb * Treatment type	Between Groups (Combined)	21.154	8	2.644	1.412	0.204
	Within Groups	149.864	80	1.873		
	Total	171.018	88			

Table 4. Classification of hemodialysis patients according to ERI value.

		Frequency	Percent	Valid Percent
Valid	A	20	29.9	29.9
	B	40	59.7	59.7
	C	7	10.4	10.4
	Total	67	100.0	100.0

Table 5. ANOVA test to compare Hgb level means between ERI groups.

Hgb * ERI	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	32.089	2	16.045	8.705	.000
Within Groups	117.956	64	1.843		
Total	150.046	66			

CONCLUSION

In conclusion, this study reveals that anemia is unsatisfactorily controlled in hemodialysis patients. ESA hyporesponsivness played a critical role in lowering hemoglobin levels in the current therapeutic strategies used; therefore, the appropriate management of anemia should be followed by adherence to KDOQI recommendations to decrease complications and improve the quality of life of HD patients.

REFERENCES

1. WORLD HEALTH RANKINGS. Libya: Kidney Disease. 2020; Available from: https://www.worldlifeexpectancy.com/libya-kidney-disease.
2. Murtagh, F.E., J. Addington-Hall, and I.J. Higginson, The prevalence of symptoms in end-stage renal disease: a systematic review. Advances in chronic kidney disease, 2007. 14(1): p. 82-99.
3. Jiang, J., et al., The impact of short daily hemodialysis on anemia and the quality of life in Chinese patients. Brazilian Journal of Medical and Biological Research, 2013. 46(7): p. 629-633.
4. Suzuki, M., et al., Effects of anemia correction by erythropoiesis-stimulating agents on cardiovascular function in non-dialysis patients with chronic kidney disease. International heart journal, 2012. 53(4): p. 238-243.
5. Pınarbaşı, A.S., et al., Erythropoietin resistance index and the affecting factors in children with peritoneal dialysis. Blood Purification, 2021. 50(6): p. 942-951.
6. Mikhail, A., et al., Renal association clinical practice guideline on Anaemia of Chronic Kidney Disease. BMC nephrology, 2017. 18: p. 1-29.
7. Martinez-Vea, A., et al., Role of oxidative stress in cardiovascular effects of anemia treatment with erythropoietin in predialysis patients with chronic kidney disease. Clinical nephrology, 2012. 77(3): p. 171-181.
8. Go, A.S., et al., Chronic kidney disease and the risks of death, cardiovascular events, and hospitalization. New England Journal of Medicine,2004. 351(13): p. 1296-1305.
9. Silverberg, D.S., et al., The effect of correction of anaemia in diabetics and non—diabetics with severe resistant congestive heart failure and chronic renal failure by subcutaneous erythropoietin and intravenous iron. Nephrology Dialysis Transplantation, 2003. 18(1): p. 141-146.
10. Al-Jabi, S.W., et al., A multicenter descriptive analysis of anemia management in hemodialysis patients and its association with quality of life. BMC nephrology, 2023. 24(1): p. 197.
11. Al-Ageel, N.A., et al., Appropriateness of anemia management in hemodialysis patients. Saudi Pharmaceutical Journal, 2012. 20(1): p. 85-91.
12. Akel, M., et al., Evaluation of the management of anemia in hemodialysis patients in Lebanon. Journal of Nephropharmacology, 2017. 6(2): p. 68-73.
13. Lizardi Gómez, L., et al., Factors related to the presence of anemia in patients with chronic kidney disease in hemodialysis. Annals of Hematology and Oncology, 2021. 8(1): p. 1326.