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# Pervasiveness and Factors Associated with Diabetes Retinopathy among Type 2 Diabetic Patients

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**Abstract**
A recent study put the prevalence of diabetic retinopathy globally at 34.6%. Risk factors for diabetic retinopathy are widely known the condition's prevalence in industrialised countries has been extensively studied. On the other hand, little is known regarding the prevalence and risk factors of diabetic retinopathy in individuals with type 2 diabetes in the research regions. All adult patients with diabetes who visited the diabetic clinic and Comprehensive Specialised Hospitals throughout the data collecting period made up the study population. Each large, specialty hospital provides care for three to five million patients. Compared to females, the risks of higher [AOR = 4.21, 95% CI (2.80, 7.68)]. Individuals with a monthly visitation schedule for their diabetes condition had a 98% [AOR = 0.028, 95% CI (0.004, 0.254)] lower risk of developing diabetic retinopathy compared to patients with a six-month visitation schedule. In contrast to those with a diploma and above, the chances of having no education were 5.21 times higher [AOR = 6.20 95% CI (2.08, 17.48)]. Less than half of the diabetic participants in this research developed diabetic retinopathy. Sex, educational attainment, glycemic control, visiting health facilities status of hypertension were all significantly linked to diabetic retinopathy.

## INTRODUCTION

Defects in insulin action, secretion, or both are the primary causes of diabetes mellitus[1]. It is the primary cause of adult blindness, traumatic lower extremity amputations, cardiovascular diseases end-stage renal disease (ESRD)[2]. Among adults, the prevalence of diabetes mellitus was 8.5% worldwide in 2014[3]. For the last thirty years, the prevalence of diabetes has been rising consistently, in low- and middle-income nations, this growth has been the fastest[4]. One well-known consequence of diabetes mellitus is diabetic retinopathy, which is characterised by variable degrees of micro aneurysm, bleeding, hard exudates, cotton-wool patches, venous alterations new vascular development in the macula, peripheral retina, or both[5]. An estimated 27.0% of diabetes individuals worldwide have diabetic retinopathy, which results in 0.4 million blind people worldwide.Six According to a combined study of many hospital-based research, the prevalence of diabetic retinopathy is 19.48% in Ethiopia and 31.6% across Africa[7,8] According to estimates from the International Diabetic Federation, about 25% of people worldwide had diabetic retinopathy in 2019[9]. Although there has been a decline in visual impairment worldwide, the number of blind individuals due to diabetic retinopathy has increased from 0.2 million to 0.4 million[10]. Diabetic retinopathy is the primary cause of blindness in persons of working age and one of the top worldwide causes of permanent blindness. About 80% of individuals with type 2 diabetes are estimated to have retinopathy[11,12]. A research carried out in the hospitals of Jima, Arbaminch Debremarkos in Ethiopia revealed that the prevalence of diabetic retinopathy was 41.4%, 13% 18.5%, respectively[13,14].

Diabetic retinopathy (DR) is the most significant visual consequence and the leading cause of blindness in Europe[15]. DR development is comparable in both DM types. A non-mydriatic fundus camera is used in DR screening, which is an affordable method of screening DM populations[16]. Depending on the kind of DM, screening frequency varies[17]. In 2000, our group implemented a screening programme including endocrinologists and general practitioners[18]. In a previously published research, we also documented an increase in the prevalence of DR. In this research, we ascertain the prevalence of diabetic macular oedema (DMO), sight-threatening retinopathy (STDR) any-DR in patients with T1DM, as well as how these conditions change in those with T2DM.

## MATERIALS AND METHODS

### Source and Study Population

**Source Population:** All diabetes patients that visit the hospital's diabetic clinic made up the source population.

**Study Population:** All adult patients with diabetes who visited the diabetic clinic and Comprehensive Specialised Hospitals throughout the data collecting period made up the study population.

### Inclusion and Exclusion Criteria

**Inclusion Criteria:** The research comprised adult patients with diabetes who were receiving diabetic follow-up at the time.

**Exclusion Criteria:** The research eliminated all diabetic patients whose medical records were insufficient.

**Statistical Methods:** The statistical software programme SPSS V.22.0 was used for data assessment and analysis, with a significance level of $p<0.005$ being evaluated.

In order to do a descriptive statistical analysis on quantitative data, the mean, SD, lowest and maximum values 95% confidence interval were ascertained. We used the analysis of frequency and percentage in each category for the qualitative data. When comparing two variables, the two-tailed Student's t-test was used to assess differences; when comparing more than two variables, one-way analysis of variance was used. The ?2 table and the Fisher test's finding were used to do inferential analysis on qualitative data. Cox survival regression analysis was used for multi variate analysis.

## RESULTS AND DISCUSSIONS

For males, the odds of diabetic retinopathy were 4.25 times that of females [AOR = 4.21, 95% CI (2.80, 7.68)]. Patients who visit health institutions for their diabetic case every month had about 98% [AOR = 0.028, 95% CI (0.004, 0.254)] less chance of diabetic retinopathy than those patients who visit health institutions for their diabetic case every six months. The odds of no educa-tion were 5.21 times compared to a diploma and above [AOR = 6.20 95% CI (2.08, 17.48)]. It was also observed that patients with glycemic control less than 8 had about 9.8% less chance [AOR = 0.098, 95% CI(0.03, 0.50)] to diabetic retinopathy compared with patients with gly-cemic control greater than 7. Hypertensive patients had about 3.51 times the chance of diabetic retinopathy than non-hypertensive patients [AOR = 3.51, 95% CI (2.01, 7.41)]. The other covariates age, residence, occupation and BMI does not have a significant effect on Diabetic retinopathy (Table 3).

One of the most well-known microvascular complications of diabetes mellitus (DM) is diabetic retinopathy (DR), which is very costly for the health care system and a significant worldwide health problem.

The study's findings indicated that 36.3% of patients had diabetic retinopathy, with a 95%

**Table 3 Factors associated with diabetic retinopathy among type two diabetic patients attending diabetic clinic**

| | Retinopathy | | OR (95% CI) | |
|---|---|---|---|---|
| Variables | Yes | No | COR 95% CI | AOR 95% CI |
| Sex | | | | |
| Male | 140 | 118 | 1.90(1.08, 3.49) | 4.21(1.81, 7.70) |
| Female | 102 | 156 | 1 | 1 |
| Educational Level | | | | |
| No education | 23 | 53 | 7.14(3.18, 16.02) | 5.22(1.08, 17.46) |
| Primary educa- tion | 29 | 69 | 6.98(3.22, 15.14) | 7.21(0.84, 22.08) |
| Secondary education | 17 | 126 | 2.18(0.96, 4.97) | 3.51(0.70, 9.88) |
| Diploma and above | | | | |
| Occupation | 11 | 172 | 1 | 1 |
| Student | 6 | 17 | 0.32(0.11, 0.98) | 2.10(0.15, 8.07) |
| Self-employee | 15 | 146 | 0.12(0.04, 0.39) | 2.50(0.25, 10.41) |
| Employee | 7 | 183 | 4.11(2.03, 10.50) | 3.20(0.35, 6.41) |
| Unemployed | 32 | 33 | 2.71(0.53, 6.71) | 0.81(0.18, 1.36) |
| House-wife | 15 | 27 | 2.01(0.27, 4.95) | 0.04(0.45, 3.17) |
| Other | 7 | 20 | 1 | 1 |
| Income < 1000 | 51 | 80 | 4.18(1.24, 9.16) | 2.04(0.37, 3.52) |
| 1000–3000 | 15 | 235 | 0.31(0.12, 0.85) | 0.07(0.08, 5.09) |
| 3001–5000 | 7 | 78 | 0.40(0.13, 2.31) | 0.22(0.04, 1.08) |
| > 5000 | 7 | 31 | 1 | 1 |
| HbA1C | | | | |
| = 7 | 20 | 235 | 0.28(0.108, 0.61) | 0.098(0.03, 0.50) |
| < 7 | 58 | 187 | 1 | 1 |
| Hypertension | | | | |
| Yes | 70 | 267 | 3.57(2.08, 6.60) | 3.51(2.02, 7.46) |
| No | 16 | 163 | 1 | 1 |

confidence interval (CI) of 29.8, 47.6. This result is consistent with a 36.2% research carried out in Armenia[19] The present research and the study in Armenia may be comparable despite the differences in socioeconomic situation and the degree of development of the health sector. This might be due to the use of a similar study population (diabetic patients), study unit study design.

This result exceeds that of a research done in Arbaminch (13%), in China (8.1%) in Arbaminch (20%).21 However, this result is less than that of a research carried out at the hospitals of Jimma University (41.4%), Kenya (41%) Babol Teaching Hospitals (64.1%), Iran. Different approaches, sample sizes, temporal variations within the research period participant health-seeking behaviours might all be contributing factors to this discrepancy.

Only 81.08% of the individuals in this research who had had DM for more than 20 years went on to acquire DR. The Wisconsin Diabetes Registry Study found a 92% prevalence of any-DR, which is lower than previous studies like the Wisconsin Epidemiological Study of Diabetic Retinopathy, which found values of 97%. Recent studies have frequently shown a decrease in the incidence of DR in this group of patients. Thirteen One reason for these variations might be because people who have had diabetes for more than 15 years had lower HbA1c levels and better metabolic control. The lipid analysis demonstrates that LDL cholesterol is a risk factor for the participants in this sample. Studies on lipids sometimes give rise to disagreement. One such research was the meta-analysis, which found a correlation between DMO and greater total cholesterol. The fenofibrate study also showed similar results, showing that the use of fenofibrates slowed the onset and progression of DR. Either UACR or eGFR may be used to assess kidney function; both measurements are associated with DR. Prior to a rise in UACR, changes in eGFR take place. As renal function declines, the eGFR rises in early-stage diabetes mellitus and falls in mature stages. eGFR was recently calculated using the CKD-EPI formula[24,25]. It is clear from this research that eGFR measurements have more significance than creatinine levels. Additionally, in the Cox's survival regression, UACR seems to be less significant than eGFR (table 3). It's possible that infection or microalbuminuria brought on by artery hypertension masquerades as UACR. Several medical associations advise using the CKD-EPI equation as a reference for eGFR. DMO and CKD-EPI values were shown to be significantly correlated in a cohort research conducted by Man[26]. Based on our findings, we recommend further research to identify the CKD-EPI equation as a significant DR risk predictor in T1DM patients.

## CONCLUSION

Tis study revealed that the prevalence of diabetic retinopathy was high, Sex, number of visits, educational level, glycemic control and hypertension were found to have signifcantly associated with diabetic retinopathy. Tis study result will help as a guideline for decision makers and program planners at the time to design and implement of intervention. Moreover, the result of this study could be used as a literature for future researchers and be a clue for further studies to be done on the prevalence of retinopathy among diabetes type 2 patients.

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