OBSERVATIONS

Prevalence and Associated Factors of Diabetic Retinopathy in Rural Central India

Prevalence of diabetic retinopathy (DR) in patients with diabetes was recently estimated to be 34.6% (1–4). Living conditions in markedly rural regions differ considerably from those in urban areas where most previous studies were performed, and there are almost no data on the prevalence of DR available for the rural regions of India. We therefore performed this study in rural central India close to a remote tribal region. We assessed the prevalence of DR in this population mostly untouched by modern industrialization, examined the prevalence of DR within the group of subjects with diabetes, explored the relationship between DR and associated factors, and finally compared the findings with those obtained in studies from other regions and societies.

The population-based Central India Eye and Medical Study included 4,711 subjects (aged ≥30 years) living in a minimally developed rural region of central India. DR was diagnosed on fundus photographs according to the Early Treatment of Diabetic Retinopathy Study criteria (5).

Fundus photographs were available for 4,551 (96.6%) subjects. DR was detected in 15 subjects (0.33% [95% CI 0.16–0.50]). Prevalence of diabetes was 5.5% (95% CI 4.6–6.5). Among the diabetic subjects, DR prevalence was 9.6% (4.4–14.8). Prevalence of DR increased from the age-group 30–39 years (0.00%) and the age-group 40–49 years (0.22 ± 0.13%) to the age-group 50–59 years (0.63 ± 0.28%) and the age-group 60–69 years (0.71 ± 0.29%) and decreased thereafter (age 70–79 years: 0.27 ± 0.27%; ≥80 years: 0.00%). In multivariate analysis, DR prevalence was associated with higher age ($P = 0.03$), higher blood glucose concentration ($P < 0.001$), higher HbA_{1c} concentration ($P < 0.001$), and higher blood monocyte count ($P = 0.02$). The prevalence of DR was not significantly associated (all $P > 0.05$) with the systemic parameters of blood pressure, BMI, level of education; blood concentrations of cholesterol, hemoglobin, high-density lipoproteins and urea; count of eosinophils, lymphocytes, and neutrophils; and erythrocyte sedimentation rate. DR prevalence was not correlated with the ocular parameters of ocular perfusion pressure, axial length, refractive error, optic disc size, optic disc hemorrhages, neuroretinal rim area, intraocular pressure, and retinal nerve fiber layer cross-section area. None of the DR eyes showed neovascular proliferations, macular edema, or vision-threatening DR. Visual acuity of eyes with DR was 0.16 ± 0.18 logMAR (0.00–1.20), with cataract as the main reason for the moderate vision loss.

In conclusion, in little developed rural central India, prevalence of DR (0.25 ± 0.05%), parallel to a relatively low prevalence of diabetes of 5.5 ± 0.5%, was markedly lower than in more developed populations; showed an inverse U-shaped association with older age; and was not related to blood pressure and blood lipid concentration. The underdeveloped region and a most basic lifestyle, coupled with unavailability of major medical services with a potentially shortened life expectancy of subjects with diabetes may have prevented the development of DR in these patients. Correspondingly, none of the 22 eyes with DR showed severe forms of DR such as neovascular proliferations, macular edema, or vision-threatening DR. Moderate visual acuity loss in the eyes with DR was mainly due to cataract.

JOST B. JONAS, MD[1,2]
VINAY NANGIA, MD[1]
ANSHU KHARE, MD[1]
ARSHIA MATIN, MD[1]
KRISHNA BHOJWANI, MD[1]
MAITHILI KULKARNI, MD[1]
AJIT SINHA, MD[1]
SARANG LAMBAT, MD[1]
RAJESH GUPTA, MD[1]
SONGHOMITRA PANDA-JONAS, MD[1,2]

From the [1]Suraj Eye Institute, Nagpur, India; and the [2]Department of Ophthalmology, Medical Faculty Mannheim of the Ruprecht-Karls-University Heidelberg, Mannheim, Germany.

Corresponding author: Jost B. Jonas, jost.jonas@medma.uni-heidelberg.de, or Vinay Nangia, nagpursuraj@gmail.com.

DOI: 10.2337/dc12-2377

J.B.J. and V.N. contributed equally to this work.

© 2013 by the American Diabetes Association. Readers may use this article as long as the work is properly cited, the use is educational and not for profit, and the work is not altered. See http://creativecommons.org/licenses/by-nc-nd/3.0/ for details.

Acknowledgments—This study was supported by an unrestricted grant from Om Drishti Trust, Nagpur, India; Heidelberg Engineering Co., Heidelberg, Germany; Rotary Sight Saver Netherlands; ORBIS International; and Carl Zeiss Meditec Co., Jena, Germany. No other potential conflicts of interest relevant to this article were reported.

J.B.J. and V.N. designed and conducted the study, performed statistical analysis, wrote the manuscript, and had final approval of the manuscript. A.K., A.M., K.B., M.K., A.S., S.L., R.G., and S.P.-J. conducted the study and had final approval of the manuscript. J.B.J. is the guarantor of this work and, as such, had full access to all the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis.

References

1. Yau JW, Rogers SL, Kawasaki R, et al.; Meta-Analysis for Eye Disease (META-EYE) Study Group. Global prevalence and major risk factors of diabetic retinopathy. Diabetes Care 2012;35:556–564
2. Namperumalsamy P, Kim R, Vignesh TP, et al. Prevalence and risk factors for diabetic retinopathy: a population-based assessment from Theni District, south India. Br J Ophthalmol 2009;93:429–434
3. Dandona L, Dandona R, Naduvilath TJ, McCarty CA, Rao GN. Population based assessment of diabetic retinopathy in an urban population in southern India. Br J Ophthalmol 1999;83:937–940
4. Raman R, Rani PK, Reddi Rachepalle S, et al. Prevalence of diabetic retinopathy in India: Sankara Nethralaya Diabetic Retinopathy Epidemiology and Molecular Genetics Study report 2. Ophthalmology 2009;116:311–318
5. Nangia V, Jonas JB, Sinha A, Matin A, Kulkarni M, Panda-Jonas S. Ocular axial length and its associations in an adult population of central rural India: the Central India Eye and Medical Study. Ophthalmology 2010;117:1360–1366

Downloaded from http://diabetesjournals.org/care/article-pdf/36/5/e69/614864/e69.pdf by guest on 01 July 2022