

Incidence of anemia in type 2 diabetic mellitus and its prognostic index

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Abstract

Objective: To identify the incidence of anemia in type 2 diabetic mellitus in a rural population and its prognostic value. **Methodology:** This is prospective observational study conducted at RMMCH, Chidambaram; the study comprises of 250 patients diagnosed with type 2 diabetic mellitus. Age of greater than 18 years, Risk factor such as hypertension and CAD were included in the study. Age of less than 18 years, anemia due to chronic blood loss, anemia due to other secondary causes and patient on treatment for anemia is excluded from the study. In patients with diabetic mellitus, HbA1c, Complete Blood Picture, Smear study, were done after obtaining consent detail from patients. **Result:** In the present study out of 250 populations females was dominated by 160/250(64%) with mean age group of 60±13 were mean duration of diabetes being 4.1±3 years and mean hemoglobin level was 11.3 ±2%, the comorbid condition such as CAD and Hypertension was present in 90 and 110 patients respectively. Mean HbA1c value was 8.4±2.1. Normocytic Normochromic anemia was present in 25% of anemic patients; Microcytic Hypochromic anemia was found in 35%, Macrocytic Hyperchromic is 32% and Dimorphic anemia was present in 8%. **Conclusion:** Anemia is present in 74% of the study population which point towards the need of hematological evaluations and care needed for the diabetic patients for better outcome in rural population.

Key words: Type 2 Diabetic Mellitus, Anemia, HbA1c.

Introduction

Diabetes mellitus (DM) is a metabolic disorder of great impact worldwide. The diabetes affects about 7% of the population worldwide [1]. The prevalence of diabetes among adults in the southern states of India has been reported as being 18.6 % in urban populations and approximately 10% in rural populations [2, 3]. With the prevalence rate is increasing in the younger age groups [4, 5]. The long term complications of diabetes can be expected to occur during their productive years causing severe economic and social burden [6]. The increasing prevalence of type 2 diabetes mellitus has become a major public health concern. The diabetic patient number has been increasing due to population and urbanization growth, increase in the prevalence of obesity and sedentary lifestyle, and the longer survival of patients with DM [7]. Several studies suggest that anemia is twice as common in diabetics compared with

non-diabetics [8]. Despite these facts, anemia is unrecognized in 25% of the diabetic patients. [9] Anemia also develops earlier and is more severe in patients with diabetes than in patients with renal impairment from other causes [10]. Recent studies have linked anemia with relatively low serum erythropoietin in persons with either type 1 or type 2 diabetes, even without advanced kidney disease or overt uremia [11]. The etiology of anemia in diabetes is multifactorial and includes inflammation, nutritional deficiencies, concomitant autoimmune diseases, drugs, and hormonal changes in addition to kidney disease [9]. Anemia is found to contribute to the development and progression of micro- and macro-vascular complications of diabetes, which has a negative impact on the quality of life and an additional burden on the health of the patients. [10, 12] There for it is important to diagnose and treat anemia in diabetic mellitus patients. This study aimed to determine the prevalence of anemia in type 2 diabetics in relation to the diabetic mellitus status.

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Methodology

This is prospective observational study conducted at RMMCH, Chidambaram; the study was carried out during the period of 3 months from February 2016 to May 2016, the study comprises of 250 patients with type 2 diabetic mellitus. All patients admitted with diabetic mellitus aged more than 18 years of both genders were included in the study. Risk factor such us hypertension and CAD were also included. Age of less

than 18 years, anemia due to chronic blood loss and anemia due to other secondary causes is excluded from the study. The demographic data such as Name, Age, Sex, duration of Diabetes, HbA1c, Complete Blood Picture, Smear study, were done. Anemia was diagnosed based on WHO criteria; the data obtained was analyzed using statistical tool SPSS; version 16, mean and standard deviation were calculated from the collected data's.

Result

A total of 250 patients with diabetes were included (90 males and 160 females) in the study, out of that 185 were found to be anemic. Mean age was 60 ± 13 were Mean duration of diabetes being 4.1 ± 3 years and Mean Hb was $11.3 \pm 2\%$ with unsatisfactory glycemic control in 74% of diabetics. The comorbid conditions such us CAD and Hypertension was present in 90 (70males and 20 females) and 110 (65 males and 45 females) patients respectively. Mean HbA1c value was 8.4 ± 2.1 . The prevalence of anemia was significantly higher with 74% (185/250); which was 36% (90/250) in men and 38% (95/250) in women. Among these, Normocytic Normochromic anemia was present in 25% of anemia, Microcytic hypochromic anemia was found in 35%, Macrocytic Hyperchromic anemia was found in 32% and Dimorphic anemia was present in 8% respectively. The hemoglobin level was found to be less than 7g/dl for 16 male & 20 female patient and more than 13g/dl was observed in 37 (17 male and 20 female). Highest number of population of 78 (26 males and 52 females) was seen in the range between 9-11g/dl.

Table-1

Age group	HbA1c										Hemoglobin									Duration of DM			
	<6		6-7		7-8		8-9		>9		<7		7-9		9-11		11-13		>13		<5	5-10	>10
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	years	years	years
21-30	1	0	1	0	0	0	2	0	0	0	1	0	0	0	2	0	1	0	0	0	4	0	0
31-40	0	0	2	4	2	7	4	4	3	4	1	4	1	6	4	4	2	1	3	4	14	10	6
41-50	0	0	6	3	5	6	5	12	2	6	2	3	1	6	4	9	5	6	2	3	18	12	11
51-60	0	0	6	6	6	9	9	25	5	11	5	4	5	9	7	18	4	14	5	6	11	31	35
61-70	0	0	3	3	4	6	9	18	4	9	3	2	3	6	7	12	3	12	4	4	14	18	24
>70	0	0	5	2	2	5	5	13	3	7	4	7	2	5	2	9	4	8	3	3	9	14	19

Discussions

A study conducted by Nadia *et al.* found anemia in diabetic mellitus patients is comparatively higher in females (26%) than males (10%)[13] where as in our study the incidence of anemia in diabetic mellitus was 38% in females and 36% in male. The mean duration of diabetic mellitus is 4 years in our study; where as in Nadia *et al.* the mean duration is 7 years [13] In our study Normocytic Normochromic anemia is found to be 25%, Microcytic Hypochromic anemia is 35% and

Macrocytic Hyperchromic anemia is 12% where study conducted by Nadia *et al.* shows 59.8% of Normocytic and 37.8% of Microcytic anemia respectively. Travest *et al.* suggest that anemia is prevalent in elderly diabetics. [14] similar pattern was seen in our study where age group between 51-60 and 61-70 have higher incidence of anemia and quarter of them remain undiagnosed. Most of the patients belong to older age group with long duration of Diabetic mellitus that could

be possible additional contribution factor for unexplained anemia. Polypharmacy is most common among diabetic patients which may contribute to anemia directly or indirectly. Marthias *et al* found ACE inhibitors and ARB to be associated with reversible decrease in hemoglobin concentration in diabetics [15]. Our study shows that the comorbid conditions such as CAD and Hypertension was present in 90 (70 males and 20 females) and 110 (65 males and 45 females) patients respectively which is a contributing factor to polypharmacy and further as risk factor for anemia where the same conclusion was found in study conducted by Dousampanis *et al* [16].

Several trials conducted of treating anemia in diabetics suggest that correction of anemia leads to improved quality of life in diabetic patients [17] were same scenario was seen in our Study. Anemia is frequently seen in diabetes and very often remain undiagnosed, WHO reports global prevalence of anemia in general population to be 24.8% (12.7 in males and 30.2 in females).[18]. With respect to the global prevalence the greatest absolute increase in the number of people with diabetes will be in India with a projected estimate of 366 million in the year 2030 from 171 million in 2000 [19].

Another chronic condition which affects the quality of life is anemia. The occurrence of anemia in diabetics was earlier attributed to renal pathology but studies have shown that anemia develops earlier in patients with diabetes when compared to patients with renal involvement due to other causes [20]. Observational studies also indicate that low hemoglobin levels in diabetics may increase risk for progression of kidney disease and cardiovascular morbidity and mortality [21,22].

Conclusion

Our study shows 185 patients out of 250 were anemic; which accounts 74% of the total population which points toward the need for hematological screening in all diabetics presenting to hospital for better result outcome and prognosis.

Limitation of the Study

1. This study is conducted in rural population where most of the patients are from lower socioeconomic class, hence other care for anemia to be rule out.
2. Anemia due to secondary causes was not examined in detail.

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