PREVALENCE OF ANEMIA IN TYPE 2 DIABETICS

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Author's Contribution

All authors declare no conflict of interest.

ABSTRACT

BACKGROUND: Anemia leads to multiple complications in body including fatigue, body aches, lethargy, shortness of breath, poor mental health which increases burden of disease in already diseased patients. So this must be addressed at earliest before development of complications in diabetic patients. The purpose of the study was to see frequency of anemia in type 2 diabetes. The study aims at stating the high prevalence of anemia which goes un-noticed initially and hence will signify the need to understand the importance of early recognition.

MATERIAL AND METHODS: This was a retrospective study made after observations on 114 patients of type 2 DM who were reported to the Department of Medicine, D.H.Q Hospital Sargodha, Pakistan, over a period of six months between from July 1, 2019 to December 31, 2019. Variables noted for each patient from each case record i.e, age, gender, hemoglobin, and glycated hemoglobin. After obtaining consent, all diabetics were subjected to detailed data, clinical trials, and investigations as follows: immediate blood sugar, postprandial blood sugar, glycated hemoglobin, whole blood count with peripheral smear and kidney function tests, creatinine clearance (Cockroft -Gault equation), urine proteinuria test. Adult patients with type 2 diabetes, and patients on sulfonylureas, metformin or insulin were included. Patients with diabetes type 1, diabetes during pregnancy or any malignancy were excluded. Diabetes was defined if fasting glucose was more than 126mg/dl or HbA_1c level more than 6.5%. Anemia was labeled if hematocrit was below 41% in males and below 36% in females (WHO criteria).

RESULTS: Out of these 114 patients, there were 136 females and 64 males. There was 95% of sample population was found to be anemic, among them 60% were women (mainly between 51-70 years of age) and 40% were men (between 41-60 years of age). The mean age of patients with anemia was found to be 60.69 ± 0.198 years. The average age of patients without anemia was found to be 54.07 ± 0.121 years. The difference in mean age was significant in the cases with anemia and without anemia (P <0.05). This shows that advancing age along with increased duration of disease significantly increases risk of developing anemia in type 2 diabetics.

Of the 114 patients, 95 patients were anemic (83.3%); 40% of diabetic men and 60% of diabetic women were diagnosed with the anemia. Of the 114 patients, 31 patients had managed their blood sugars well, and rest of 84 patients were poorly controlled for diabetes. Anemia was more common among the group that had poorly controlled their blood sugar levels.

There is a statistically significant relationship between the prevalence of anemia and sex, e.g. the prevalence of anemia is

significantly greater in women with diabetes than in men with diabetes (P <0.05). The prevalence of anemia was significantly higher in advancing age, diabetes which was not properly controlled and longer duration of disease than in the well glycemic control group (P <0.05).

CONCLUSION: Chronic disease like type-2 diabetes is associated with low hemoglobin level and is more common in females.

KEYWORDS: Diabetes mellitus type 2 , anemia ,gender ,age ,duration of disease, glycemic control

INTRODUCTION:

Diabetes mellitus (DM) has a high worldwide impact[1] .It leads to various problems when poorly managed, such as nephropathy, neuropathy, and retinopathy and a few metabolic disorders. Type 2 diabetes affects around 7% adults[2]. It is estimated that by 2030, we will have around 440 million diabetes cases.[3] The risk of developing anemia in patients with long standing diabetes is doubled as compared to the general population[4]. Incidence of unfavourable cardiovascular consequences and need for either dialysis or transplantation is much more in diabetics with anemia as shown by multiple studies [5].Several studies in various populations also evaluated that anemia increased risk for hospitalization and all cause mortality [6]. Indeed many patients with long standing, poorly controlled diabetes do not develop nephropathy[7]. Thus, the difference in individual risk remains unexplained and the presence or absence of diabetic nephropathy does not always correlate to the level of anemia.[5, 8-11]

Diabetes mellitus type 2 a heterogenous group of disorders predominantly affects adults but in the past few decades due to changes in life style its incidence has been on rise in all age groups[7]. Sedentary life style and lack of exercise is a common contributing factors to disordered metabolism and inappropriate hyperglycemia[4]. Patients with poor glycemic control are susceptible to long term complications of hyperglycemia causing significant morbidity and mortality. Vascular injury and diabetic microangiopathy leads to development of diabetic nephropathy, retinopathy, neuropathy and accelerated atherosclerosis. Type 2 DM is also one of the causes of anemia of chronic disease as diabetic nephropathy leads to decreased production of erythropoietin, contributing positively to the increased risk of anemia[1]. Increased hepcidin levels [5]among chronic diseases can be a major mediator that interferes with intestinal iron absorption. Thus, diabetic patients are more prone to develop anemia than the general population of the same age group.[11] Indeed some patients developed anemia long before development of overt nephropathy. So factors other than kidney dysfunction also play their part in development of anemia in such patients. Anemia

leads to multiple complications in body including fatigue, body aches, lethargy, shortness of breath, poor mental health which increases burden of disease in already diseased patients.

Anemia in adults is present if hematocrit is below 41% in males and below 36% in females[12] either due to diminished production or accelerated loss[13], which results in tissue damage[14], ineffective immune response[15] and increasing risk of target organ damage every year passing [16]. The problem is said to be affecting developing and developed countries alike, causing public health problems[17].

The rationale of this work was to determine whether anemia is more prevalent in type 2 diabetics along with its co-relation with variables like age, gender, progression in severity with time and persistent hyperglycemia.

MATERIAL AND METHODS:

This was a retrospective study made after observations on 114 patients of type 2 DM who were reported to the Department of Medicine, D.H.Q Hospital Sargodha, Pakistan. Data was collected over a 6-month period between July 1, 2019 and December 31, 2019. Variables noted for each patient from each case record: age, gender, hemoglobin, and glycated hemoglobin.

After obtaining consent, all diabetics were subjected to investigations as follows: immediate blood sugar, postprandial blood sugar, glycated hemoglobin, whole blood count with peripheral smear and kidney function tests, creatinine clearance (Cockroft -Gault equation), urine proteinuria test.

Adult patients with type 2 diabetes, and patients on sulfonylureas, metformin or insulin were included. Exclusion criteria was diabetes type 1, diabetes during pregnancy or any malignancy, blood dyscrasias, gastric / duodenal bleed, history of hemorrhoids, autoimmune disorders etc. Diabetes was defined if fasting glucose was more than 126mg/dl or HbA_1c level more than 6.5%. Anemia was labeled if hematocrit was below 41% in males and below 36% in females (WHO criteria).

The demographics including gender, age, anemia, disease duration and HbA_1c levels were analyzed using SPSS 20 statistical software.

RESULTS:

In this study, data of 114 diabetic patients who were reported to the Department of Medicine, D.H.Q Hospital Sargodha, Pakistan was analyzed. Out of these 114 patients, number of female patients was 136 and male were 64. (Table1).

Table 1. Gender distribution of the population sample

Gender	Frequency	Percentage
Woman	67	59
Male	47	41
Total	114	100

Table 2: Age distribution of the sample population

Age Group (age)	Female	Male
30-40	10	4
41-50	12	9
51-60	27	13
61-70	16	6
> 70	2	6

Table 3: Percentage of Anemia in Sample population

WHO Criteria	Men	Women	Percent
WHO Criteria	38 (40%)	57 (60%)	9 5 (83.3%)
Anemia	9 (7.8%)	10 (8.7%)	1 (16.6%) 9
No Anemia	47 (41%)	67 (58.7%)	1 1 4 (100%)

Table 4. Glycemic status of the population

Glycemic Status	No. of patients	Percent
Glycemic Status	31	27
Well managed	83	72.8

95% of sample population was found to be anemic, among them 60% were females (mainly between 51-70 years of age) and 40% were men (between 41-60 years of age). The mean age of patients with anemia was found to be 60.69 ± 0.198 years. The average age of patients without anemia was found to be 54.07 ± 0.121 years. The difference in mean age was significant in the cases with anemia and without anemia (P <0.05). This shows that advancing age along with increased duration of disease significantly increases risk of developing anemia in type 2 diabetics.

Of the 114 patients, 95 patients were anemic (83.3%); 40% of diabetic men and 60% of diabetic women were diagnosed with the anemia.

Of the 114 patients, 31 patients had managed their blood sugars well, and rest of 84 patients were poorly controlled for diabetes.

Anemia was more common among the group that had poorly controlled their blood sugar levels. (Table 4).

There is a statistically significant relationship between the prevalence of anemia and sex, e.g. the prevalence of anemia is significantly greater in women with diabetes than in men with diabetes (P <0.05). The prevalence of anemia was significantly higher in advancing age, diabetes which was not properly controlled and longer duration of disease than in the well glycemic control group (P <0.05) (Table 4).

DISCUSSION:

In this study, of the 114 patients, 83.3% were anemic and 16.6% were non-anemic. In contrast, a study by Kaushik et al [18] showed that 63% were anemic and 37% were non-anemic. In another study by Ezenwaka et al [19] 46.45% were anemic and 53.54% were non-anemic. Usually, chronic diseases, such as DM, are associated with anemia of inflammation or infection or chronic anemia (ACD) [20]. Multiple studies of recent past are in accord with the fact that anemia is more prevalent in diabetic patients as the disease progresses with advanced age and time [21,22]. Possible reasons for this increase may be due to a poor dietary habits ,impaired intestinal absorption of iron and micro nutrients such as cyanocobalamin, folate or age-related comorbidities.

Raised blood sugar levels in patients with poor glycemic control may lead to raised levels of oxygen free radicals which may have toxic effects on marrow erythrocytes or mature erythrocytes leading to dysfunctional erythrocyte [23] and programmed cell death of immature red cells further reduces hemoglobin.

Though anemia is a common in diabetics but its burden has been less well characterized. As shown in study about 3 / 4th of the population of patients with diabetes had anemia. Anemia adversely affects the quality of life resulting in poor health in diabetic patients by causing myriad symptoms such as muscle weakness, impaired mental function, depressive symptoms. It is therefore prudent to monitor blood sugar levels frequently and be compliant to medication so that glucose levels remain in the normal range to reduce risk of developing anemia and its complications. Whether a patient is presenting in emergency due to acute complication of diabetes or is diagnosed for the first time on routine check-up ,whatever the presentation may be, it may be also be desirable to check for hemoglobin levels by simply doing complete blood counts, as timely identification of anemia and intervention could offer them a better quality of life.

CONCLUSION:

Chronic disease like type-2 diabetes is associated with low hemoglobin level and is more common in females.

STUDY LIMITATION:

This kind of study should be performed over a large scale.

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