PREVALENCE OF ANEMIA IN CHRONIC KIDNEY DISEASE PATIENTS IN LADY READING HOSPITAL PESHAWAR

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ABSTRACT

Objective: Anemia is most common and its prevalence is increasing as the incidence and prevalence of chronic kidney diseases are increasing worldwide. The aim of this study was to find the prevalence and pattern of anemia in chronic kidney disease patients of Lady Reading Hospital, Peshawar.

Material and Methods: Six months cross-sectional study of 327 chronic kidney disease patients was conducted in Medical Department of Lady Reading Hospital Peshawar from July 2015 to December 2015. All the chronic kidney disease patients who presented with signs and symptoms of chronic kidney diseases were included in the study and data regarding various variables was collected while patient with age less than 18 and above 80 years were excluded.

Results: Results of 327 chronic kidney disease patients were analyzed as: most of the patients were males n= 231 (70.64%) while females were n=96 (29.36%). Male to female ratio was approximately 1:2.4. The prevalence of anemia in chronic kidney patients was 48.62% (n=159). In n=112 (34.25%) patients with chronic kidney disease having age above 50 years had anemia. Among anemic patients (n=159); n=98 (61.64%) had positive history of diabetes mellitus; n=101 (63.52%) had glomerulonephritis, and n=76 (47.80%) had positive history of hypertension. Among anemic patients, Stage-I had 10.06% (n=16), Stage-II had 17.72% (n=25), Stage-III had 22.01% (n=35), stage-IV had 23.27% (n=37) and stage-V had 28.93% (n=46) anemia prevalence.

Conclusion: The prevalence of anemia was quite high (approximately 48.62%) in chronic kidney disease patients associated with diabetes mellitus, hypertension and glomerulonephritis, and early attention is needed to diagnose and manage anemia in chronic kidney disease patients.

Key words: Anemia, Chronic Kidney Diseases, Prevalence, Hypertension, Diabetes Mellitus.

INTRODUCTION

Chronic kidney disease is defined as kidney damage or glomerular filtration rate (GFR) less than 60 ml/min/1.73m^2 for three months or more, irrespective of cause. Its prevalence is increasing rapidly around the world [1]. Chronic kidney disease patients need certain restrictions and limitations [2]. The kidneys helps in maintaining blood pressure, electrolyte balance, produce the active form of vitamin D and produce a substance called erythropoietin, which stimulates production of red blood cells. Chronic Kidney Disease (CKD) has adverse consequences on almost all body systems [3]. In chronic kidney disease (CKD), the kidneys do not work effectively and do not have symptoms until reach advanced stages, which had high rate of complications i.e. cardiac, vascular, anemia, pulmonary, sleep complaints, fatigue, depression[4], bleeding[5], viral hepatitis B & C infection[6], and uremic pruritus [7].

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Anemia associated with chronic renal insufficiency (CRI) may have substantial clinical and public health importance. Chronic Kidney Disease is frequently complicated with anemia and is associated with significant morbidity throughout the globe[8,9]. The prevalence of anemia was 7.3% i.e. 3.5% among men and 10.7% among women[10]. Iron deficiency anemia occurs in most of the patients secondary to increased iron demand driven by the accelerated erythropoiesis, after stimulating agents were administered[11].

Anemia is an early sign of chronic renal failure and has consequences are mainly on cardiovascular system. Cardiovascular morbidity and mortality highly correlate with the degree of anemia[12]. Anemia is a common and well recognized complication of chronic kidney disease. Iron deficiency is prevalent in patients with chronic kidney disease (CKD)[13]. Patients with chronic kidney disease (CKD) may lose up to 3 g of iron each year because of frequent blood losses[14].

The National Health and Nutrition Examination Survey (NHANES) III study showed that the prevalence of anemia increases as expected GFR falls. Data collected in 2007-2010 showed that anemia was twice as prevalent in people with CKD (15.4%) as it was in the general population (7.6%). The prevalence increased with the stage of CKD, from 8.4% at stage 1 to 53.4% at Stage-V[15]; while in another study it increased from 1% to 33% among men and form 1% to 67% among

women[16]. Patients with renal insufficiency have reduced hemoglobin levels, mostly as a result of decreased kidney function[9].

Anemia prevalence was significantly greater in persons with diabetes compared to persons without diabetes[17]. The most common etiology was chronic glomerulonephritis[9,18]. In study the prevalence of CKD was associated with diabetes mellitus, and was reported in 27% of participants, including 30% of men and 25% of women[17]. Anemia has strong significant association with GN, diabetes mellitus and hypertension; and thus has generally high prevalence[18]. Anemia is common in chronic kidney disease at all stages but it is universal among patients with stage-V CKD, besides this other possible causes include iron, B12 or folic acid deficiency or blood loss[3].

Pakistan is a developing country and thus having high prevalence of chronic kidney disease causing anemia. Moreover the prevalence of anemia is on rise due to the associated conditions of hypertension, diabetes mellitus and malnutrition, so this cross sectional study was formulated to find the prevalence of anemia in chronic kidney diseases patients admitted in Medical Units, Lady Reading Hospital, Peshawar Pakistan; and to provide relevant information regarding important variables causing anemia and to prevent its consequences in chronic kidney patients.

MATERIAL AND METHODS

Six months cross-sectional study of 327 chronic kidney disease patients was conducted in Medical Units of Lady Reading Hospital Peshawar from July 2015 to December 2015. All chronic kidney diseases patients who were admitted in Medical Units were selected for the study, while patients of age less than 20 years and those referred form other wards or had multiple severe diseases were excluded from the study. Relevant data was collected from the patient's and ward records, through a structured questionnaire. The hemoglobin level was used to estimate anemia. For males if the value is less than 12 gm/dl and for females if less than 11 gm/dl will be labeled as anemic. Informed written consent was obtained from all patients/attendants. The manuscript protocol was approved by the Lady Reading Hospital ethical committee. The data was exclusively used for study purpose. Microsoft Word 2007 and SPSS 16 were used for statistical analysis. Data was presented in form of tables and graphs.

RESULTS

The prevalence of anemia and its relation with age and sex among chronic kidney disease patients (n=327) was shown in Tables No 1. The Prevalence of Diabetes Mellitus, Glomerulonephritis and Hypertension response among anemic CKD patients (n=159) is shown in Figure No 1. The frequency of different stages of Chronic Kidney Disease patients (n=327) was shown in Table No 2.

DISCUSSION

In our study the prevalence of anemia in chronic kidney patients was 48.62% (n=159) while in a study published in England Journal of Medicine in 2006 showed 7.3% prevalence among the CKD patients[16] and thus our study had high prevalence as compared to international studies having 10% and 22.2%. In a study published in 2004; revealed 47.7% of anemia and thus our study revealed similar prevalence among CKD patients[19].

In our study in age group 20-50 years; had 14.37% (n=47) while in ages 50 & above had 34.25% (n=112) anemia. In our study 67.92% of males and 32.08% of female had anemia; while an international study supported our findings and revealed 52.8% and 47.2% respectively[20], whereas in another study the prevalence of anemia was 33% among men and 67% among female patients of chronic kidney diseases[16].

Literature search showed that the prevalence of anemia was increasing from stage 1 to stage 5 among CKD patients. In our study, the prevalence of anemia among CKD patients was 10.06% in Stage-I, 15.72% in Stage-II, 22.01% in Stage-III, 23.27% in stage-IV and 28.93% in stage-V; whereas in another study the prevalence of anemia increased with CKD stages; from 8.4% at stage 1 to 53.4% at stage 5[21] and similarly in another study the prevalence was 34% in the initial stages and 57% in later stages of CKD[11]. Moreover, another study showed the same prevalence of anemia among the CKD patients i.e. 14.6% in stages I – II and 26.4% in stages III, IV[21]. In our study at CKD stage V, the prevalence of anemia was 28.93% while in another study it was 6.76% thus our study had highest prevalence among the CKD patients.

In our study among the CKD patients with glomerulonephritis, there was 63.52% (n=101) prevalence of anemia and was strongly associated with renal pathology, and thus supported the findings that glomerulonephritis is the most common risk factor of anemia among the CKD patients[18].

Anemia prevalence was significantly greater in persons with diabetes compared to persons without diabetes[17]. In our study, 61.64% (n=98) among the anemic CKD patients had diabetes mellitus and showed strong association, which was also confirmed in a study showing 67.6%[20] & 49.5%. Moreover, our study results showed 29.97% of anemia among the diabetic mellitus positive patients which were supported by different international studies showing 27%[17] and 30.7%.

Anemia associated with hypertension may have substantial clinical and public health importance. Patients with hypertension have reduced hemoglobin levels, mostly as a result of decreased kidney function[9]. In various international journals, there were strong

Table No 1: Showing prevalence of anemia vs Age and Sex of chronic kidney disease patients (n=327) in LRH Peshawar

Gender	Age Groups among CKD Patients (n=327)			Anemic among CKD Patients (n=159)		
	20 - 50 Year	51 - 80 Years	Total	20 - 50 Year	51 - 80 Years	Total
Male	61	170	231 (70.64%)	31	77	108 (67.92%)
Female	37	59	96 (29.36%)	16	35	51 (32.08%)
Total	98	229	327	47	112	159

Table No 2: Frequency and percentages of different stages of Chronic Kidney Disease Patients (n=327)

CKD Stage	Frequency	n=Anemic, %
Stage 1	89	16 (10.06%)
Stage 2	53	25 (15.72%)
Stage 3	65	35 (22.01%)
Stage 4	54	37 (23.27%)
Stage 5	66	46 (28.93%)
Total	327	159

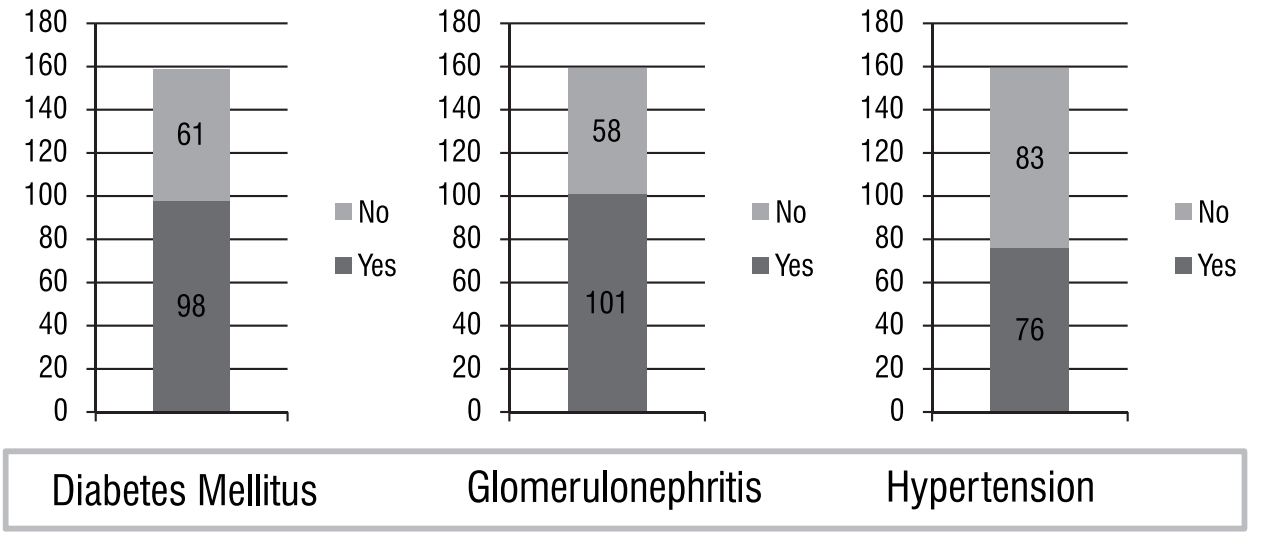

Figure No 1. Showing the Prevalence of Diabetes Mellitus, Glomerulonephritis and Hypertension response among anemic CKD patients (n=159) in LRH Peshawar

association and correlation between hypertension and anemia in CKD patients. The prevalence of anemia in hypertensive CKD patients showed 9.7%, 33% and 67.2%, which was supported and confirmed by our study results and showed 47.80% (n=76) among the CKD patients with hypertension[20]. Out of all 327 patients with CKD; 36.70% (n=120) had diabetes mellitus, 45.26% (n=148) had hypertension, and 43.73% (n=184) had had history of glomerulonephritis; and thus anemia was strongly associated with diabetes mellitus and glomerulonephritis as were supported by international studies[17,18].

CONCLUSIONS

Our study concludes that the prevalence of anemia was more (48.62%) in chronic kidney disease patients and thus needs monitoring of risk factors like diabetes mellitus and hypertension. Moreover awareness among the public regarding kidney complications, healthy diet, avoid non prescribed drugs & drinking alcohol, regular exercise, and its timely management is needed to prevent anemia and associated complications in chronic kidney disease patients.

REFERENCES

1. Horigan A.E. Fatigue in hemodialysis patients: a review of current knowledge. J Pain Symptom Manage. 2012 Nov; 44(5):715-24.

2. Kusumota L., Marques S., Haas V.J., Rodrigues Rapl. Adults and elderly on hemodialysis evalution of health related quality of life. Acta Paul Enferm. 2008; 21:152-9.

3. Ansari I., Sheikh A., Ahmed S.S., Jabbar Q., Ali S. Management of Anemia and other Hematologic Derangements in Patients with Chronic Kidney Disease. Arab J Nephrol Transplant. 2014 Jan; 7(1):13-9.

4. Cukor D., Peterson R.A., Cohen S.D., Kimmel P.L. Depression in end-stage renal disease hemodialysis patients. Nat Clin Pract Nephrol. 2006 Dec; 2(12):678-87.

5. Huang K.W, Leu H.B., Luo J.C., Chan W.L., Hou M.C., Lin H.C., Lee F.Y., Kuan Y.C. Different peptic ulcer bleeding risk in chronic kidney disease and end-stage renal disease patients receiving different dialysis. Dig Dis Sci. 2014 Apr; 59(4):807-13.

6. Huang C.C. Hepatitis in patients with end-stage renal disease. J Gastroenterol Hepatol. 1997 Oct; 12(9-10):S236-41.

7. Sun J., Yu R., Zhu B., Wu J., Larsen S., Zhao W. Hepatitis C infection and related factors in hemodialysis patients in china: systematic review and meta-analysis. Ren Fail. 2009; 31(7):610-20.

8. Levin A. The treatment of anemia in chronic kidney disease: understandings in 2006. Curr Opin Nephrol Hypertens. 2007 May; 16(3):267-71.

9. Chi-Yuan H.S.U., Charles E. Mcculloch, and Gary C. Curhan. Epidemiology of Anemia Associated with Chronic Renal Insufficiency among Adults in the United States: Results from the Third National Health and Nutrition Examination Survey. J Am Soc Nephrol 13: 504–510, 2002.

10. Subhanud Din., Shahida A.R.Shah. Haemoglobin level in chronic kidney disease. J Med Sci Jan 2011; 19(1):15-7.

11. Ocasio H.E., Diaz H., Cangiano J.L., Báez R., Suárez E. Anemia management among hemodyalisis patients at the University Hospital in Puerto Rico Bol Asoc Med P R. 2014; 106(2):9-12.

12. Dimković N. Erythropoietin-beta in the treatment of anemia in patients with chronic renal insufficiency. Med Pregl. 2001 May-Jun; 54(5-6):235-40.

13. Besarab A., Coyne D.W. Iron supplementation to treat anemia in patients with chronic kidney disease. Nat Rev Nephrol. 2010 Dec; 6(12):699-710.

14. Kalantar-Zadeh K., Streja E., Miller J.E., Nissenson A.R. Intravenous iron versus erythropoiesis-stimulating agents: friends or foes in treating chronic kidney disease anemia? Adv Chronic Kidney Dis. 2009 Mar; 16(2):143-51.

15. Stauffer M.E., Fan T. Prevalence of anemia in chronic kidney disease in the United States. PLoS One. 2014 Jan 2; 9(1):e84943.

16. Tilman B., Drüeke., Francesco Locatelli., Naomi C., Kai-Uwe E., Iain C. Macdougall., Dimitrios T., Hans-Ulrich B., and Armin S. Normalization of Hemoglobin Level in Patients with Chronic Kidney Disease and Anemia. N Engl J Med 2006; 355:2071-2084November 16, 2006.

17. Tarek M., Achkar,, Suzanne E., Ohmit P.A., Mccullough, Errol D. Crook, Wendy W. Brown,Richard Grimm,George L. Bakris,William F. Keane, and John M. Flack. Higher prevalence of anemia with diabetes mellitus in moderate kidney insufficiency: The Kidney Early Evaluation Program, Kidney International, Vol. 67 (2005), pp. 1483–1488.

18. Yves Vanrenterghem, Claudio Ponticelli, Jose Maria Morales, Daniel Abramowicz, Keshwar Baboolal, Bjorn Eklund, Volker Kliem, Christophe Legendre, Antonio Luis Morais Sarmento, and Flavio Vincenti. Prevalence and Management of Anemia in Renal Transplant Recipients: A European Survey. American Journal of Transplantation 2003; 3: 835–845.

19. Marc Leisterwitz. The prevalence of anemia in patients with chronic kidney disease. 2004, Vol. 20, No. 9, Pages 1501-10.

20. Anees M., Ibrahim M. Anemia and hypoalbuminemia at initiation of hemodialysis as risk factor for survival of dialysis patients. J Coll Physicians Surg Pak Dec - Dec 2009; 19(12):776-80.

21. Stauffer ME, Fan T. Prevalence of anemia in chronic kidney disease in the United States. PLoS One. 2014 Jan 2; 9(1):e84943.