

Prevalence and Risk Factors of Hypertensive Retinopathy in Hypertensive Patients in a Tertiary Hospital of Gandaki Province of Nepal

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ABSTRACT:

Introduction: Hypertensive retinopathy is one of the major complications of hypertension. Presence of hypertensive retinopathy may be an indicator of presence of other complications too. This study aimed to determine the prevalence and risk factors of hypertensive retinopathy in hypertensive patients in a tertiary care hospital in Nepal. **Methods:** This was a hospital based cross-sectional study conducted among 95 hypertensive patients aged 30 years and above. Standard proforma was used to collect socio-demographic and clinical variables of the patients. Detailed eye examination including fundus evaluation under mydriasis was done on all patients and hypertensive retinopathy was graded according to Keith-Wagener-Barker classification. Statistical analysis was carried out using Epi-info 7. **Results:** The mean age of the study sample was 59.74±15.11 years. The prevalence of hypertensive retinopathy was 38.95%. Among the patients with hypertensive retinopathy, the prevalence of grade I, II, III and IV retinopathies were 7.36%, 17.89%, 10.52% and 3.15% respectively. There was statistically significant association between hypertensive retinopathy and controlled blood pressure and treatment of hypertension. However, there was no statistically significant association between hypertensive retinopathy and gender, duration of hypertension, residence, family history, history of smoking and diet. **Conclusion:** Uncontrolled blood pressure and untreated patients of hypertension were the significant risk factors for hypertensive retinopathy. Early diagnosis and treatment of hypertension is essential to prevent loss of vision.

Keywords: Hypertension, Hypertensive retinopathy, Prevalence, Risk factors

INTRODUCTION:

Hypertension leads to numerous disabling complications.[1]WHO has warned that the developing countries are sitting on a time bomb of non-communicable diseases and hypertension is one of them.[2] The retinal circulation undergoes a series of pathophysiological changes in response to elevated blood pressure.[3] These changes are manifested clinically as a spectrum of signs

referred to as hypertensive retinopathy.[4] Keith et al. devised a four- grade classification system for hypertensive retinopathy, with increasing severity based on arterial characteristics and retinopathy ('Keith-Wagener-Barker System').[5] The 3-years survival rate was 70% for patients with grade 1 hypertensive retinopathy compared to 6% with grade 4 retinopathy.[6] The prevalence of hypertensive retinopathy was 58.93% in Nepal.[7]

Limited studies of hypertensive retinopathy have been conducted in Nepal. The study showing the association of hypertensive retinopathy with different clinical and socio-demographic variables is lacking in Nepal. The aim of the study was to

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determine the prevalence of hypertensive retinopathy in a tertiary care hospital. This study also evaluated the association of hypertensive retinopathy with different clinical and sociodemographic variables.

METHODS:

This was a hospital based cross-sectional study conducted in Ophthalmology Out-Patient Department of Manipal College of Medical Sciences, Pokhara, Nepal from July 2019 to December 2019. Ethical approval was taken from the Institutional Review Committee of the institute before the initiation of the study. The sample size was calculated by using the formula Zpq/d^2 (where; p =prevalence, 58.93[7], q =100- p , 41.07%; d =margin of error, 10%). The sample size according to this formula was 93. Adding two more sample (2% as non response rate), the final sample size was calculated to be 95.

Hypertensive patients aged 30 years and above were included in the study sample. Patients with other systemic diseases like diabetes mellitus or any ocular disease like corneal or lens opacities that cause media haze resulting difficulty in fundus assessment were excluded from the study. Informed consent was taken from all the patients.

A detailed history and examination was carried out including fundus examination under mydriasis with direct ophthalmoscope, +78 D lens and +20 D lens and hypertensive retinopathy was graded according to Keith-Wagener-Barker classification.

The data was entered and analyzed with Epi-info version 7. Qualitative data were presented in frequency and percentage. Chi Square test was applied for statistical analysis. The p -value less than 0.05 was considered statistically significant.

RESULTS:

A total of 95 hypertensive patients were enrolled in the study. The mean age of the study sample was 59.74 years (± 15.11 years). There was no statistically significant association between mean age of patients with hypertensive retinopathy (58.43 ± 16.13 years) and without hypertensive retinopathy (60.58 ± 14.50 years) (p -value=0.51).

The prevalence of hypertensive retinopathy was 38.95%. Among the patients with hypertensive retinopathy, the prevalence of grade I, II, III and IV

retinopathies were 7.36%, 17.89%, 10.52 and 3.15% respectively (Table 1).

Table 1. Frequency of hypertensive retinopathy.

Hypertensive Retinopathy		Number (%)
Yes	Grade I	7 (7.36)
	Grade II	17 (17.89)
	Grade III	10 (10.52)
	Grade IV	3 (3.15)
No		58 (61.05)

The relationship between hypertensive retinopathy with different variables was showed in table 2. The prevalence of hypertensive retinopathy was 37.7%, 31.2% and 46.2% in the patients having duration of hypertension of less than 5 years, 5 to 10 years and more than 10 years respectively. There was statistically significant association between hypertensive retinopathy and controlled blood pressure and treatment of hypertension. However, there was no statistically significant association between hypertensive retinopathy and gender, duration of hypertension, residence, family history of hypertension, history of smoking and diet of the study samples.

DISCUSSION:

In this study, the prevalence of hypertensive retinopathy was 38.95%. Among the patients with hypertensive retinopathy, the prevalence of grade I, II, III and IV retinopathies were 7.36%, 17.89%, 10.52 and 3.15% respectively. One study conducted in Bangladesh showed the prevalence of hypertensive retinopathy was 29.9%. Grade I hypertensive retinopathy was maximum 14.7% and grade IV hypertensive retinopathy was minimum 0.3%.[8] Several other studies found low prevalence of hypertensive retinopathy.[9,10,11] The low prevalence of hypertensive retinopathy in those studies may be due to good blood pressure control and patients had duration of hypertension of less than five years. However, one study done in Nepal noted high prevalence of hypertensive retinopathy (56.5%). [12] Other studies also found high prevalence of hypertensive retinopathy in hypertensive patients. [13-18] The high prevalence of hypertensive retinopathy may be due to late presentation of the patients to the hospital, uncontrolled hypertension, patients not taking anti- hypertensive medication regularly and lack of awareness of hypertension in the society.

Table 2. Relationship between hypertensive retinopathy with different variables.

Variables		Retinopathy		Total	Odds Ratio	Chi-square	p-value
		No (%)	Yes (%)				
Gender	Female	28 (62.2)	17 (37.7)	45	1.09	0.04	0.82
	Male	30 (60.0)	20 (40.0)	50			
Duration of hypertension (in years)	<5	33 (62.3)	20 (37.7)	53	*	0.99	0.67
	>10	14 (53.8)	12 (46.2)	26			
	5-10	11 (68.8)	5 (31.2)	16			
Residence	Rural	18 (54.5)	15 (45.5)	33	0.66	0.90	0.34
	Urban	40 (64.5)	22 (35.5)	62			
Family history	No	20 (51.3)	19 (48.7)	39	0.49	2.65	0.10
	Yes	38 (67.9)	18 (32.1)	56			
H/O Smoking	No	34 (60.7)	22 (39.3)	56	0.96	0.006	0.93
	Yes	24 (61.5)	15 (38.5)	39			
Diet	Non-vegetarian	43 (58.9)	30 (41.1)	73	0.66	0.61	0.43
	Vegetarian	15 (68.2)	7 (31.8)	22			
Controlled blood Pressure	Yes	51 (75.0)	17 (25.0)	68	8.57	19.57	<0.001
	No	7 (25.9)	20 (74.1)	27			
Treatment of hypertension	No	9 (39.1)	14 (60.9)	23	0.30	6.13	0.01
	Yes	49 (68.1)	23 (31.9)	72			

*Odds ratio cannot be calculated.

In the current study, the prevalence of hypertensive retinopathy was high (46.2%) in the hypertensive patients whose duration of hypertension was more than ten years. The study done in Bangladesh noted higher hypertensive retinopathy in those with duration of hypertension more than five years.[8]

In this study, 74.1% of hypertensive retinopathy was seen in those whose blood pressure was not controlled. Similarly other studies also observed that hypertensive patients whose blood pressure was uncontrolled more likely to develop retinopathy than individuals whose blood pressure was controlled with medications.[9,19] However, one study conducted in Bangladesh noted higher rate of hypertensive retinopathy in controlled blood pressure patients (31.36% vs 27.03%).[8]

In this study, the mean age of the sample was 59.74 years. Different other studies noted the mean age of the patients was 60.58 years, 60.24 years and 51.80 years.[8,12,13]

In our study, the male had more hypertensive retinopathy than female patients. Similarly, other studies also noted that male had more hypertensive retinopathy as compared to female.[8,12,13] However, one study found hypertensive retinopathy more in female than in male.[20] The variation may be explained by differential distribution in risk factors (e.g. genetic predisposition, dietary factors and lack of physical activities).

The study has few limitations. The cross-sectional design of the study was the obvious limitation of this study which does not measure causal association. This study was hospital-based study conducted in one geographical area only. Hence, further large-scale analytical study in different regions of Nepal is required. The study recommends routine ophthalmological examination of every hypertensive patient. The study also recommends holistic management of hypertensive patients jointly by physician and ophthalmologist to prevent blindness. Prompt control of hypertension and regular treatment would be helpful to avoid complications.

CONCLUSION:

The prevalence of hypertensive retinopathy was 38.95%. Uncontrolled blood pressure and untreated patients of hypertension are the significant risk factors for hypertensive retinopathy. There is a need to educate hypertensive patients about the need to comply with treatment and have regular ocular examination. Early diagnosis and treatment of hypertension is essential to prevent loss of vision.

Conflict of Interest: The authors declare that no competing interests exist.

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