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Original Article

# Duration of the Hypertension and Prevalence of Retinopathy in Hypertensive Patients

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## Abstract

**Objective:** To determine the prevalence of hypertensive retinopathy and its severity in hypertensive patients in a tertiary care hospital of Azad Kashmir

**Methods:** This study was conducted in a public sector teaching hospital of AJK-Medical College between March 2019 and Feb 2020. Adult patients above the age of 18 years, with the diagnosis of hypertension were included in the study from out-patient and in-patient departments. A standard Performa was used to collect the demographic information, medical history and physical examination of patients. The age, sex, residential area, marital status, education, profession, presenting complaints, smoking and other addictions, functional status and physical activity were recorded. The measurement of Blood Pressure (BP) was performed with mercury sphygmomanometer and retinal examination was performed in a relatively dark room with ophthalmoscope.

**Results:** A total of 100, hypertensive patients were enrolled in the study between the ages of 27 to 96 years. The mean age of the participants was 57 year. 55% patients were male while 45% patients were females. 23% had good control of hypertension while 77% had poor control.7% participants were monitoring their BP on daily basis, 32% weely,39% once in month while 22% never had any schedule of monitoring their Blood Pressure. The family history of hypertension was present in 61%. Overall, 85% of the participants had retinopathy. 44% had grade-I retinopathy, 40% grade-II, 4% grade-III and 2% had grade-IV retinal changes.

**Conclusion:** Hypertensive retinopathy is common in middle age and elderly hypertensive patients.

**Keywords:** Hypertensive retinopathy, Keith Wegener classification

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## Introduction

Hypertension is a common medical condition being managed by general practitioners, cardiologist and physicians. According to WHO 1.28 billion adults between the ages of 30-79 years are suffering from hypertension[1]. Less than half of these patients are diagnosed of their condition and offered treatment. Most of these patients are living in low and middle income countries. One of the global targets for non-infectious conditions, is to reduce the prevalence of hypertension by 33% between 2010 and 2030.

The overall estimated prevalence of hypertension in Pakistan is (26.34%) with higher urban prevalence (26.61%) than the rural (21.03%).[2] The disease burden, with this prevalence in Pakistan, for the population of 212.48 million is huge. Hypertension itself, is a major health problem and is also a major risk factor for cardiovascular, cerebrovascular and chronic kidney disease.[3,4] There is significant mortality and worldwide, hypertension is estimated to cause 7.5 million deaths every year, about 12.8% of all deaths.

General practitioners, physicians and cardiologists are the most common among health professional involved in the evaluation and management of hypertensive patients. However, often the evaluation for target organ damage caused by hypertension is over looked especially in public sector hospitals with very busy outpatient departments in Pakistan.

Retina is the only place where blood vessels can be observed directly by funduscopic examination in vivo.

The vascular changes due to elevated blood pressure are visible as hypertensive retinopathy.[5] These changes are a surrogate marker to potential threat to other end-organ damage. If, on priority, this examination can easy be performed in almost all clinical settings where hypertensive patients are being evaluated. However, routine fundoscopy is often not performed in general and medical out-patient departments in Azad Kashmir. The present study will emphasize the significance of this examination.

## Methods

This study was conducted in Abbas Institute of Medical Sciences, a public sector teaching hospital of AJK-Medical College between March 2019 and Feb 2020. All adult patients above the age of 18 years, with the diagnosis of hypertension were included in the study from out-patient as well as in-patient departments. The institutional ethical review committee of Abbas Institute of Medical Sciences approved the study. A standard Performa was used to collect and document the demographic information, medical history and physical examination of patients. The age, sex, residential area, marital status, education, profession, presenting complaints, smoking and other addictions, functional status and physical activity were recorded. The family history of Hypertension, ischemic heart disease and diabetes was also documented. A complete general and systemic physical examination was performed and information was recorded. The measurement of Blood Pressure (BP) was performed with mercury sphygmomanometer after seating the patient for at least 10 minutes with the arm positioned at the level of the heart. The BP was measured by manual auscultatory technique with appropriate adult size cuff. The retinal examination was performed in a relatively dark room with the ophthalmoscope after dilating the pupils.

### Operational definitions

Grade-1 Hypertension6: 140-159/90-99 mmHg

Grade-2 and 3 hypertension: > 160/100 mmHg

### Retinopathy

Keith-Wagener-Barker Classification of Hypertensive Retinopathy was used to grade the severity of retinopathy.[7]

Grade-1: Mild generalized retinal arteriolar narrowing

Grade-2: Definite focal narrowing and arteriovenous nipping

Grade-3: Grade 2 plus retinal hemorrhages, exudates and cotton wool spots

Grade-4: Severe grade 3 retinopathy plus papilledema

Statistical Analysis: All statistical analyses were performed using SPSS version 23.0 (SPSS Inc., Chicago, IL, USA). For all tests, p values of <0.05 were considered statistically significant. Continuous parametric variables were reported as mean ± standard deviation; nonparametric continuous variables were reported as median and categorical variables were expressed as percentages.

## Results

A total of 100, hypertensive patients were enrolled in the study between the ages of 27 to 96 years with mean age of 57 years. 55% patients were male while 45% patients were females in the study. 68% had sedentary job while 32% had a field work. Among women, 61% were house wives. 16% of participants were living their retired lives. Overall, 85% of the participants had retinopathy. 23% had good control of hypertension while 77% had poor control. 7% participants were monitoring their BP on daily basis, 32% weely, 39% once in month while 22% never had any schedule of monitoring their Blood Pressure. The family history was present in 61%, while 18% patients were smoker.

**Table 1:** *Prevalence of Retinopathy in different Groups of Hypertensive Patients.*

| Duration of Hypertension | Percentage of Patients | Retinopathy | |
|---|---|---|---|
| | | Present | Absent |
| Less than 5 years | 46 | 38 (82%) | 8 |
| Between 5-10 years | 35 | 33(94%) | 2 |
| More than 10 years | 19 | 19(100%) | 0 |

**Table 2:** *Relationship of Duration of Hypertension and Grades of Retinopathy.*

| Duration of hypertension | Grades of retinopathy | | | | Total |
|---|---|---|---|---|---|
| | Grade-1 | Grade-2 | Grade-3 | Grade-4 | |
| Less than 5 years | 21 | 14 | 3 | 0 | 38 |
| Between 5-10 years | 14 | 17 | 0 | 2 | 33 |
| More than 10 years | 5 | 13 | 1 | 0 | 19 |
| Prevalence of Retinopathy | 40 (44%) | 44 (49%) | 4 (4%) | 2 (2%) | |

Logistic regression showed statistical significant relationship p-value <0.05 of poor control and long duration of hypertension with development of retinopathy. The age and gender of the participants were not associated with the risk of developing retinopathy in this cohort of patients.

## Discussion

Hypertension is a major risk factors for several systemic conditions associated with significant mortality and morbidity.[8] Hypertension Causes vasospasm and results in narrowing of the arterioles due to the increased

vascular tone. This study showed a significant prevalence of retinopathy in hypertensive patients.[9] It is the established fact, that the vascular changes in retina are the Surrogate markers of pathology in other organs and retina is the window in hypertensive patients through which other organ damage is visible. Chronic hypertension leads to structural changes in the vessel wall. In retina these changes are visible as opacification of the vessel wall (Silver and copper wiring). There is arteriovenous (A/V) nipping as the thickened arterioles cross the venules. Sustained hypertension leads to the formation of micro aneurysms and focal ischemic changes in the nerve layer of retina are visible as cotton wool exudates. The breakdown of blood-retina barrier results in the exudation of blood (retinal hemorrhages) and lipids (hard exudates).Very severe, a condition previously called as malignant hypertension, results in raised intracranial pressure, optic nerve ischemia and papilledema.[10]

In internal medicine, this examination is often neglected and not performed routinely by the physicians. This study showed that 38% of patients were having retinopathy even when the known duration of hypertension was less than five years. With more than 10 years of known hypertension, retinopathy was present in 100% of patients.

There was the presence of all the grades of retinal changes in the participants of the study. The grade-2 retinopathy was the most frequently observed while only a small number of patients had grade-4 changes. A study by Petros Cyrus Kayange and colleagues in 104 patients, 75% had evidence of hypertensive retinopathy and 80% of patients had the sub-optimal blood pressure control.[11] These results were comparable with our study with 85% overall prevalence of retinopathy and 76% patients with poor control of hypertension.

A study by Priyadarshini Cholera and Manish Pendse showed 83% prevalence of retinopathy in patients older than 80 years and 69% in patients between the ages of 70-80 years. The prevalence of grade-I retinopathy was 51%, grade-II 27%, grade-III 23% and grade-IV 8%. The findings are similar to our study to the extent of prevalence, while severity of retinopathy by Keith Wagener classification was different from our study. This difference has a plausible explanation that our study was done in the internal medicine unit while the other study was carried out in the ophthalmology unit in majority of patients referred for ophthalmology consultation.[12]

In a study by Pun CB et al the mean age of the patients was 60.58 ±12.26 while 31% had grade I, 19% had grade II, 6% had grade III and 0.5% had grade IV hypertensive retinopathy.[13] These findings were similar to the findings in our study with mean age of participant 57 year and low prevalence of grade-III and IV retinopathy (4% and 2%) respectively. A similar study by Rajindra P Gupta from India showed 84% prevalence of hypertensive retinopathy in patients more than 60 year of age.[14]

The study by Mohammad R Besharati from Iran showed the prevalence rate of retinopathy in patients suffering from mild hypertension was 25.3%, moderate hypertension 34.5% and severe hypertension 84.6%. Of the patients with retinopathy, 42.36% had grade I, 20% had grade II and 2.35% had grade III retinopathy.[15] The findings in this study were similar to the findings in our study.

## Conclusion

Hypertension is an easily diagnosed condition and is associated with a large numbers of comorbidities and end organ damage. The retinopathy is the surrogate marker of generalized vascular changes due to hypertension. These catastrophic sequelae of hypertension can be prevented with early diagnosis and treatment of this common condition.

### Recommendations

Retinal examination if often neglected by physicians in their OPD clinics especially in the busy public sector hospitals. As retinopathy is the indicator of vascular changes in other organ systems, this examination needs priority and should be performed in all medical OPD while evaluating the hypertensive patients.

**Conflict of Interest:** None

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