

Original Research Article

## Prevalence of diabetic retinopathy detected on routine screening of diabetic patients in urban population

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**Abstract:** Diabetic retinopathy is an ocular manifestation of diabetes, a systemic disease, which affects up to 80 percent of all patients who have had diabetes for 20 years or more. With this view the present work was planned to study prevalence of diabetic retinopathy detected on routine screening of diabetic patients in urban population. The present study work was done at Rao Nursing Hospital at Pune. The sample size was determined with help of expert statistician. The routine OPD patients visited for eye examination were included during last six months. Routine patients were checked with intention of earlier detection. From present study it is observed that there is seen higher prevalence associated with microalbuminuria during routine test. However risk cases regular screening is highly helpful in early detection of diabetic neuropathy and its subsequent complications. Microalbuminuria is associated cross-sectionally with the presence of retinopathy in persons with diabetes and with the presence of proliferative disease in younger-onset individuals. It was underlined observation, which high ting the importance of regular screening.

**Keywords:** microalbuminuria, urban population, OPD, diabetes.

### INTRODUCTION

Diabetic retinopathy is an ocular manifestation of diabetes, a systemic disease, which affects up to 80 percent of all patients who have had diabetes for 20 years or more [1]. Despite these intimidating statistics, research indicates that at least 90% of these new cases could be reduced if there were proper and vigilant treatment and monitoring of the eyes [2]. The longer a person has diabetes, the higher his or her chances of developing diabetic retinopathy [3]. Each year in the United States, diabetic retinopathy accounts for 12% of all new cases of blindness. It is also the leading cause of blindness for people aged 20 to 64 years [4].

Diabetic retinopathy often has no early warning signs. Even macular edema, which can cause rapid vision loss, may not have any warning signs for some time. In general, however, a person with macular edema is likely to have blurred vision, making it hard to do things like read or drive. In some cases, the vision will get better or worse during the day. With this view the present work was planned to study prevalence of diabetic retinopathy detected on routine screening of diabetic patients in urban population.

### METHODOLOGY

The present study work was done at Rao Nursing Hospital at Pune. The sample size was determined with help of expert statistician. The routine OPD patients visited for eye examination were included during last six months.

Diabetic retinopathy is detected during an eye examination that includes:

- **Visual acuity test:** This test uses an eye chart to measure how well a person sees at various distances (*i.e.*, visual acuity).
- **Pupil dilation:** The eye care professional places drops into the eye to dilate the pupil. This allows him or her to see more of the retina and look for signs of diabetic retinopathy. After the examination, close-up vision may remain blurred for several hours.
- **Ophthalmoscopy or fundus photography:** Ophthalmoscopy is an examination of the retina in which the eye care professional: (1) looks through a slit lamp biomicroscope with a special magnifying lens that provides a narrow view of the retina, or (2) wearing a headset (indirect ophthalmoscope) with a bright light, looks through

a special magnifying glass and gains a wide view of the retina. Hand-held ophthalmoscopy is insufficient to rule out significant and treatable diabetic retinopathy. Fundus photography generally recreates considerably larger areas of the fundus, and has the advantage of photo documentation for future reference, as well as availing the image to be examined by a specialist at another location and/or time.

- **Fundus Fluorescein angiography (FFA):** This is an imaging technique which relies on the circulation of Fluorescein dye to show staining,

leakage, or non-perfusion of the retinal and choroidal vasculature.

A data of 355 patients was collected randomly.

**RESULTS**

From present study it is observed that there is seen higher prevalence associated with microalbuminuria during routine test.

Second most important finding was underlined by us that during routine screening we found majority cases (41%) without any prior symptoms etc. It was underlined observation, which high ting the importance of regular screening.

**Table-1: Prevalence of diabetic retinopathy detected on routine screening of diabetic patients in urban population. (N = 355)**

| S.no. | Parameter                              | Number of cases | Percentage |
|-------|--|-----------------|------------|
| 1     | History of impaired glucose regulation | 192             | 54.08      |
| 2     | Hypertension                           | 98              | 27.60      |
| 3     | Microalbuminuria                       | 215             | 60.56      |
| 4     | History of diabetics more than 5 years | 172             | 48.50      |

**DISCUSSION**

Diabetic retinopathy is the result of microvascular retinal changes. Hyperglycemia-induced intramural pericyte death and thickening of the basement membrane lead to incompetence of the vascular walls. These damages change the formation of the blood-retinal barrier and also make the retinal blood vessels more permeable [5]. Hypoxia has been implicated as a causative factor in the degradation of the retina and some early investigations have supported this hypothesis [6].

The pericyte death is caused when "[glucose] persistently activates protein kinase C-δ (PKC-δ, encoded by Prkcd) and p38 mitogen-activated protein kinase (MAPK) to increase the expression of a previously unknown target of PKC-δ signaling, Src homology-2 domain-containing phosphatase-1 (SHP-1), a protein tyrosine phosphatase. This signaling cascade leads to PDGF receptor- dephosphorylation and a reduction in downstream signaling from this receptor, resulting in pericyte apoptosis..."[7].

Small blood vessels – such as those in the eye – are especially vulnerable to poor blood sugar (blood glucose) control. An overaccumulation of glucose damages the tiny blood vessels in the retina. During the initial stage, called nonproliferative diabetic retinopathy (NPDR), most people do not notice any change in their vision. Early changes that are reversible and do not threaten central vision are sometimes termed *simplex retinopathy* or *background retinopathy* [8].

Some people develop a condition called macular edema. It occurs when the damaged blood vessels leak fluid and lipids onto the macula, the part of the retina that lets us see detail. The fluid makes the macula swell, which blurs vision. There is need of multihospital studies like study conducted by Karandikar *et al.*[8]. The translational research model may be helpful in this regards. In this process the analysis of data of laboratory records on large scale may be useful for more accuracy [9].

In our study microalbuminuria is associated cross-sectionally with the presence of retinopathy in persons with diabetes and with the presence of proliferative disease in younger-onset individuals. These data suggest that microalbuminuria may be a marker for the risk of proliferative retinopathy developing. If longitudinal studies confirm these findings, individuals with insulin-dependent diabetes mellitus (IDDM) who have microalbuminuria may benefit from ophthalmologic follow-up [10].

Diabetic retinopathy is a leading cause of visual impairment in working-age adults. While defects in neurosensory function have been demonstrated in patients with diabetes mellitus prior to the onset of vascular lesions, the most common early clinically visible manifestations of diabetic retinopathy would include microaneurysm formation and intraretinal hemorrhages. Microvascular damage leads to retinal capillary nonperfusion, cotton wool spots, and increased numbers of hemorrhages, venous abnormalities, and intraretinal microvascular abnormalities (IRMA). During this stage, increased vasopermeability can result in retinal thickening (edema) and/or exudates that may

lead to a loss in central visual acuity. The proliferative stage results from closure of arterioles and venules with secondary proliferation of new vessels on the disc, retina, iris, and in the filtration angle. These new vessels then lead to traction retinal detachments and neovascular glaucoma respectively. Vision can be lost in this stage from capillary nonperfusion or edema in the macula, vitreous hemorrhage, and distortion or traction retinal detachment. In conclude , early detection of retinopathy depends on educating patients with diabetes as well as their families, friends, and health care providers about the importance of regular eye examination even though the patient may be asymptomatic. Patients must be informed that they may have good vision and no ocular symptoms, yet may still have significant disease that needs treatment, which depends on timely intervention.

From present study it is observed that there is seen higher prevalence associated with microalbuminuria during routine test [11]. However risk cases regular screening is highly helpful in early detection of diabetic neuropathy and its subsequent complications. The American Academy of Ophthalmology recognizes that screening for diabetic retinopathy using validated digital imaging can be a sensitive and effective detection method. Such technology has not been demonstrated to be as effective, however, at detecting and quantifying the spectrum of other ophthalmic pathology that can accompany diabetic retinopathy, including cataract and glaucoma, which are more prevalent in patients with diabetes mellitus. Imaging technology also does not mitigate the need for periodic comprehensive ophthalmic examinations.<sup>11</sup>

## CONCLUSION

Microalbuminuria is associated cross-sectionally with the presence of retinopathy in persons with diabetes and with the presence of proliferative disease in younger-onset individuals. It was underlined observation, which high ting the importance of regular screening.

## REFERENCES

1. Diabetic retinopathy, Diabetes.co.uk., Retrieved 25 November 2012.
2. Kertes PJ, Johnson TM, (Eds.); Evidence-based eye care. Lippincott Williams & Wilkins, 2007.
3. Tapp RJ, Shaw JE, Harper CA, De Courten MP, Balkau B, McCarty DJ, Zimmet PZ, et al.; The prevalence of and factors associated with diabetic retinopathy in the Australian population. *Diabetes care*, 2003; 26(6): 1731-1737.
4. Caroline MacEwen; diabetic retinopathy, August 2, 2011.
5. Engelgau MM, Geiss LS, Saaddine JB, Boyle JP, Benjamin SM, Gregg EW, Imperatore G; The evolving diabetes burden in the United States. *Annals of internal medicine*, 2004; 140(11): 945-950.

6. Non proliferative Diabetic Retinopathy; Includes Macular Edema, Retrieved August 17, 2013.
7. Causes and Risk Factors. Diabetic Retinopathy. United States National Library of Medicine, 15 September, 2009.
8. Karandikar PM, Tayade MC; Application of Robotics technology in clinical practice in India , *Asian Journal of Medical Sciences*, 2013; 5(1): 29-33.
9. Motilal CT, Vinod, Ramchandra GL; Translational research in physiology: Review, *Indian Journal of Basic and Applied Medical Research*, 2015; 4(3): 405-414.
10. Facts About Diabetic Eye Disease; National Eye Institute, 2016.
11. American academy of ophthalmology, Screwing for diabetic retinopathy, Downloaded from: <http://www.aao.org/clinical-statement/screening-diabetic-retinopathy--june-2012>.