

Retinal Diseases among Patients Attending to the Department of Ophthalmology in a Tertiary Care Center of Central Nepal

Enfermedades de la retina en pacientes que acuden al Departamento de Oftalmología de un centro de atención terciaria: Un estudio descriptivo transversal

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Abstract

Introduction: Retinal diseases are emerging causes of visual impairment and blindness in the developing world. The prevalence of retinal diseases is on the rise due to the increasing prevalence of non-communicable diseases like hypertension, diabetes mellitus, and refractive error, particularly myopia. This study aimed to find out the prevalence and types of retinal diseases among patients attending the outpatient Department of Ophthalmology in a tertiary care hospital.

Methods: A descriptive cross-sectional study was conducted among patients attending the Department of Ophthalmology after receiving ethical approval from the Institutional Review Committee (Reference number: CMC-IRC/079/80-054). The study was conducted from 15 September 2022 to 25 March 2023. Basic demographic data, risk factors, clinical characteristics, and diagnosis of retinal diseases were entered into a specified proforma for the study. Convenience sampling was done. Data analysis was done using Statistical Package for the Social Sciences version 26, point estimate at a 95% Confidence Interval (CI) was calculated along with frequency and proportion for binary data.

Results: Among 1256 participants, retinal disease was found in 224 (17.83%) (15.82-20.05, 95% Confidence Interval) participants in at least one eye. Diabetic retinopathy 110 (49.10%) was the most common retinal morbidity followed by hypertensive retinopathy 47 (20.98%). Posterior vitreous detachment 12 (5.57%), lattice degeneration 10 (4.46%), and myopic degeneration 09 (4.01%) were the other commoner retinal diseases in the study subjects.

Conclusions: The prevalence of retinal diseases in the current study was lower than the national estimates. The alarming rise of diabetes and hypertension in Nepal was reflected by the higher prevalence of diabetic, and hypertensive retinopathies.

Key words: Age-related macular degeneration; diabetic retinopathy; hypertensive retinopathy; myopia; retinal detachment.

Resumen

Introducción: Las enfermedades de la retina son causas emergentes de discapacidad visual y ceguera en el mundo en desarrollo. La prevalencia de las enfermedades de la retina va en aumento debido a la creciente prevalencia de enfermedades no transmisibles como la hipertensión, la diabetes mellitus y los defectos de refracción, en particular la miopía. El objetivo de este estudio era averiguar la prevalencia y los tipos de enfermedades de la retina entre los pacientes que acuden al Departamento de Oftalmología de un hospital de atención terciaria.

Métodos: Se realizó un estudio descriptivo transversal entre los pacientes que acudían al Departamento de Oftalmología tras recibir la aprobación ética del Comité de Revisión Institucional (Número de referencia: CMC-IRC/079/80-054). El estudio se llevó a cabo del 15 de septiembre de 2022 al 25 de marzo de 2023. Los datos demográficos básicos, los factores de riesgo, las características clínicas y el diagnóstico de las enfermedades de la retina se introdujeron en un formulario específico para el estudio. Se realizó un muestreo de conveniencia. El análisis de los datos se realizó con el paquete estadístico Statistical Package for the Social Sciences versión 26. Se calculó la estimación puntual con un intervalo de confianza (IC) del 95%, junto con la frecuencia y la proporción de los datos binarios.

Resultados: Entre los 1056 participantes, se encontró enfermedad retiniana en 224 (21,21%) (18,85-23,78, intervalo de confianza del 95%) participantes en al menos un ojo. La retinopatía diabética 110 (49,10%) fue la morbilidad retiniana más frecuente, seguida de la retinopatía hipertensiva 47 (20,98%). El desprendimiento vítreo posterior 12 (5,57%), la degeneración reticular 10 (4,46%) y la degeneración miópica 09 (4,01%) fueron las otras enfermedades retinianas más frecuentes en los sujetos del estudio.

Conclusiones: La prevalencia de las enfermedades de la retina en el presente estudio fue inferior a las estimaciones nacionales. El alarmante aumento de la diabetes y la hipertensión en Nepal se reflejó en la mayor prevalencia de retinopatías diabéticas e hipertensivas.

Palabras clave: Degeneración macular asociada a la edad; retinopatía diabética; retinopatía hipertensiva; miopía; desprendimiento de retina.

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Introduction

Retinal diseases are an important cause of ocular morbidity, and visual impairment globally. The prevalence of retinal diseases is on the rise lately due to various factors¹.

The reported prevalence of various population-based studies on retinal diseases varies. Increased life expectancy, changing lifestyles, and chronic systemic illnesses like diabetes mellitus, and hypertension are the leading contributing factors to develop retinal diseases in the modern world^{2,3}. In various population and hospital-based studies, age-related macular degeneration (AMD), hypertensive retinopathy, diabetic retinopathy, and retina vascular occlusions have been reported to be more common vitreoretinal disorders⁴⁻⁶. In Nepal, retinal diseases were the third most common leading cause of blindness in the 1981 survey¹.

There is a paucity of data on the prevalence of retinal diseases in Nepal, this study aimed to find out the prevalence, and types of retinal diseases among patients attending a tertiary care hospital in central Nepal.

Methods

A descriptive cross-sectional study was conducted on the patients visiting the outpatient Department (OPD) of Ophthalmology at Chitwan Medical College (CMC), Bharatpur, Nepal after obtaining ethical clearance from the Institutional Review Committee (Reference number: CMC-IRC/079/80-054). The study was conducted from 15 September 2022 to 25 March 2023 over seven and a half months. All patients visiting the outpatient Department of Ophthalmology were included in the study. Critically ill patients, patients from the emergency department, patients below 20 years of age, and more than 90 years of age, glaucoma suspects, patients with glaucomatous disc damage, patients with hazy media due to anterior segment pathologies, and patients not willing to provide consent for the study were excluded from the study. A convenience sampling technique was used. The sample size was calculated using the formula:

$$n = \frac{Z^2 \times (p \times q)}{e^2}$$

$$= 1.96^2 \times \frac{(0.52 \times 0.48)}{(0.05)^2} = 383$$

Where,

n= minimum required sample size

Z= 1.96 at 95% Confidence interval (CI)

p= prevalence of any retinal pathology reported by a similar study, 52.37%¹

q= 1-p

e= margin of error, 5%

The minimum sample size calculated was 383, considering the non-respondent rate of 10%, the total sample size becomes 421. However, we took 1256 participants in the study.

After explaining the purpose of the study and the confidentiality of data collection, informed consent was obtained from each participant. The study participants were evaluated in detail in the following sequence: visual acuity measurement of each eye separately (unaided and with a pinhole), extra-ocular movement assessment, cover test, cover-uncover test, refraction using a Heine Beta 200 retinoscope, anterior segment examination with a slit lamp, and detailed fundus examination. Evaluation of the fundus was done by a retina specialist and consultant Ophthalmologist of the Department of Ophthalmology. Fundus evaluation was done using direct Ophthalmoscope and indirect Ophthalmoscopy using +20 Diopter (D), +78D, and +90D lenses. Tropicamide 1% and or tropicamide 0.8% + phenylephrine 5% eye drops were used to dilate the pupils for fundus evaluation. All four quadrants of the retina superior, inferior, nasal, and temporal were examined in detail. The macular and foveal region was given special attention during the fundus evaluation. The significant findings from the fundus were documented and a picture of the fundus was drawn for the record.

Modified Airlie House classification and early treatment and diabetic retinopathy study (ETDRS) were used for the evaluation of different stages of diabetic retinopathy and macular edema in the study subjects⁵. Keith Wagner and Baker classification was used for the classification of hypertensive retinopathy in known hypertensive study participants⁶. Baseline socio-demographic characteristics, awareness about diabetic retinopathy in diabetic patients, data regarding associated factors like family history of diabetes mellitus (DM) and hypertension (HTN), duration of DM in years, type of DM, smoking habit, alcohol consumption, body mass index, other co-morbid conditions like myopia, trauma were entered in a specifically made proforma for the study. In addition, investigations like blood sugar levels, serum total cholesterol levels, and glycated hemoglobin levels (HbA1c) were done in study participants when indicated.

Patients with suspected retinal morbidities needing further investigations like Optical coherence tomography (OCT), Fundus photography, and fundus fluorescein angiography (FFA) were suggested and advised to undertake the investigations and follow up with reports. In patients with suspected cardiac problems investigations like Electrocardiogram (ECG) and Serum lipids were advised and referred to the internists for management and control of the systemic problems. Accurate diagnosis was made using clinical findings, investigation reports, and interobserver agreement.

Data were entered and analyzed using IBM SPSS Statistics version 26.0. Point estimate and 95% CI were calculated.

Results

Among 1256 participants, retinal disease was found in 224 (17.83%) (15.82-20.05, 95% Confidence Interval) participants in at least one eye. Diabetic retinopathy 110 (49.10%) was the most common retinal morbidity followed by hypertensive retinopathy 47 (20.98%). Posterior vitreous detachment 12 (5.57%), lattice degeneration 10 (4.46%), and myopic degeneration 09 (4.01%) were the other commoner retinal diseases in the study subjects (**Table I**).

Of 224 participants with retinal pathologies, 79 (35.26%) were obese or overweight, 177 (79.01%) were diagnosed as diabetics, 118 (52.67%) were hypertensives, 139 (62.05%) were aware of retinal consequences due to chronic diseases, 138 (61.60%) gave a prior history of cataract surgery, and 28 (12.50%) study participants had electrocardiogram changes as summarized (**Table II**).

The mean age of presentation of the study participants was 60.15±15.00 years. Males 118 (57.62%) just outnumbered the females. The majority of the study participants were above the age of 50 years 187 (83.49%). Geographic distribution wise 192 (85.72%) belonged to the urban areas, and literacy wise 178 (79.46%) study participants were literate. Agriculture 84 (37.50%) was the most common occupation of the study participants as summarized (**Table III**).

Table I: Types of retinal diseases among the study subjects (n = 224).

Variables	n (%)
Diabetic retinopathy	110 (49.10)
Grade I HTN retinopathy	31 (13.84)
Grade II HTN retinopathy	4 (1.78)
Grade III HTN retinopathy	3 (1.33)
Grade IV HTN retinopathy	9 (4.01)
Myopic degeneration/Tigroid fundus	9 (4.01)
Retinal detachment	5 (2.23)
Age-related macular degeneration (ARMD)	4 (1.78)
Hereditary drusen	4 (1.78)
Retinal detachment	1 (0.44)
Macular hole/retinal holes	4 (1.78)
Lattice degeneration	10 (4.46)
Chorioretinal scar	2 (0.89)
Chorioretinal coloboma	1 (0.44)
Epiretinal membrane	3 (1.33)
Macular scar	2 (0.89)
Posterior Vitreous Detachment (PVD)	12 (5.35)
Central Retinal Vein Occlusion (CRVO)	1 (0.44)
Central Retinal Artery Occlusion (CRAO)	1 (0.44)
Branch Retinal Vein Occlusion (BRVO)	1 (0.44)
Optic atrophy	2 (0.89)
Retinitis pigmentosa	1 (0.44)
Central serous chorioretinopathy (CSCR)	1 (0.44)
Asteroid hyalosis/Synchisis scintillans	2 (0.89)
Others	1 (0.44)
Total	224 (100)

Discussion

In the present study, Among 1256 participants, retinal disease was found in 224 (17.83%) (15.82-20.05, 95% Confidence Interval) participants in at least one eye. Diabetic retinopathy 110 (49.10%) was the most common retinal morbidity followed by hypertensive retinopathy 47 (20.98%). Posterior vitreous detachment 12 (5.57%), lattice degeneration 10 (4.46%), and myopic degeneration 09 (4.01%) were the other commoner retinal diseases in the study subjects. In a study done in Nepal¹, the overall prevalence of vitreoretinal diseases was found to be 52.37%, this did not compare well with the current study as in the current study the prevalence of retinal disease was much lower at 21.21%. However, in another study from Nepal⁴ from a similar setting the prevalence of vitreoretinal disease was found to be 5.35% which was lower than the current study findings. In a study done in rural Southern India, the prevalence of vitreoretinal disease was found to be 10.40% which was lower than our study findings and did not correlate with our study findings². This difference in the prevalence

Table II: Clinical characteristics of the study participants with retinal pathologies (n=224).

Variables	n (%)
Body Mass Index (BMI)	
Overweight	67 (29.91)
Obese	12 (5.35)
Alcohol Consumption	
Social alcohol consumption	74 (33.03)
Regular alcohol consumption	11 (4.91)
Alcohol addiction	2 (.89)
Current smokers	63 (28.15)
History of ocular trauma	21 (9.37)
Participants with Diabetes Mellitus	177 (79.01)
Participants aware of retinal diseases	139 (62.05)
Participants diagnosed as Hypertensives	118 (52.67)
Visual impairment in the participants due to refractive error	20 (89.28)
Prior history of cataract surgery	138 (61.60)
Abnormal electrocardiogram (ECG) findings in the participants	28 (12.50)
Total	224 (100.00)

Table III: Demographic profile of the study participants (n= 224).

Variables	n (%)
Gender distribution	
Male	118 (57.62)
Female	106 (42.38)
The age group of the study participants	
More than 50 years of age	187 (83.49)
Below 50 years of age	37 (16.51)
Geographical distribution of the study participants	
Rural areas	32 (14.28)
Urban areas	192 (85.72)
Occupation of the study participants	
Agriculture	84 (37.50)
Retired	58 (25.90)
Other	82 (36.90)
Educational background of the study participants	
Literate	178 (79.46)
Illiterate	46 (20.53)
Total	224 (100.00)

rate of vitreoretinal study could be attributed to various factors but we believe the sample size, the study age group, and study site, and risks associated were important contributing factors, needless the mention the current study being a hospital-based study and the aforementioned studies being population based surveys.

Age-related macular degeneration (ARMD) has been described as the most common vitreoretinal pathology in studies from other parts of Nepal with prevalence being 35.43% and 1.50% respectively^{1,4}. In the current study, diabetic retinopathy was the commonest vitreoretinal pathology 49.10% encountered followed by hypertensive retinopathy 20.98%, these were followed by posterior vitreous detachment in 5.35%, myopic degeneration in 4.01% and lattice degeneration in 4.68%, in the current study ARMD was seen only in 1.78% study subjects. The prevalence of ARMD at 1.78% in the current study did compare with the findings from a study from Nepal⁴ where the prevalence of ARMD was 1.50%. The higher prevalence of diabetic retinopathy and hypertensive retinopathy in the current study is attributed to the study site and study population, in the current hospital-based study the study participants with chronic diseases like diabetes and hypertension were very high 79.01%, and 52.67% respectively. A very low prevalence of ARMD when compared to other studies from Nepal^{1,4} could be attributed again to the study population and the risks associated, our study had participants below 50 years of age accounting for 16.51% of total study participants, and age is one of the most important risks to develop ARMD as per existing literature ARMD is believed to occur in people above 50 years of age with the risk advancing high with each passing year^{7,8}. Findings of other vitreoretinal pathologies like retinitis pigmentosa, macular hole, retinal detachment, lattice degeneration, CSCR, Chorioretinal scars, Chorioretinal coloboma, epiretinal membrane (ERM) in the current study were consistent and comparable to findings of other studies from Nepal and abroad^{1-4,10}. Only a case of CRAO in the present study could be attributed to the rarity of the disease and presentation of the patient mostly to the Department of Emergency and Critical Care before the Ophthalmology Department.

In the current study advancing age, smoking, alcohol intake, overweight and obesity, electrocardiogram changes, hypertension, diabetes prior history of cataract surgery, and history of ocular trauma have been identified as the potential risks in developing vitreoretinal diseases these findings of the study correlated and compared very well with study findings from studies done in Nepal

and abroad^{1-6,8-14}. Importantly retinal problems can remain largely asymptomatic until advanced stages in many cases, so timely precautions, early detection, screening, and prompt treatment are some measures necessary to prevent irreversible blindness in these high-risk populations.

In the current study 62.05% of the study subjects were aware of the vitreoretinal disease this figure could have been attributed to factors like literacy, 79.46% of the study subjects were literate, 85.52% of the study subjects represented urban areas with easy access to tertiary care hospitals and eye care centers, and presence of chronic systemic diseases like diabetes mellitus and hypertension 79.01%, 52.67% respectively, requiring regular follow up to the hospital besides periodic retinal evaluation and health education to the patients. The current study included patients below the age of 50 years which was one of the important reasons for a lower prevalence of ARMD when compared to other studies from Nepal^{1,4}. Other demographic features of the study participants were consistent with a similar study from Nepal¹.

Conclusions

The prevalence of retinal diseases in the current study was lower than the national estimates. The alarming rise of diabetes and hypertension in Nepal was reflected by the higher prevalence of diabetic, and hypertensive retinopathies. Health promotion and education, periodic screening, and provision of early treatment in identified patients with risks and or vitreoretinal disease prevent vision-threatening consequences. An Ophthalmic evaluation referral system should be in place in all the hospitals for patients with diabetes mellitus, hypertension, and other metabolic diseases for periodic fundus evaluation by the Ophthalmologists.

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References

1. Thapa R, Khanal S, Tan HS, Thapa SS, van Rens GHMB. Prevalence, Pattern and Risk Factors of Retinal Diseases Among an Elderly Population in Nepal: The Bhaktapur Retina Study. *Clin Ophthalmol*. 2020 Jul 24;14:2109-18.
2. Nirmalan PK, Katz J, Robin AL, Tielsch JM, Namperumalsamy P, Kim R, et al. Prevalence of vitreoretinal disorders in a rural population of southern India. *Arch Ophthalmol*. 2004;122:581-6.
3. Hatef E, Fotouhi A, Hachemi H, Mohammad K, Jalali KH. Prevalence of retinal diseases and their pattern in Tehran. The Tehran eye study. *Retina*. 2008;28:755-62.
4. Thapa SS, Thapa R, Paudyal I, Khanal S, Aujla J, Paudyal G et al. Prevalence and pattern of vitreo-retinal diseases in Nepal: the Bhaktapur glaucoma study. *BMC Ophthalmol*. 2013 Mar 28;13:9.
5. Bastola P, Khatiwada S, Khadka M, Dahal P, Bastola S. Diabetic Retinopathy among Diabetic Patients at a Tertiary Care Hospital: A Descriptive Cross-sectional Study. *J Nepal Med Assoc*. 2022 Mar 11;60(247):234-40.
6. Bastola P, Singh JP, Dhital BM, Dahal P. Serum biomarkers of lipid, atherogenic index of plasma, electrocardiogram, and fundus changes in hypertensive patients of central Nepal. *Journal of Chitwan Medical College*. 2021;11(38):78-82.
7. Klein R, Klein BE, Linton KL. Prevalence of age-related maculopathy. The Beaver Dam Eye Study. *Ophthalmology*. 1992 Jun;99(6):933-43.
8. Coleman HR, Chan CC, Ferris FL 3rd, Chew EY. Age-related macular degeneration. *Lancet*. 2008 Nov;372(9652):1835-45.
9. Shaikh N, Srishti R, Khanum A, Thirumalesh MB, Dave V, Arora A, et al. Vitreous hemorrhage - Causes, diagnosis, and management. *Indian J Ophthalmol*. 2023 Jan;71(1):28-38.
10. Nowak MS, Jurowski P. The prevalence and pattern of vitreoretinal diseases in a sample: the population of older adults in the city of Lodz, Poland. *Klin Oczna*. 2018;119:3.
11. Thapa R, Twyana SN, Paudyal G, Khanal S, van Nispen R, Tan S et al. Prevalence and risk factors of diabetic retinopathy among an elderly population with diabetes in Nepal: the Bhaktapur Retina Study. *Clin Ophthalmol*. 2018 Mar 23;12:561-8.
12. Bastola, P, Pun C, Koirala S, Shrestha U. Fasting serum lipids and fundus changes in hypertensive patients. *Nepal Journal of Medical Sciences*. 2012 August;1(2):103-7.
13. Thapa R, Bajimaya S, Paudyal G, Khanal S, Tan S, Thapa SS, et al. Prevalence, pattern and risk factors of retinal vein occlusion in an elderly population in Nepal: the Bhaktapur retina study. *BMC Ophthalmol*. 2017 Sep;17 (1):162.
14. Thapa R, Bajimaya S, Paudyal G, Khanal S, Tan S, Thapa SS, van Rens G. Prevalence of and risk factors for age-related macular degeneration in Nepal: the Bhaktapur Retina Study. *Clin Ophthalmol*. 2017 May;11:963-72.