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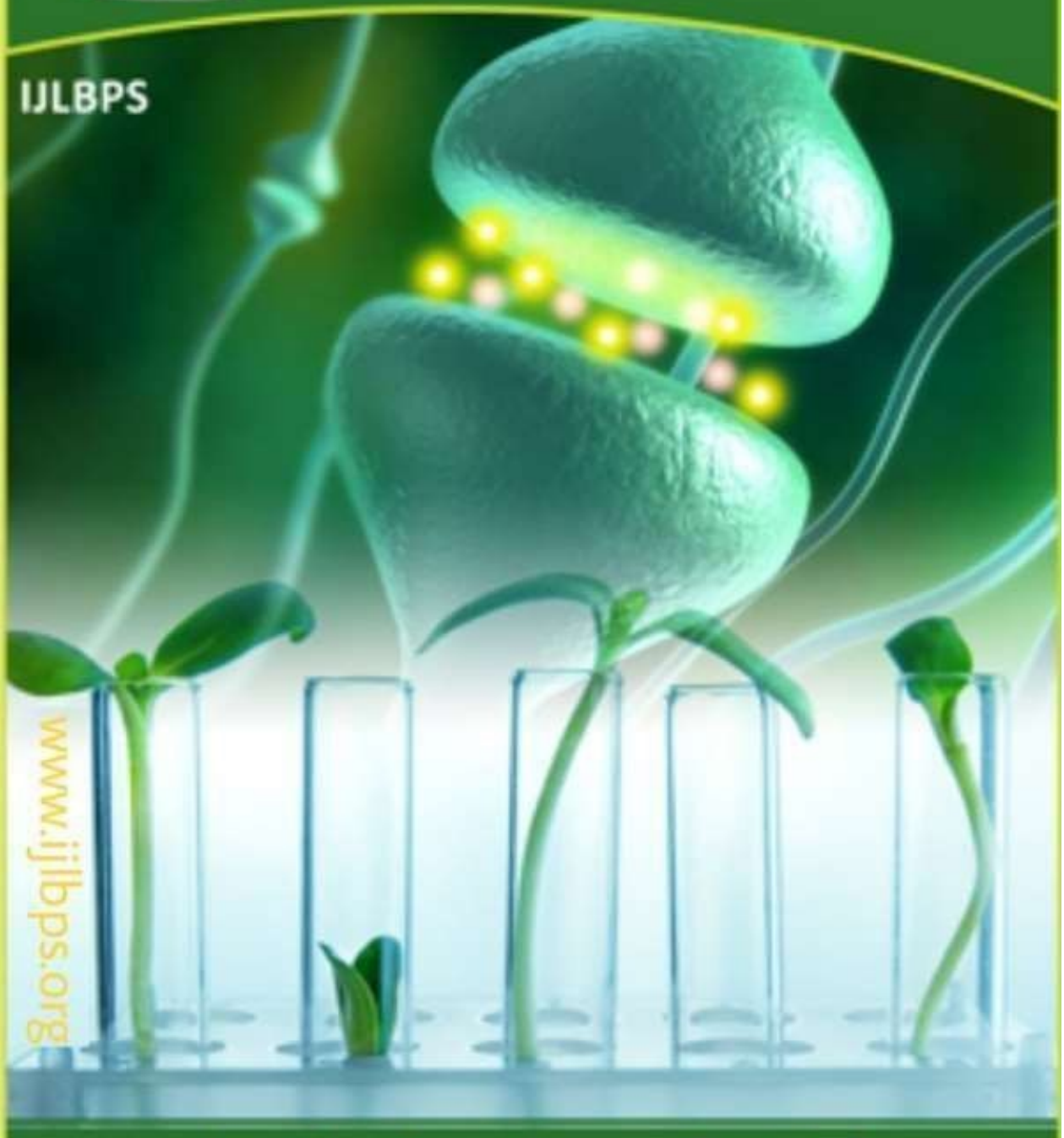

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An investigation into the prevalence of anemia in patients diagnosed with type 2 diabetes mellitus who were treated at a tertiary care hospital

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ABSTRACT

To provide some context, diabetes mellitus refers to a collection of metabolic illnesses that affect the metabolism of carbohydrates. Studies have shown that diabetics have a twofold higher incidence of anemia compared to people who do not have diabetes. The development of anemia is an extra burden that is added to the microvascular issues that are associated with diabetes. In spite of these facts, twenty-five percent of diabetic patients do not seek medical attention for anemia. The goals are: 1. To conduct research on the degree to which patients with type 2 diabetes mellitus experience acute anemia 2. To investigate the significance of anemia as a clinical indication of prognosis in patients diagnosed with type 2 diabetes mellitus as a method: A prospective clinical study was carried out at selected tertiary hospital during the months of August 2022 and January 2024. The study involved 125 patients who were evaluated for type 2 diabetes mellitus and were admitted to the inpatient department of general medicine. The relevant inferential statistics were utilized in order to analyze the data. Based on the findings of the study, it was found that out of a total of 125 patients, 78 (36.5%) were females, while 47 (37.5%) were males. Among the observations that fall into the HbA1c >10 group, the majority of them (86.7% of them) have a Severe Hb. Significantly more than sixty-three percent of people who have had diabetes for more than ten years have significant Hb severity. The findings of this study indicate that there is a requirement for periodic hematological screening in all diabetic patients who present themselves to the hospital, as well as treatment of anemia, in order to achieve a more favorable outcome and reduce the risk of complications.

INTRODUCTION

Diabetes mellitus is a category of metabolic disorders of carbohydrate metabolism in which glucose is both underutilized as an energy source and overproduced due to improper gluconeogenesis and glycogenolysis, resulting in hyperglycemia. This condition is characterized by a combination of both of these features. According to the data that was published by the International Diabetes Federation in 2021, over 537 million people around the world were affected

by diabetes. This is approximately 10.5% of the total population of the planet. Recent research has demonstrated that impaired glucose tolerance can rapidly lead to diabetes in the southern states of India. In these states, the prevalence of diabetes among adults has reached approximately 20% in urban populations and approximately 10% in rural populations. Furthermore, impaired glucose tolerance has shown an increasing trend with increasing age. During the past few years, there has been a significant shift in the age at which diabetes first manifests itself, which is the most unsettling development. people who have diabetes acquire anemia at an earlier age and with a greater severity than people who do not have diabetes, which can lead to consequences of diabetes that cannot be reversed. Anemia in diabetics is caused by a complex interaction of multiple factors. Patients who have diabetes may experience anemia, which can result in the development and progression of microvascular and macrovascular complications of diabetes. These problems have a negative impact on the patients' quality of life and add an additional burden to their health circumstances. Therefore, it is essential to diagnose and treat anemia in people who have diabetes mellitus. Treatment is also essential. Therefore, the purpose of this study is to assess the prevalence of anemia in a set of patients who have type 2 diabetes mellitus and to determine the importance of this condition in terms of prognosis in a tertiary care center located in Salem.

Objectives:

1. To study the occurrence of anemia in patients with type 2 diabetes mellitus
2. To study role of anemia as prognostic marker in patients with type 2 diabetes mellitus

MATERIALS AND METHODS:

In the course of a prospective clinical trial that was carried out at a certain tertiary hospital in Salem between the months of August 2022 and January 2024, 125 patients who were diagnosed with type 2 diabetes mellitus and were admitted to the inpatient department of general medicine were evaluated for the same condition. The relevant inferential statistics were utilized in order to examine the data. This was a prospective study design for the research.A tertiary hospital in Salem was chosen as the location for the research investigation.We had 125 people in our sample.

INCLUSION CRITERIA:

1. All patients above the age of 18 years.
2. Diagnosed patients of type 2 diabetes mellitus as per ADA (American diabetes association) Criteria

Exclusion Criteria:

1. Anemia that is caused by a persistent loss of blood or a recognized instance of anemia

2. Patients who are taking medications that cause anemia Patients diagnosed with diabetes mellitus who are experiencing renal failure, as evidenced by microalbuminuria, macroalbuminuria, and impaired kidney function

Statistical Analysis: In order to examine the statistical data, the software version IBMSPSS25.0 was utilized. On an Excel page, the data that were collected were spread out, and a master chart was created. A number of tables and graphs were built with the help of the master chart. The mean and standard deviations of the quantitative data were computed, and the t-test was utilized to determine whether or not the data was statistically significant. The chi-square test and the Fisher exact probability test were utilized for the purpose of determining the statistical significance of qualitative data analysis. Considered to be statistically significant if the P-value was lower than 0.05

RESULTS:

Table No.: 01. The table provides the severity of the Hemoglobin observed at different level of HbA1c levels.

HbA1c Category	HB Category				Total
	Severe	Moderate	Mild	Normal	
< 7	0	0	24	05	29
	0.00%	0.00%	82.80%	17.20%	100.00%
07-10,	0	65	1	0	66
	0	98.50%	1.50%	0.00%	100.00%
>10	26	4	0	0	30
	86.70%	13.30%	0	0	100%
Total	26	69	25	5	125
	20.80%	55.20%	20.00%	4.00%	100.00%

*chi-square statistic = 215.726, p-value < 0.000 (highly significant association)

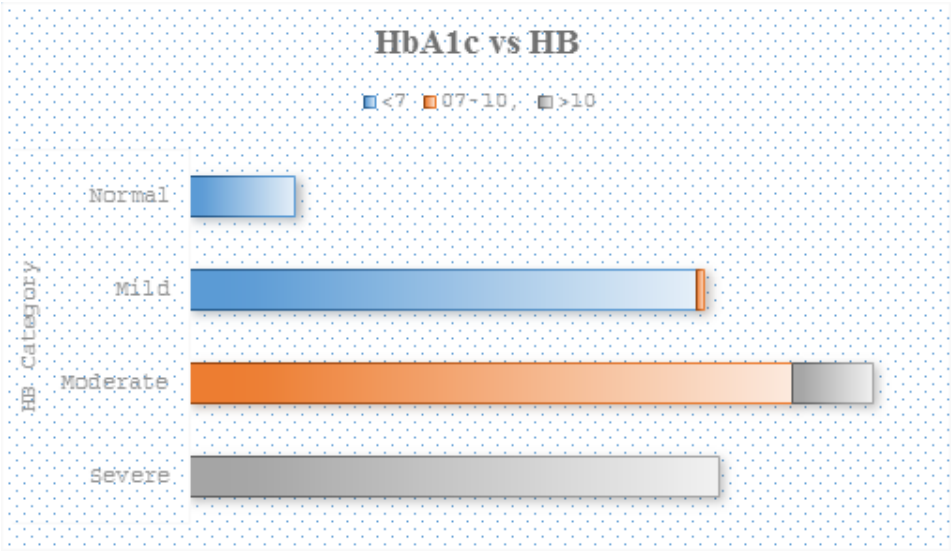


Table No.: 02. The table provides the severity of the Hemoglobin observed among history of CAD.

history of CAD	HB Category				Total
	Severe	Moderate	Mild	Normal	
Absent	0	24	25	5	54
	0	44.40%	46.30%	9.30%	100.00%
Present	26	45	0	0	71
	36.60%	63.40%	0.00%	0.00%	100.00%
Total	26	69	25	5	125
	20.80%	55.20%	20.00%	4.00%	100.00%

*chi-square statistic = 61.211, p-value < 0.000 (highly significant association)

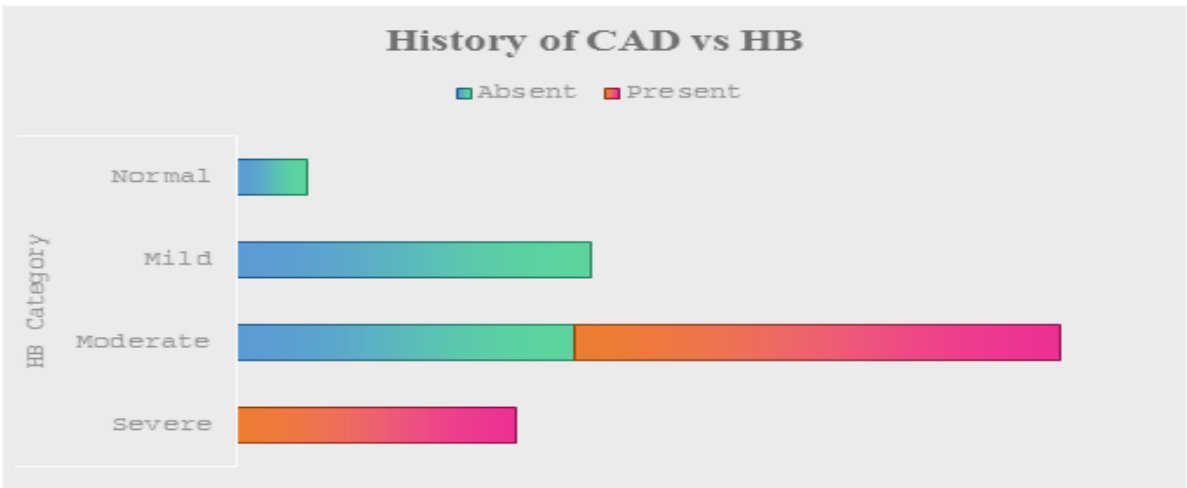
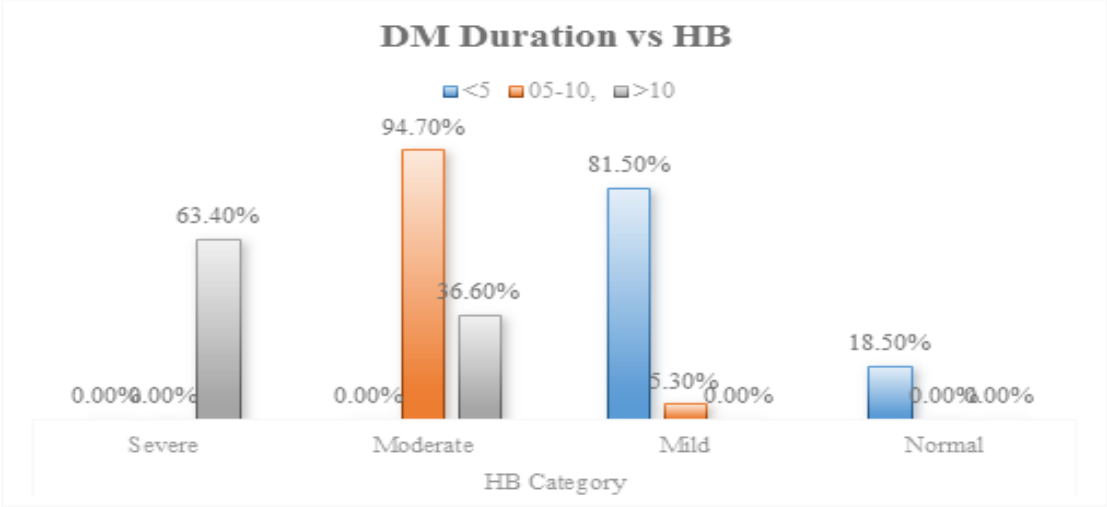


Table No.: 03. The table provides the severity of the Hemoglobin observed at different levels of diabetes mellitus.

DM Duration	HB Category				Total
	Severe	Moderate	Mild	Normal	
<5	0	0	22	5	27
	0	0	81.50%	18.50%	100.0%
05-10	0	54	3	0	57
	0	94.70%	5.30%	0	100%
>10	26	15	0	0	41
	63.4%	36.60%	0	0	100%
Total	26	69	25	5	125
	20.8%	55.20%	20%	4.0%	100%

*chi-square statistic = 170.455, p-value < 0.01 (highly significant association)



DISCUSSION:

A comparison was made between the severity of hemoglobin (Hb) levels in diabetic patients who were male and those who were female. There were a total of 125 patients, with 78 (62.5%) girls and 47 (37.5%) males attending the facility.When compared to males, who have a 48.9% chance of having moderate Hb severity, females have a 59% chance of having it.In comparison to females, males have a higher probability of having a normal hemoglobin severity (10.6%). There are 86.7% of observations that have a severe Hb severity, while 13.3% have a moderate Hb severity, and the majority of these observations fall into the HbA1c >10 category. Poor glycemic control was shown to be associated to the prevalence of anemia in diabetic patients, according to the findings of a study that was carried out by Ankeet Kumar and colleagues.
A study was conducted to investigate the correlation between a previous history of coronary artery disease (CAD) and the severity of hemoglobin (Hb). The results of the study resulted in a highly significant association, as indicated by a p-value of less than 0.000.Among people who have a

history of coronary artery disease (CAD), the majority of them (63.4% of them) have moderate hemoglobin severity, while 36.6% of them have severe hemoglobin severity. None of them have a mild or normal hemoglobin level.

An investigation was conducted to examine the severity of hemoglobin (Hb) levels at various durations of diabetes mellitus (DM). The results obtained were found to be very significant, with a p value of less than 0.000.The majority of people who have had diabetes for more than ten years have severe hemoglobin levels, which accounts for 63.4% of the total, while 36.6% have moderate hemoglobin levels. None of them have a mild or normal hemoglobin level. In the peripheral smear, the normocytic normochromic pattern is the most prevalent, followed by the microcytic hypochromic pattern. persons who have a history of coronary artery disease are more likely to have severe or moderate hemoglobin severity, according to this study, and persons who have a HbA1c that is greater than 10 have severe anemia. Hb severity also increases in proportion to the duration of diabetes.

CONCLUSION:

One of the most prevalent illnesses that can be avoided, anemia is especially prevalent in those who have diabetes mellitus. Patients who had type 2 diabetes and anemia had a higher risk of developing hypertension, coronary artery disease, and other comorbidities. The conclusion of this study is that there is a requirement for periodic hematological screening in all diabetic patients who present themselves to the hospital, as well as suitable remedial procedures that are both cost-effective and successful in terms of iron and vitamin supplements. These measures will result in improved outcomes and prognoses, as well as the prevention of significant problems.

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