Diabetes And Its Effects on The Eyes- A Study in Urban Area of Assam

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***Abstract*- Diabetes is medical condition in which the patient suffering high blood sugar from their normal range where normal ranges are; in case of fasting 80-100mg/dl and post prandial is less than 140mg/dl; As a result, patient may experience in fatigueness, weakness, and other systemic symptoms. The main types of diabetes are Type 1, where the body makes little to no insulin; Type 2, where the body doesn't use insulin properly; and gestational diabetes, which occurs during pregnancy. Other types exist, such as Maturity Onset Diabetes of the Young and latent autoimmune diabetes in adults, which is sometimes called type 1.5 diabetes. The aim of the study was to know the prevalence of ocular morbidities among diabetic patients in different age, groups, along with awareness for prevention of ocular system. Systemically, diabetic patients are facing some complications which are always hungry, always thirsty, weight loss, frequent urination, fatigue, dry skin, dizziness, weakness etc. In ocular complication of diabetic retinopathy is blurring of vision, floaters, difficulty with night vision, faded colors, dark or empty areas in vision, sudden vision loss, severe eye pain etc. A questionnaires-based survey was done within the urban area of Guwahati, from August 2025 to December 2025 randomly. Individuals, those who were suffering diabetic and ocular complications were distributed a prescribed questionnaires among them to filled properly. After that, individual, those who had ocular complications, were examined their visual acuity by Snellen's chart, Anterior segment examination was done by torch and loupe, Posterior segment including fundus examination were done by direct Ophthalmoscopy. Individuals, those who have had refractive errors were corrected by dry radioscopy as objective refraction followed by subjected refraction of suitable method. Individuals, those who had blurry vision symptoms, were tested by ophthalmoscopy. Individuals, who were attending in the age group 20 to 80 years of age and suffering diabetic related systemic abnormalities and facing ocular complications were included in the study. Individuals who were bearing normal range of blood sugar level but pre-existing ocular diseases, other systemic related eye diseases are excluded from the study. The age group, bellow 20 years and above 80 years are not included in this study. The study was conducted in urban Area of Assam; where 89 individuals were identified as diabetic, and also facing different ocular abnormalities in different age groups in both genders. Out of 89 diabetic patients 61 were male, 28 were females. In the study we also consider in three different age groups in both sex: 1st group 20-40years of age; 2nd group 41-60 years of age; 3rd group 61-80 years of age. The study highlights a significant correlation between diabetic and visual disturbances, such as blurred vision, floaters, difficulty with night vision, faded colors, dark or empty areas in vision, sudden vision loss, severe eye pain issues. Diabetic can reduce to improve on a healthy lifestyle that includes regular physical activity, a balanced diet, maintaining a healthy weight, and getting enough sleep. Prediabetes or type 2 diabetes, losing even a small percentage of body weight can significantly lower blood sugar levels. Other key steps include quitting smoking, managing blood pressure and cholesterol, and working with a healthcare professional to create a personalized plan.**

Key words*: *Diabetic; prevalence, ocular abnormalities; blurring vision; weakness; urban area of Assam.

I. INTRODUCTION

Diabetes is medical condition in which the patient suffering high blood sugar from their normal range where normal ranges are; in case of fasting 80-100mg/dl and post prandial is less than 140mg/dl. As a result, patient may experience in fatigueness, weakness, and other systemic symptoms.

The main types of diabetes are Type 1, where the body makes little to no insulin; Type 2, where the body doesn't use insulin properly; and gestational diabetes, which occurs during pregnancy. Other types exist, such as Maturity Onset Diabetes of the Young and latent autoimmune diabetes in adults, which is sometimes called type 1.5 diabetes.

Type 1 diabetes

a) The body's immune system attacks and destroys the insulin-producing cells in the pancreas.

b) It requires daily insulin injections to survive.
c) It is often diagnosed in children and young adults but can appear at any age.

Type 2 diabetes

a) The body's cells do not respond to insulin properly, and the pancreas may not make enough insulin to keep blood glucose levels normal.
b) It is the most common type of diabetes.
c) Risk factors include being overweight or obese and having a family history of the disease.
d) It can be managed with lifestyle changes (diet, exercise) and sometimes medication or insulin.

Gestational diabetes

a) Occurs only in pregnant women.
b) It is a temporary condition that usually disappears after the baby is born.
c) It can increase the risk of developing Type 2 diabetes later in life.

Systemically, diabetic patients are facing some complications which are always hungry, always thirsty, weight loss, frequent urination, fatigue, dry skin, dizziness, weakness etc.

In ocular complication of diabetic retinopathy is blurring of vision, floaters, difficulty with night vision, faded colors, dark or empty areas in vision, sudden vision loss, severe eye pain etc.

In these studies, in Assam show a high prevalence of type-2 diabetes in urban populations, which likely corresponds to a significant burden of diabetic retinopathy (DR). Research from tertiary care centres in North-East India suggests an overall DR prevalence of around 30% among diabetic patients, though population-based studies often report lower figures.

Diabetes Prevalence in Urban Assam: An early survey in the urban areas of Guwahati found the age-adjusted prevalence of type 2 diabetes was 8.2%. A more recent ICMR study reported an overall diabetes incidence of 5.5% for Assam as a whole, with a narrow rural-urban divide, but noted that the trend is rising.

Diabetic Retinopathy (DR) Prevalence: A hospital-based study in North-East India reported an overall prevalence of any form of DR as 30% among patients with diabetes. The study noted this figure was higher than some other Indian studies, likely due to referral bias.

National, population-based data from India suggests the prevalence of any DR among people with diabetes to be around 16.9% (with sight-threatening DR at 3.6%).

Associated Risk Factors: Prolonged duration of diabetes, poor glycaemic control, family history of diabetes, and hypertension are significantly correlated with the presence of DR.

This project would address the current gap in comprehensive, population-based epidemiological data from North-Eastern India and contribute to global and national efforts to prevent vision loss from diabetes.

Few studies on the national and international studies described that, the worldwide prevalence of diabetic was estimated to be 34.6% among people with diabetes mellitus (DM) in 2012[1]. A recent meta-analysis (comprising 59 studies) found a lower prevalence estimate of 22.27%, with the highest prevalence in the African and North American regions and a comparatively lower prevalence in South-East Asia[2]. In 2000, it was estimated that India would be home to nearly 80 million people living with DM by 2030[3]. However, with an estimated 77 million people with diabetes in 2019, the predicted disease burden has arrived in India nearly a decade earlier. The revised projection forecasts that 130 million people will be living in India with diabetes by 2045[4].

The Indian ICMR-INDIAB study, a nationally representative population-based study, reported a lower prevalence of DM in rural (5.2%) than urban (11.2%) India. However, there was a distinct difference between affluent rural communities (6.4%) and lower socioeconomic rural populations (3.9%)[5]. With a rapid change in the socioeconomic structure in India and the fast urbanization of rural settlements, the gap between urban and rural areas in the prevalence of DM is likely to narrow. In the last five decades, the prevalence of DM has increased in rural and urban India from 2.4% and 3.3% in 1972 to 15% and 19%, respectively, in 2015–2019[6]; it is higher than the worldwide rural (7.2%) and urban

(10.8%) prevalence of DM[4]. It is, therefore, necessary to study the impact of DM on vision in this population because eye care services in rural India are scarce, and nearly 65% of people of India live in villages[7]. The recent rollout of health programs such as the National Program for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases, and Stroke (NPCDCS) and National Multisectoral Action Plan (NMAP) across India has a limited provision of eye care built into these systems[8].

The rural-urban divide and the socioeconomic burden of DR in India have been studied in only some regions of India. The studies investigating the DR prevalence in the rural and urban communities of the same ethnic population have indicated a higher prevalence in urban than in rural areas, with an odds of 1.4–6 times higher in the urban population[9,10]. A wide range in DR prevalence has been reported in studies of urban and rural people alone, 10.1%–22.4% and 9.6%–32.5%, respectively[11,12,13,14]. The wide variation might have been due to differences in the study type (population/camp/hospital-based), surveyed population, and the survey period.

II. AIM OF THE STUDY

To know the prevalence of ocular morbidities among diabetic patients in different age, groups, along with awareness for prevention of ocular system.

III. OBJECTIVES OF THE STUDY

a) To determine the current, population-based prevalence of diabetic in a specific urban area of Guwahati, Assam.
b) To identify the key risk factors associated with Diabetic in this population.
c) To assess the awareness regarding Diabetic screening among the urban diabetic population.

IV. METHODS & METHODOLOGY

A questionnaires-based survey was done within the urban area of Guwahati, Assam from August 2025 to December 2025 randomly. Individuals, those who were suffering diabetic means high blood sugar and ocular complications were distributed a prescribed questionnaires among themed filled properly. After that, individual, those who had ocular complications, were examined with their visual acuity by Snellen's chart, anterior segment examination was done by torch and loupe, posterior segment including fundus examination were done by direct Ophthalmoscopy. Individuals, those who have had refractive errors were corrected by dry radioscopy as objective refraction followed by subjected refraction of suitable method.

Study Design: A population-based, cross-sectional study was conducted randomly selected adults greater than equal to 20 years, residing in the urban area of Assam, those who were suffering diabetes, were collecting their visual abnormalities with both genders.

Data Collection: Structured questionnaires to gather information on demographics, lifestyle, duration of diabetes, family history, and access to healthcare. Clinical measurements (blood pressure, BMI) would also be taken.

Inclusion criteria: Individuals, who were attending in the age group 20 to 80 years of age and suffering diabetic related systemic abnormalities and facing ocular complications were included in the study.

Exclusion criteria: Individuals who are bearing normal range of blood sugar but pre-existing ocular diseases, other systemic related eye diseases are excluded from the study. The age group, bellow 20 years and above 80 years are not included in this study.

Sample Collection: The study was conducted in urban Area of Assam; around 89 people were visited in hospital, where 89 individuals were identified as diabetic, where they also facing different ocular abnormalities in different age groups in both genders.

Study Area: Guwahati, the largest city in Northeast India and Assam's cultural hub, sits on the Brahmaputra River, acting as the region's key gateway, known for its blend of ancient temples like Kamakhya, tea gardens, vibrant markets, and proximity to the hills, serving as a vital transport and commercial center connecting the other North-East states. Guwahati is the largest city of Assam and a major metropolitan city in Northeast India, functions as a key urban hub with its core governed by the Guwahati Municipal Corporation (GMC), covering about 217 sq. km., characterized by growth radiating from its center into surrounding areas, and serving as a vital economic, transport, and cultural center

despite being nestled within a rich biodiversity hotspot.

V. RESULT OF THE STUDY

The study was conducted in urban Area of Assam; around 89 people were visited hospital, where 89 individuals were identified as diabetic, they were also facing different ocular abnormalities in different age groups in both genders. Out of 89 diabetic patients 61 were male, 28 were females. In the study we also consider in three different age groups in both sex: 1st group 20-40years of age; 2nd group 41-60 years of age; 3rd group 61-80years of age. [Table-1]

Gender	1st group 20-40years	2nd group 41-60years	3rd group 61-80 years	Total
Male	23(25.84%)	38(42.69%)	0	61(68.53%)
Female	7(7.86%)	12(13.48%)	9(10.11%)	28(31.46%)
Total	30(33.70%)	50(56.17%)	9(10.11%)	89

Table-1 Gender wise diabetic patient distribution in different age groups

In the study total 89 diabetic patients were suffering different types of systemic abnormalities like weakness, fatigueness, dizziness, frequent urination, always hungry as in different age groups.

In the below table we were found different types of systemic abnormalities in the male diabetic patients in different age groups. Out of 61 diabetic male patients we were found…… [Table-2]

Systemic Abnormalities	1st group 20-40years	2nd group 41-60years	3rd group 61-80 years	Total
Weakness	6(9.83%)	8(13.11%)	2(3.27%)	16(26.22%)
Fatigueness,	5(8.19%)	3(4.91%)	3(4.91%)	11(18.03%)
Dizziness	4(6.55%)	3(4.91%)	1(1.63%)	8(13.11%)
Frequent Urination	7(11.47%)	2(3.27%)	1(1.63%)	10(16.39%)
Always Hungry	5(8.19%)	3(4.91%)	1(1.63%)	9(14.75%)
Multiple abnormalities	5(8.19%)	1(1.63%)	1(1.63%)	7(11.47%)
Total	32(52.45%)	20(32.78%)	9(14.75%)	61

Table-2 male diabetic patient sufferer in systemic abnormalities in different age groups

In the below table we were found different types of systemic abnormalities in the female diabetic patients in different age groups. Out of 28 diabetic female patients we were found…… [Table-3]

Systemic Abnormalities	1st group 20-40years	2nd group 41-60years	3rd group 61-80 years	Total
Weakness	6(21.42%)	2(7.14%)	2(7.14%)	10(35.71%)
Fatigueness,	4(14.28%)	2(7.14%)	1(3.57%)	7(25%)
Dizziness	2(7.14%)	1(3.57%)	1(3.57%)	4(14.28%)
Frequent Urination	1(3.57%)	0	1(3.57%)	2(7.14%)
Always Hungry	0	1(3.57%)	0	1(3.57%)
Multiple abnormalities	3(10.71%)	1(3.57%)	0	4(14.28%)
Total	16(57.14%)	8(28.57%)	4(14.28%)	28

Table-3 Female diabetic patient sufferer in systemic abnormalities in different age groups

In the study we also identified many anemic patients are experienced different ocular abnormalities like, blurring of vision, floaters, difficulty with night vision, faded colors, dark or empty areas in vision , sudden vision loss, severe eye pain as in different age groups.

In the below table we were found different types of ocular abnormalities in the male diabetic patients in different age groups. Out of 61 diabetic male patients we were found…… [Table-4]

Ocular Abnormalities	1st group 20-40years	2nd group 41-60years	3rd group 61-80 years	Total
Blurring of vision	13(21.31%)	10(16.39%)	2(3.27%)	25(40.93%)
floaters	5(8.19%)	4(6.55%)	2(3.27%)	11(18.03%)
Difficulty with night vision	6(9.83%)	1(1.63%)	1(1.63%)	8(13.11%)
Sudden vision loss	2(3.27%)	3(4.91%)	0	5(8.19%)
Dark and empty area in vision	3(4.91%)	5(8.19%)	1(1.63%)	9(14.75%)
Multiple Abnormalities	2(3.27%)	1(1.63%)	0	3(4.91%)
Total	31(50.81%)	24(39.34%)	6(9.83%)	61

Table-4 male diabetic patient sufferer in Ocular abnormalities in different age groups

In the below table we were found different types of ocular abnormalities in the male anemic patients in different age groups. Out of 28 diabetic female patients we were found…… [Table-5]

Ocular Abnormalities	1st group 20-40years	2nd group 41-60years	3rd group 61-80 years	Total
Blurring of vision	5(17.85%)	2(7.14%)	1(3.57%)	8(28.57%)
floaters	3(10.71%)	2(7.14%)	1(3.57%)	6(21.42%)
Difficulty with night vision	2(7.14%)	1(3.57%)	2(7.14%)	5(17.85%)
Sudden vision loss	3(10.71%)	0	2(7.14%)	4(14.28%)
Dark and empty area in vision	2(7.14%)	1(3.57%)	0	3(10.71%)
Multiple Abnormalities	0	1(3.57%)	1(3.57%)	2(7.14%)
Total	15(53.57%)	6(21.42%)	7(25%)	28

Table-5 female diabetic patient sufferer in Ocular abnormalities in different age groups

VI. DISCUSSION OF THE STUDY

In urban areas of Assam, studies indicate a high prevalence of diabetic, with one significant hospital-based study in the region reporting an overall prevalence of 30.0% among diabetic patients. Nationally, while some studies show no significant difference between urban and rural DR rates, urban populations often have a higher prevalence of diabetes itself. Key Findings on Prevalence in Assam of Northeast India: 1) Overall DR Prevalence: In a study conducted at a tertiary care center in Northeast India (including Assam patients), 30.0% of individuals with diabetes presented with some form of DR. 2) Vision-Threatening Retinopathy (VTDR): Approximately 10% of diabetic patients in this study had VTDR, a severe form of the disease that can lead to blindness. 3) Urban vs. Rural (Regional Data): In the specific study from the Assam region, the prevalence of DR was found to be 29.26% in urban populations and 34.19% in rural populations, but this difference was not statistically significant. 4) Ethnic Variation: The study found significant variations among different ethnic groups. The Assamese group had a DR prevalence of 28.0% among all diabetic cases, while the "Others like immigrants" group had the highest prevalence at 46.67%, and tribal groups had the lowest at 21.98%.

Associated Risk Factors of diabetic, the prevalence and severity of DR are strongly linked to several modifiable and non-modifiable risk factors identified in studies in Assam and across India: a) Duration of Diabetes: Longer duration of diabetes is a primary risk factor, with prevalence significantly higher in people with known, long-standing diabetes compared to newly diagnosed cases. b) Glycemic Control: Poor glycemic control, indicated by high HbA1c levels, is strongly associated with an increased risk of developing DR. c) Hypertension: Associated high blood pressure is another significant risk factor. d) Awareness and Screening: A major issue highlighted in the research is a lack of awareness about the need for regular retinal examinations. One study found that

89.9% of known diabetics had never undergone a fundus examination, emphasizing the need for better public health campaigns.

In summary, the high prevalence of DR in the urban areas of Assam, coupled with low screening rates, indicates a critical public health challenge that requires targeted interventions and improved awareness to prevent vision loss.

VII. CONCLUSION OF THE STUDY

The study highlights a significant correlation between diabetic and visual disturbances, such as blurred vision, floaters, difficulty with night vision, faded colors, dark or empty areas in vision, sudden vision loss, severe eye pain issues. Diabetic can reduce to the risk of or manage diabetes, focus on a healthy lifestyle that includes regular physical activity, a balanced diet, maintaining a healthy weight, and getting enough sleep. For those with prediabetes or type 2diabetes, losing even a small percentage of body weight can significantly lower blood sugar levels. Other key steps include quitting smoking, managing blood pressure and cholesterol, and working with a healthcare professional to create a personalized plan.

Diet and nutrition
Eat a balanced diet: Focus on whole grains, fruits, vegetables, lean proteins, and healthy fats.
Control portions: Use the plate method and avoid overeating. Limit harmful foods: Reduce your intake of sugary drinks, sweets, refined grains, and foods high in saturated fat and sodium. Eat at regular times: Don't skip meals to help manage blood sugar levels. Stay hydrated: Drink water instead of juice or soda.

Physical activity
Aim for 150 minutes of moderate exercise per week: This can be broken down into shorter sessions. Incorporate strength training: Work on all major muscle groups at least two times a week. Reduce sedentary time: Get up and move around for a few minutes every 30 minutes to help control blood sugar.

Other lifestyle changes
Maintain a healthy weight: Even a 5-7% reduction in weight can make a difference. Quit smoking: Smoking can worsen cholesterol levels and increase insulin resistance. Get enough sleep: Aim for 7 to 8 hours of quality sleep per night. Manage stress: Stress can impact your blood sugar levels, so find healthy ways to manage it. Monitor your health: Regularly check your blood sugar, blood pressure, and cholesterol levels.

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