ORIGINAL ARTICLE

PATTERN OF ANEMIA IN DIABETIC PATIENTS PRESENTING TO PRIVATE SECTOR`S TERTIARY CARE HOSPITALS IN PESHAWAR

Ambreen Gul[1], Umarah Nisar[1], Safia Rahman[2], Zahoor Ullah [3], Muhammad Furqan[4], Momina Haq[5]

[1]Department of Pathology, Peshawar Medical College, Riphah International University, Islamabad - Pakistan

[2]Department of Chemical Pathology Khyber Teaching Hospital, z Peshawar - Pakistan

[3] Department of Biochemistry, Peshawar Medical College, Riphah International University, Islamabad - Pakistan

[4] Department of Information Technology, Peshawar Medical College, Riphah International University, Islamabad - Pakistan

[5] Department of Physiology, Peshawar Medical College, Riphah International University, Islamabad - Pakistan

ABSTRACT

Objective: To determine the frequency and type of anemia based on MCV in diabetic patients.

Materials and Methods: A Retrospective descriptive study, done at Peshawar Medical College, Peshawar, and its affiliated teaching hospitals from January 2016 to August 2018. It was a Laboratory and Medical OPD record-based study of 450 diabetic patients presenting to these teaching hospitals.

Results: Among 450 diabetic patients, 283(63%) were having anemia (Hb less than 13.5 g/dl in males and 11.5 g/dl in females). Among those who had anemia, 102(36%) had microcytic hypochromic, 176(62%) had normochromic normocytic and 6(2%) had macrocytic anemia on the basis of the mean corpuscular volume of more than 80, 80-95 and 95 fl respectively.

Conclusion: More than 60 % of diabetic patients presented with anemia predominantly suffering from normocytic and normochromic anemia.

Keywords: Anemia, Diabetes, hemoglobin, MCV, Normocytic and Normochromic anemia.

This article may be cited as: Gul A , Nisar U, Rahman S, Ullah Z, Furqan M, Haq M, Anemia in diabetic patients presenting to tertiary care hospitals of private sector in Peshawar. J Med Sci 2022 October;30(4):246-249

INTRODUCTION

Anemia is one of the common health problems in Pakistan. It is well identified and documented in most parts of the world but still, its incidence has not reduced probably due to ignoring it and not treating it. It is more common in children and women of childbearing age, especially belonging to low socioeconomic populations.[1,2] The main reason for its under-treatment is poor nutrition, high prevalence of infectious diseases, poverty, and lack of awareness[3].

Some studies [4,5] also suggest that anemia is commonly associated with non-infectious diseases like diabetes especially type II. Diabetes has taken the status of a global epidemic. In 2000 [4] number of patients suffering from diabetes was 171 million which is estimated to reach 366 million by 2030.

The incidence of Anemia is twofold in diabetics than in non-diabetics however the mechanism of its development is not clearly understood. [9, 10]

In Pakistan, the weighted prevalence of diabetes is reported to be 26.3%. The prevalence of diabetes in urban and rural areas has been reported to be 20.3% and 25.3% respectively.

According to Faseeh et al [11] 66.8% of patients reporting to a public sector tertiary care hospital in Peshawar are anemic (Hb<13g/dl for males and <12g/dl for females). Generally, anemia is a common health problem in middle and lower-income groups, who seek consultation from public sector hospitals, so in the present study, we planned to look for the condition of anemia in diabetes, reporting to tertiary care hospitals of the private sector in Peshawar. Diabetics have reached an epidemic proportion in Pakistan during the last decade especially Type 2. The aim of the study was to determine the frequency of anemia in patients with diabetes and to assess the common type normally prevailing, based on MCV data of the patient.

Correspondence
Dr. Safia Rahman
Assistant Professor
Department of Chemical Pathology Khyber Teaching Hospital, Peshawar - Pakistan
Email: safia.rahman@hotmail.com
Cell: +92-335-9793682
Date Received: 17-12-2021
Date Revised: 27-11-2022
Date Accepted: 03-12-2022

MATERIALS AND METHODS

Data on diagnosed cases of DM type 2 were obtained from medical O.P.D and laboratory records of Mercy and Kuwait Teaching hospitals during the period Jan 2016 to August 2018 after obtaining ethical approval from Peshawar Medical College Ethical Review Board.

The study included both adult male and female subjects. Laboratory data of HbA1C levels of all those patients were taken from the lab registers. Those with HbA1C levels of > 6.5% were selected for the establishment of an association. The hematology analyzer reports were taken out and reviewed. Clinical data and demographic details of the patients were recorded on predesigned proforma. During the study period, a total of 450 cases with HbA1c of >6.5% were seen.

RESULTS

Table II Shows the common type of anemia, which is classified on the basis of MCV. 62% of the subjects suffered from normocytic and normochromic anemia, while a lesser proportion had microcytic hypochromic anemia.

Classification of anemia as macrocytic, normocytic/normochromic, and microcytic/ hypochromic type in both genders was done on the basis of Mean Corpuscular Volume (MCV), with the cut of limits as more than 95 fl, 80—95 fl, and less than 80 fl respectively. The most common anemia in both genders was found to be normocytic normochromic. The data are summarized in table III

Table IV Shows, the common type of anemia, classified on the basis of MCV, in various age groups of diabetic patients.

Table 1: Age and Gender wise distribution of anemic cases

Age in years	Male		Female	
	Number	Percentage (%)	Number	Percentage (%)
Up to 35	17	21.5	30	14.7
36—55	49	62.0	163	80.0
Above 55	13	16.5	11	5.3
	79	100%	204	100%

Table 2: Frequency of Most Common Anemia among Diabetes

Subjects with Anemia	Microcytic, Hypochromic	Normocytic, normochromic	Macrocytic
283	102	176	6
	36%	62%	2%

Table 3: Classification of anemia on the basis of MCV in both genders.

Type of anemia	Male		Female		Total	
	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)
Macrocytic MCV 95 fl)	1	2	4	2	5	2
Normocytic and Normochromic (MCV 95—80 fl)	54	68	123	60	177	62
Microcytic and Hypochromic MCV < 80fl.	24	30	77	38	101	36

Table 4: Type of anemia on basis of MCV in diabetic cases

Age of patient	Macrocytic N= (5)		Normocytic & normochromic N=177		Microcytic & hypochromic N= 101	
	Number	Percentage (%)	Number	Percentage (%)	Number	Percentage (%)
Up to 35	1	(2)	28	(60)	18	(38)
55—36	3	(2)	98	(62)	60	(37)
Above 55	1	(3)	50	(67)	23	(31)

DISCUSSION

Anemia is a common problem among patients with diabetes. Its early identification is of great importance because with the passage of time the condition may worsen and enhance the misery of the patient. Anemia may aggravate the complications of diabetes, like retinopathy and macrovascular complications.

In the present study among 450 diabetics, 283(63%) people were found, and Sharif et al[13] also reported the same number of diabetic patients having anemia.

In contrast, another study conducted in Nigeria reported 15.3% anemia in type 2 diabetics.[14]Prevalence of 19.6% was reported in another study.[15]

We found more females being affected by anemia as compared to males for obvious reasons. Same were the findings of a study conducted by Beard et al.[16]These findings were also consistent with the findings of Aldallal et al.[17]Though one of the most common causes of anemia in non-diabetic females is iron deficiency but on contrary to our study, most of the patients (62%) had normocytic normochromic anemia which might have been due to nephropathy as a sequel of microvascular complication in diabetics [6-17.]

We compared the frequency of different types of anemia in both genders. In the present study 38% of females while 30% of males were having microcytic hypochromic anemia. This type of anemia is more in females and may be attributed to physiological processes especially childbirth, pregnancy, and menstruation [18-19]. On the other hand, 68% of males and 60% of females were suffering from normocytic normochromic anemia. The frequency of macrocytic anemia was the same (2%) in both genders.

We assessed different types of anemias with reference to age. It was found that 67% of diabetics in the age group above 55 years as compared to 62% (36-55years) and 60% (below 35 years) were having normocytic normochromic anemia. This may be due to anemia caused by renal complications of diabetes[20].

Based on age, hypochromic microcytic anemia was found to be the most common type (38%) among the age group less than 35 years as compared to (31%) seen in the age group above 55 years. This could be attributed to probable menopause in females and a relatively decreased growth rate seen in both genders. At young age requirements for iron increase dramatically in both boys and girls due to the expansion of total blood volume, the increase in body mass, and menstruation in young females.[21]

CONCLUSION

The study concludes that normocytic normochromic anemia is the most common type of anemia in diabetic patients. Females are more vulnerable as compared to males. Age-wise analysis showed that at young age microcytic hypochromic anemia while at old age normocytic normochromic anemia is common. The physician should pay special attention to monitoring and management of anemia along with blood glucose levels in diabetic patients.

REFERENCES

1. Index mundi-2018 and [WHO and UNICEF Focusing on anemia: towards an integrated approach for effective anemia control 2004.
2. Chaparro CM, Suchdev PS. Anemia epidemiology, pathophysiology, and etiology in low and middle income countries.Ann N Y Acad Sci.2019 Aug;1450(1): 15-31.
3. Soofi S, Khan GN, Sadiq K, Ariff S, Habib A, Kureishy S, Hussain I, et al. Prevalence and possible factors associated with anaemia, and vitamin B 12 and folate deficiencies in women of reproductive age in Pakistan: analysis of national-level secondary survey data. BMJ open. 2017 Dec 1;7(12)
4. Salma,M. , AlDalal, jeena,N.,Prevalence of anemia in type 2 diabetic patients. J ID'Hematoloie 2018: 7(2), 57-61.
5. Basit A, Fawwad,A.,Qureshi,H et al" Prevalence of diabetes, prediabetes and associated risk factor 2nd national data base survey of Pakistan 2016-17. BMJ open 2018;8: e20961
6. Mghanga FP, Genge CM, Yeyeye L, Twalib Z, Kibopile W, Rutalemba FJ, et al. Magnitude, Severity, and Morphological Types of Anemia in Hospitalized Children Under the Age of Five in Southern Tanzania. Cureus. 2017;9(7).
7. Gul A, Sharif N, Ahmed S. Diabetes; comparison of hba1c and serum glycated albumin levels as monitoring tool. Prof Med J. 2018;25(1).
8. Hoffbrand V, Moss PA. Hoffbrand's essential haematology: John Wiley & Sons; 2015.
9. Al-Salman M. Anemia in patients with diabetes mellitus: prevalence and progression. General Medicine: Open Access. 2015:1-4.
10. Barbieri J, Fontela PC, Winkelmann ER, Zimmermann CEP, Sandri YP, Mallet EKV, et al. Anemia in patients with type 2 diabetes mellitus. Anemia. 2015;2015.
11. Shahab,F., Sikandar,S., Shahab,A and Raziq F. Frequency of anemia in patients presenting to tertiary care hospital in Peshawar KMUJ 2015;7(1):30-33
12. Thomas MC, MacIsaac RJ, Tsalamandris C, Molyneaux L, Goubina I, Fulcher G, et al. Anemia in patients with type 1 diabetes. J Clin Endo and Metabolism. 2004;89(9):4359-63.
13. Sharif A, Younus S, Baig K, Ali NH. Prevalence and risk of anemia in type-2 diabetic patients. Health. 2014;6(12):1415.
14. Adejumo BI, Dimkpa U, Ewenighi CO, Onifade AA, Mokogwu AT, Erhabor TA, et al. Incidence and risk of anemia in type-2 diabetic patients in the absence of renal impairment. Health. 2012;4(6):304-8.
15. Bonakdaran S, Gharebaghi M, Vahedian M. Prevalence of anemia in type 2 diabetes and role of renal involvement. Saudi J Kidney Dis and Transplant. 2011;22(2):286.
16. Beard JL. Iron requirements in adolescent females. J Nutrition. 2000;130(2):440S-2S.
17. AlDallal SM, Jena N. Prevalence of Anemia in Type 2 Diabetic Patients. J Hematology. 2018;7(2):57-61.

18. Hasslacher C. Anaemia in patients with diabetic nephropathy—prevalence, causes and clinical consequences. European Cardiology Review. 2007;3(1):80-2.

19. Beard JL. Iron requirements in adolescent females. J Nutrition. 2000;130(2):440S-2S.

20. Pasricha S-R, Drakesmith H, Black J, Hipgrave D, Biggs B-A. Control of iron deficiency anemia in low and middle-income countries. Blood. 2013:blood-2012-09-453522.

21. Antwi-Bafour S, Hammond S, Adjei JK, Kyeremeh R, Martin-Odoom A, Ekem I. A case–control study of prevalence of anemia among patients with type 2 diabetes. J medical case reports. 2016;10(1):110.

CONFLICT OF INTEREST: Authors declare no conflict of interest

GRANT SUPPORT AND FINANCIAL DISCLOSURE: NIL

AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

Gul A: Concept, Design

Nisar U: Analysis and interpretation of data

Rahman S: Data collection,

Ullah Z: Methodology

Furqan M: Writing and Review

Haq M: Proofreading and Review

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.