



RESEARCH ARTICLE

Impact of Pregnancy on Progression of Diabetic Retinopathy

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ABSTRACT

Background: diabetic retinopathy is a microvascular complication of diabetes mellitus and remains an important cause of visual morbidity. Pregnancy is known to influence the course of diabetic retinopathy due to metabolic, hormonal, and hemodynamic changes.

Objective: To assess the impact of pregnancy on the progression of diabetic retinopathy and identify associated risk factors among pregnant women with diabetes.

Methods: From April 2025 to February 2026, 150 pregnant women with pregestational or gestational diabetes participated in a prospective observational research. First-trimester, second-trimester, third-trimester, and postpartum ophthalmic exams were conducted. The conventional fundus examination was used to grade the progression of retinopathy. Glycemic control and maternal clinical indicators were noted. SPSS version 24 was used for the statistical analysis, and $p < 0.05$ was deemed significant.

Results: Progression of diabetic retinopathy was observed in 42 (28%) women. Progression was significantly higher in women with pregestational diabetes, longer duration of diabetes, poor glycemic control ($HbA1c > 7\%$), and baseline retinopathy. Severe progression requiring laser treatment occurred in 10 (6.7%) patients. Women with diabetes duration > 5 years had significantly higher progression rates ($p = 0.002$).

Conclusion: Diabetic retinopathy is known to significantly worsen during pregnancy, especially in women who already have diabetes and have poor metabolic control. During pregnancy, intensive interdisciplinary monitoring and early ocular screening are crucial.

Keywords: Intensive interdisciplinary, ocular screening, pregnancy, diabetes, pregestational diabetes.

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INTRODUCTION

One of the most prevalent microvascular consequences of diabetes mellitus and a major contributor to avoidable blindness in working-age individuals globally is diabetic retinopathy. It is caused by retinal vascular injury brought on by long-term hyperglycemia, which causes capillary leakage, ischemia, neovascularization, and progressive vision impairment. Diabetic retinopathy has become a significant clinical problem during pregnancy due to the rising incidence of diabetes among women of reproductive age. Significant physiological changes brought on by pregnancy may modify how diabetic retinopathy develops naturally. Retinal microvascular damage can be accelerated by hormonal changes, elevated blood volume, altered retinal blood flow, and abrupt changes in glycemic control. Pregnancy may exacerbate pre-existing diabetic retinopathy, according to several studies, especially in women with baseline retinal disease, long-term diabetes, poor glycemic control, hypertension, or nephropathy(1).

Compared to women who develop gestational diabetes, those with type 1 and type 2 diabetes before to pregnancy had the highest chance of developing retinopathy. Paradoxically, rapid blood glucose improvement in the early

stages of pregnancy may exacerbate retinal abnormalities temporarily. While some patients may need intravitreal therapy or retinal laser therapy to maintain eyesight, others may experience a postpartum regression in their advancement(2).

Therefore, it is crucial to detect and manage diabetic retinopathy during pregnancy as soon as possible. According to current guidelines, retinal screening should be done either before or during the first trimester. Depending on the baseline severity, subsequent exams should be performed. However, screening awareness and adherence are still below ideal levels in many contexts. In underdeveloped nations where the prevalence of diabetes is increasing and access to specialized retinal treatment may be restricted, the burden of diabetic retinopathy during pregnancy is especially significant. Optimizing prenatal care and preventing preventable sight loss can be achieved by knowing the extent of progression and related risk factors. The goal of the current study was to assess how pregnancy affected the development of diabetic retinopathy in 150 pregnant women between April 2025 and February 2026. Finding clinical factors linked to deteriorating retinopathy

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and the requirement for ocular intervention was another goal of the investigation(3).

METHODS

Study Design

Prospective observational study.

Study Period

April 2025 to February 2026.

Sample Size

150 pregnant women with diabetes.

Inclusion Criteria

- Pregnant women with pregestational or gestational diabetes
- Willing for serial ophthalmic follow-up

Exclusion Criteria

- Pre-existing retinal disease unrelated to diabetes
- Media opacity preventing fundus examination
- Lost to follow-up before second visit

Study Procedure

Detailed obstetric and diabetic history recorded. Ophthalmic evaluation with visual acuity, dilated fundus examination, and retinal grading performed in first trimester, second trimester, third trimester, and postpartum.

Variables Recorded

Age, parity, type of diabetes, duration of diabetes, HbA1c, blood pressure, baseline retinopathy stage, progression during pregnancy, treatment requirement.

Statistical Analysis

Data analyzed using SPSS version 24. Chi-square test and logistic regression used. $p < 0.05$ significant.

RESULTS

Table 1: Baseline Characteristics (n=150)

Variable	Frequency	Percentage
Pregestational diabetes	90	60%
Gestational diabetes	60	40%
Duration >5 years	55	36.7%
HbA1c >7%	68	45.3%
Baseline retinopathy present	50	33.3%

Table 2: Progression of Retinopathy by Diabetes Type

Diabetes Type	Progression	No Progression	Total	p-value
Pregestational	35	55	90	
Gestational	7	53	60	0.001

Table 3: Progression by Risk Factors

Risk Factor	Progression n (%)	No Progression n (%)	p-value
Duration >5 years	28 (50.9%)	27 (49.1%)	0.002
HbA1c >7%	30 (44.1%)	38 (55.9%)	0.01
Baseline retinopathy	26 (52.0%)	24 (48.0%)	<0.001

Table 4: Severity and Intervention

Outcome	Frequency	Percentage
Mild progression	24	16.0%
Moderate progression	8	5.3%
Severe progression	10	6.7%
Laser treatment required	10	6.7%

DISCUSSION

The goal of the current prospective study was to assess how pregnancy affected the development of diabetic retinopathy in 150 pregnant women between April 2025 and February 2026. The results showed that there is a quantifiable chance of retinal illness getting worse during pregnancy, with 42 women (28%) showing progression. These findings are

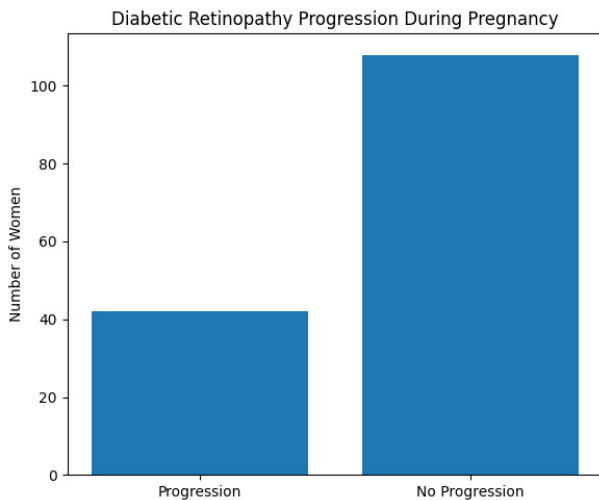


Figure 1: Diabetic retinopathy progression during pregnancy

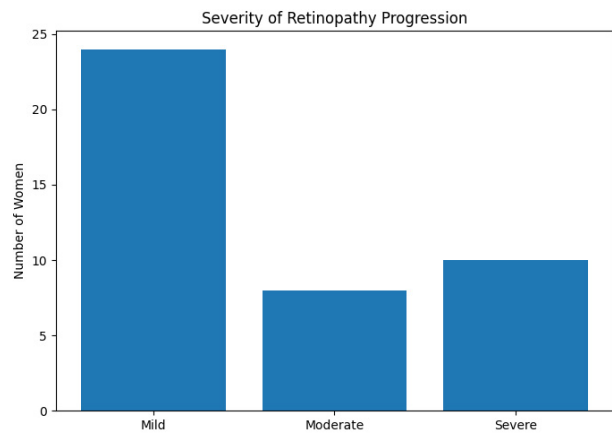


Figure 4: Severity of retinopathy progression

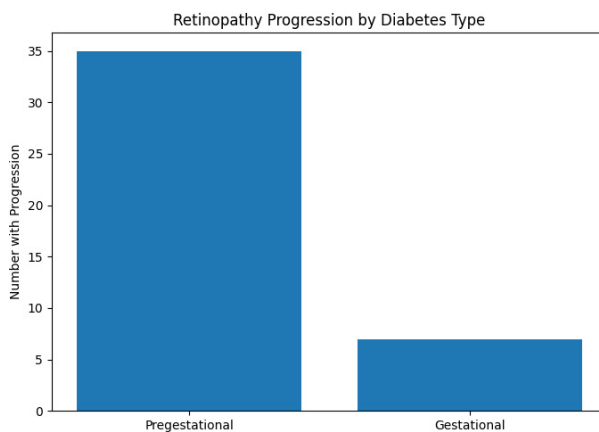


Figure 2: Retinopathy progression by diabetes types

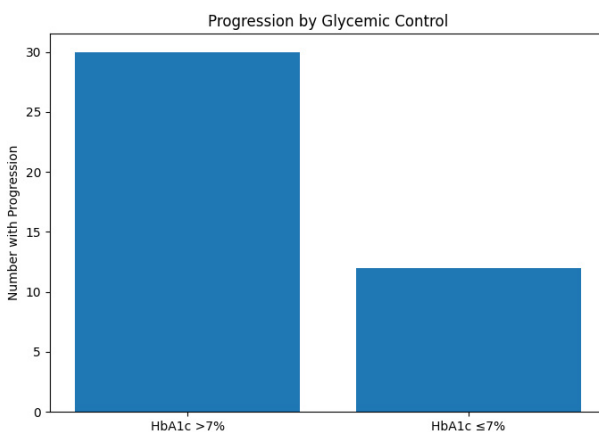


Figure 3: Progression by glycaemic control

in line with earlier research showing that pregnancy is a significant time when diabetes microvascular problems are more likely to occur. In the current investigation, women with pregestational diabetes were considerably more likely than those with gestational diabetes to experience retinopathy development (35 vs. 7 cases; $p=0.001$). The extended duration of diabetes and cumulative retinal vascular damage that existed prior to conception in women with pre-existing diabetes may account for this(4). On the other hand, established retinal lesions are less common in women with gestational diabetes and they are often exposed to hyperglycemia for shorter periods of time. These results highlight the need for greater ocular surveillance throughout pregnancy for women with known diabetes. Another significant predictor of advancement was having diabetes for more over five years ($p=0.002$). Over time, endothelial failure, microaneurysm development, retinal ischemia, and thickening of the capillary basement membrane are all consequences of chronic hyperglycemia. These pre-existing vascular problems may be accelerated by physiological changes associated with pregnancy. Therefore, while scheduling prenatal retinal follow-up, a prolonged duration of diabetes should be regarded as a high-risk factor(5).

Worsening retinopathy was also substantially correlated with poor glycemic control, as shown by HbA1c levels higher than 7% ($p=0.01$). The main cause of retinal microvascular damage is still persistent hyperglycemia. Additionally, because of changes in retinal blood flow and metabolic changes, quick blood glucose correction during pregnancy may temporarily exacerbate retinopathy.

This result emphasizes how crucial it is to attain stable glycemic control before to conception if feasible. One of the best indicators of progression was baseline retinopathy ($p < 0.001$). Pregnancy's hormonal, metabolic, and hemodynamic stressors are more likely to exacerbate pre-existing retinal illness in women. This supports the current guidelines for early first-trimester screening or preconception retinal examination to identify women who need regular follow-up(6).

Ten patients (6.7%) experienced severe progression that required laser photocoagulation. Despite being relatively rare, these instances are clinically relevant because they have the potential to cause irreparable sight loss if treatment is delayed. Preventing visual morbidity requires prompt referrals to retinal experts and collaboration between obstetricians, doctors, and ophthalmologists. This study's prospective design, serial ocular evaluation, and assessment of clinically significant maternal variables are among its strong points. The single-center setting, moderate sample size, and restricted postpartum follow-up are some of the drawbacks. After birth, certain retinal alterations may reverse; this was not thoroughly evaluated(7).

Overall, the results show that pregnancy can hasten diabetic retinopathy, especially in women who already have retinal lesions, poor metabolic management, pregestational diabetes, or a longer disease duration. Maintaining maternal vision during pregnancy still requires early discovery, routine screening, and multidisciplinary care.

CONCLUSION

The development of diabetic retinopathy is significantly impacted by pregnancy, especially in women who already have diabetes and retinal impairment. 28% of the 150 pregnant women in the current study showed signs of retinopathy progression, and 6.7% showed significant advancement necessitating laser treatment. Pregestational diabetes, diabetes lasting more than five years, poor glycemic control, and pre-existing retinopathy were all associated with a markedly increased chance of the condition getting worse. These results highlight

the significance of comprehensive retinal screening and preconception counseling before to or during early pregnancy. Throughout pregnancy and the postpartum period, women who have been recognized as high risk should have routine ophthalmic follow-up. Permanent vision impairment can be considerably decreased by quick ocular intervention, blood pressure stabilization, and good glycemic control.

For the best care, obstetricians, ophthalmologists, endocrinologists, and doctors must work together in a multidisciplinary manner. Pregnancy outcomes and maternal ocular health are both enhanced by coordinated management. To sum up, pregnancy is a crucial time for the development of diabetic retinopathy. Prenatal care for women with diabetes should incorporate routine retinal surveillance. To protect vision and enhance long-term maternal health outcomes, early detection and timely treatment are essential.

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