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ORIGINAL ARTICLE

DIABETIC AND HYPERTENSIVE EYE DISEASE, AWARENESS AND EVALUATION - A HOSPITAL BASED STUDY IN CENTRAL INDIA

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ABSTRACT: BACKGROUND: Diabetes Mellitus, particularly the Type 2 is a major health problem and of great concern worldwide and so is the Hypertension, the prevalence of which is rising and both combined together may lead to economical blindness if not treated adequately and in time. Hypertension was also identified as the 3rd ranked factor for disability adjusted life years by the world health report 2002. **MATERIAL AND METHODS:** A total of 1306 patients attending eye department for either routine checkup or referred by physicians for ophthalmoscopic examinations were studied. Relevant questions were asked regarding the presence of disease and their ocular problems along with the visual status. **RESULTS:** Mean age of the patients was 55.5 years, males 53.2% and females 46.75%. 118 patients were diabetic, 375 patients were hypertensive and 132 patients had combined disease. Awareness of diabetic retinopathy in the disease specific group was 61.01% and hypertensive retinopathy was 19.46%. It was found that awareness of diabetic retinopathy was more in diabetic population compared to the non-diabetic group, whereas knowledge of hypertension affecting the eye was much poor. Lack of awareness was found directly related to the level of illiteracy and ignorance. Prevalence of retinopathy in this series was found 24.57% in diabetics & 64.8% in hypertensives. **CONCLUSION:** People's education regarding the systemic disease related eye problems and formal education of general public especially of females will be a great step towards reducing the visual impairment. Importance of regular follow-up once diagnosed should be emphasized for early detection and management thereby.
KEYWORDS: Awareness & evaluation, Diabetic retinopathy, hypertensive retinopathy, Ocular morbidity, Visual morbidity.

INTRODUCTION: Diabetes and hypertension are common conditions associated with significant morbidity and mortality. Both hypertension and diabetes are recognized as independent cardiovascular risks, e.g., coronary artery disease, left ventricular hypertrophy, stroke, peripheral vascular disease, retinopathy and nephropathy. Worldwide, the global burden of diabetes is estimated at 346 million people. This is projected to increase to 438 million by the year 2030 (4.4% of the estimated world population).[1] In the United States, Diabetic Eye Disease is the leading cause of vision loss among working adults. Reported incidence of Diabetic retinopathy (DR) is approximately 28.5% in Americans with diabetes in age group of 40 and above i.e. more than7 million people and the no. is expected to reach >11 million by the year 2030.[2] The prevalence of Diabetic retinopathy in India was found 18% in a study conducted in urban population in South India.[3]

Prevalence of hypertension in India is low compared to world figures. In India, 23.10% men and 22.60% women over 25 years suffer from hypertension, according to W.H.O.'s global health statistics 2012.[4] Hypertensive retinopathy means the retinal microvascular changes that develop in response to increased blood pressure. These changes often occur in patients of 40 yrs. and older and are predictive of incident stroke, congestive heart failure and cardiovascular mortality, independent of traditional risk factors. It is also a major risk factor for the development of other retinal vascular diseases such as retinal vein and artery occlusion and ischemic optic neuropathy. High B.P. also increases the risk of development of diabetic retinopathy and its progression. Besides these,

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hypertension also plays an important role in pathogenesis of chronic simple glaucoma and age related macular degeneration.[5] In India, the prevalence of hypertension is increasing rapidly among both urban and rural population i.e. 20-40% in urban adults and12-17% among rural adults.[6] Population based studies detected hypertensive retinopathy in 2-14% of non-diabetic population aged 40 yrs. and older.[7]

Early detection, timely management and regular follow up can reduce the visual morbidity due to diabetic retinopathy by 95% with the advanced treatment strategies like lasers and I.V. anti vascular endothelial growth factor drugs.[1] Timely recognition of ocular changes of hypertension will also allow physicians to better monitor the end organ effects specially cardiovascular risks in hypertensive patients and thus manage them better.

Awareness regarding the ocular involvement in these diseases will encourage the people to seek timely and adequate eye care and thus reduce the enormous burden of visual impairment. The present study was therefore undertaken to assess the awareness level of the diabetic and hypertensive eye disease as well as evaluate the level of ocular and visual morbidity at the time of assessment.

MATERIAL AND METHODS: This was a cross-sectional study conducted in the Ophthalmology department of Chirayu Medical College and Hospital, Bhopal. Patients attending the OPD with complaints of headache and diminished vision and also those referred by various departments to assess the visual status specially of diabetic Type 2 and hypertensive patients. All the patients who underwent bedside fundus examination were excluded from the study as proper assessment of visual morbidity was not possible in them and also Type 1 diabetics, as number was not sufficient enough. Total number of patients examined was 1306 over a period of 1 yr.

A comprehensive eye checkup was done including visual acuity, refraction, Subjective test, tonometry, fundus examination by direct and indirect ophthalmoscopy. Gonioscoscopy and automated perimetry was also done as and when required. Total patients were divided into 2 groups for further scrutiny. Group 1 consisted of normal, refractive errors and those having disturbed vision due to other causes. Group 2 consisted of those who presented with Diabetes, and Hypertension either alone or combined. Relevant questions were asked about the presence and/ or the onset of the disease and about their knowledge regarding the disease affecting the eye. The findings were carefully noted down in our prepared format and analyzed thereafter. Diabetic changes were graded according to modified Airle House Classification and hypertensive ocular changes were graded as per Keith, Wagner and Barker classification.

RESULTS: Total 1306 patients were included in the study. Males were 695(53.20%) and females were 611(46.75%), (range 25-86), the mean age of the patients was 55.5 years. Educational status shows 672 (51.36%) were either illiterate or had only primary education. When compared the educational status versus awareness, it was found that only 12.80% in the illiterate & primary educated group had awareness regarding diabetic retinopathy and none (0%) had any awareness regarding hypertensive eye disease in the same group. Awareness gradually increases with the higher educational background. Maximum awareness regarding the diabetes and hypertension affects the eye was seen in graduates and postgraduates (Table no. 1). As regards occupation, 592(45.32%) were housewives and 260(19.9%) were agricultural workers. In group I (Non diseased group),

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awareness regarding the diabetic eye disease was found to be 23.9% and of hypertensive eye disease was 7.04%. In group II (disease specific group), the awareness in diabetics regarding ocular involvement was found to be 61.01%., in hypertensives, it was 19.46% (Table no.2). Those with combined disease there were 37.87% awareness for diabetic eye disease and 12.87% awareness for hypertensive changes in eye.

Total no. of patients in group II (disease specific group) were 625, of which 118 patients had Diabetes, 375 had Hypertension and 132 were suffering from both diabetes and hypertension. Maximum patients in each category was found in the age group of 41-60 yrs., diabetics 74/118(62.71%), hypertensives 241/375(64.26%) and 79/132 (59.84%) in combined disease group. In the diabetic and combined disease group, males were more predominantly affected than females. Diabetics male to female ratio was (M: F=60.15%:39.83%) and in combined disease group (M: F=57.57%:42.43%) whereas in hypertensives, more females were found to be affected than males (M: F=44.26%:55.73%). In each group, maximum patients presented with disease onset period between 1-5 yrs.; diabetics-35.59%, hypertensives 39.2% and in combined group, diabetics 37.12% and hypertensives 39.39% had the same period of onset.

Most of the patients presented with complaints of disturbed vision in all the groups but headache was very important feature found in hypertensives i.e. in 40.53% compared to diabetics i.e. 19.49%, and in combined group 9.09%.

Visual acuity (V.A) was not much affected in all the groups. V.A. of <6/60 was found only in 5.93% of diabetics, 8.13% of hypertensives and 12.87% of combined disease patients (Table no.3). As regards ocular morbidity at presentation in this series, only 24.57% of diabetics had retinopathy and that too mild (8.47%) to moderate (7.62%) changes was seen predominantly. Among hypertensives, 64.8% had retinopathy, of which Grade II changes were most prominent in 37.86% of subjects (Table. no.4). In combined group, diabetic retinopathy was found in 37.87% % with moderate non proliferative diabetic retinopathy (NPDR) in 16(12.12%) of subjects and clinically significant macular edema (CSME) in 11(8.33%), hypertensive retinopathy was found in 107(62.12%) of the subjects where Grade II retinopathy was the most prominent finding in 72 (54.54%) of the subjects (Table no.5). Disease specific causes of visual morbidity are as shown in the Table no.6. Maximum morbidity was found in the combined disease group (38.63%).

In the present series recently detected cases (i.e. within 3 months). 10 cases were found diabetic alone, 78 cases were found hypertensive alone and 5 cases were found to have both diabetes and hypertension. Out of the 10 diabetic cases none of them were found to have any ocular change in the form of diabetic retinopathy, whereas out of 78 hypertensive subjects, 43 (55.12%) cases showed ocular changes of different grades. In this group, among hypertensives, 20 (25.64%) had grade II changes and 3 (3.86%) had grade IV changes with papilledema. In the combined disease group, all the 5 subjects showed various ocular changes mostly due to high B.P. as diabetic retinopathy takes at least10 yrs. to manifest (Graph 1).

DISCUSSION: Prevention is better than cure. To achieve this goal, creation of awareness regarding the diseases as well as their ocular and other target organs involvement is a must. Besides this, a step forward to early detection and their prompt and adequate management will also be fruitful in reducing the disease related economical blindness. To create awareness, general education of the masses is very important. As is evident from this series, the level of awareness for both diabetes and

hypertension was found more in the better educated group which is similar as reported by different authors.[8, 9]

The illiterates and primary education group usually belong from a lower socioeconomic group besides the category of housewives as in our country, the education of girl child is still at back foot. More efforts to be made to educate them on whose shoulders lies the full responsibility of family's health and welfare. Media (newspapers, television) can play an important role in this direction side by side with formal education.

It was observed in the present series that the awareness regarding eye disease was better in diabetic population than hypertensives (61.01%:19.46%) whereas in a study done at a developed country, Singapore (70-80% awareness among diabetics).[10] Namperumalsamy et.al. found 29% of the subjects unaware of diabetic retinopathy in a study done in a developing country(south India),[11] which is similar to another study done in India (27.9%).[8] In this present series, it was found that 76.5% of the non-diabetic population were unaware of diabetic retinopathy which is quite alarming and in contrast to the diabetic group. (38.98%), which could be attributed to the fact that visual morbidity is gradual and more devastating in long standing diabetics and thus often being monitored by frequent fundus check-ups & in the process they become aware of diabetic eye disease.

The visual morbidity in hypertensives is often due to sudden episodes of vascular occlusions or transient ischemic attacks which are often impossible to predict. Here comes the role of the treating physician in proper counseling of the patient and making them aware of the consequences of the disease process and importance of regular fundus examination and medical treatment. In this study most of the hypertensive patients were undergoing fundus checkup for the first time which can be attributed to the lack of awareness on their part or lack of advice on the part of treating physician. Incidence of diabetic retinopathy in this study was 24.57% only and of which 8.47% had mild non proliferative diabetic retinopathy whereas, Chennai Urban Rural Epidemiology study in South India, it was 17.6% significantly lower than age matched western counterparts.[12] This is also quite lower than that of the result of this study.

It is estimated that 2-5% of all diabetics develop proliferative diabetic retinopathy, [13] this is similar to our findings i.e. 2.52% in diabetic group and 3.78% in the combined disease group. If untreated this may lead to blindness in >50% of cases often due to retinal detachment. India is known as the diabetic capital of the world as nearly 25% of the world's diabetic patients are Indians.[14] The recognition of hypertensive retinopathy is important in cardiovascular risk stratification of hypertensive individuals.[15] The first attempt to relate the retinal vascular changes to survival in the hypertensive population was by Keith, Wagner, and Barker in 1939.

This grouping correlated directly with the degree of systemic hypertension and inversely with the prognosis for survival and is widely accepted but the prognostic implications of early hypertensive grades are unclear.[16] In an Indian study, Grade II retinopathy was seen in 29.4% of patients with controlled B.P. [17] whereas in present study, it was slightly higher i.e. 37.86%, could be due to uncontrolled B.P. or irregular treatment. In another study conducted at Saudi Arabia by M.R. Besharati et al, the rate of retinopathy was 39.9% and the rate of retinopathy in patients with positive family history of hypertension was found to be 47.8%.[18] In the present series, the retinopathy was found to be 64.8% which is very high compared to the previous study. This could be attributed to the lack of awareness regarding the benefits of proper and regular treatment.

The frequency of hypertension in diabetic population is almost twice as compared to non-diabetic population.[19] In India, about 50% of diabetics have Hypertension.[20, 21] Hypertension may precede the onset of Diabetes. In some cases, both may be present at the initial diagnosis. Sometimes hypertension may develop later in a diabetic subject as a feature of diabetic nephropathy.[22] High B.P. increases the risk of both development of Diabetic retinopathy and it's progression.[5] as in present series, the visual morbidity was found very high in hypertensive diabetics (38.63%) compared to diabetics (16.94%) and hypertensives (8%) alone. Adequate control of hypertension has been proved to reduce the vision loss associated with diabetic retinopathy.[5]

Sudden visual loss may occur in hypertensive patients due to thrombotic lesions or ischemic attacks which may ultimately lead to permanent blindness and grave visual morbidity in large number of patients as the prevalence of hypertension is on the rise. Awareness of hypertension will not only decrease the risk of hypertensive catastrophies but also decrease the diabetic retinopathies and consequent visual morbidity and the economical blindness caused thereby.

As we could not include diabetes Type 1 patients, where the severity of retinopathic changes are more, the results of our study of diabetic retinopathy may be extrapolated with caution. Besides, good number of our patients was referred from medicine some of whom might be informed by the treating physician regarding the ocular effects of the disease. Hence is the difference in awareness in the diseased group and the non-hypertensive and non-diabetic group.

CONCLUSION: Since we find there is extreme lack of awareness among the hypertensives and the general patients compared to diabetic group, there is an urgent requirement for health education to make them better informed regarding ocular effects of the systemic diseases and the need for regular and prompt management of the condition to lead a healthy life. People should be made aware of the risk factors and be encouraged for a healthy life style.

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Educational Status	Total number	Diabetic Retinopathy		Hypertensive Retinopathy	
		Awareness Present	Percentage (%)	Awareness Present	Percentage (%)
Illiterate	440	65	04.90	0	0
Primary	232	104	07.90	0	0
Secondary	202	1.5	08.00	40	3.06
Graduate	384	132	10.10	65	4.90
Post. Graduate	48	143	10.94	65	4.90
Total	**1306**	**549**	**42.03**	**170**	**13.01**

Table 1: Educational status of the subjects and awareness regarding the disease

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Disease	Non diseased Group	Diseased Group
	Aware (%)	Aware (%)
Diabetes awareness(n=118)	160 (23.49)	72(61.01)
Hypertension awareness(n=375)	48 (07.04)	73(19.46)

Table 2: Awareness among study subjects regarding effect of diabetes and hypertension on vision

VISION	DIABETES		HYPERTENSION		COMBINED	
	n	%	n	%	n	%
>6/60	14	5.93	61	8.13	34	12.87
6/36 - 6/18	48	20.33	263	35.06	91	34.46
6/12-6/6	174	73.72	426	56.8	139	52.65
	236/2-118		**750/2-375**		**264/2-132**	

Table 3: Distribution of the patients according to the vision and disease

Disease Severity (diabetes)	(n=118) Affected	Percentage %	Disease Severity (hypertension)	(n=375) Affected	Percentage %
NPDR Mild	10	8.47	Grade-I	78	20.8
NPDR Moderate	9	7.62	Grade-II	142	37.86
NPDR Severe	3	2.54	Grade-III	17	4.53
PDR	3	2.52	Grade-IV	6	1.6
CSME	4	3.38	**Total affected**	**243**	**64.8**
Total affected	**29**	**24.57**			

Table 4: Distribution of the patients according to the severity of the disease

Diabetes	(n=132) Affected	Percentage %	Hypertension	(n=132) Affected	Percentage %
NPDR Mild	6	4.54	Grade-I	21	15.9
NPDR Moderate.	16	12.12	Grade-II	72	54.54
NPDR Severe	12	9.09	Grade-III	12	9.09
PDR	5	3.78	Grade-IV	2	1.51
CSME	11	8.33	**Total affected**	**107**	**62.12**
Total affected	**50**	**37.87**			

Table 5: Ocular morbidity at presentation in diabetic and hypertensive (combined disease) patients

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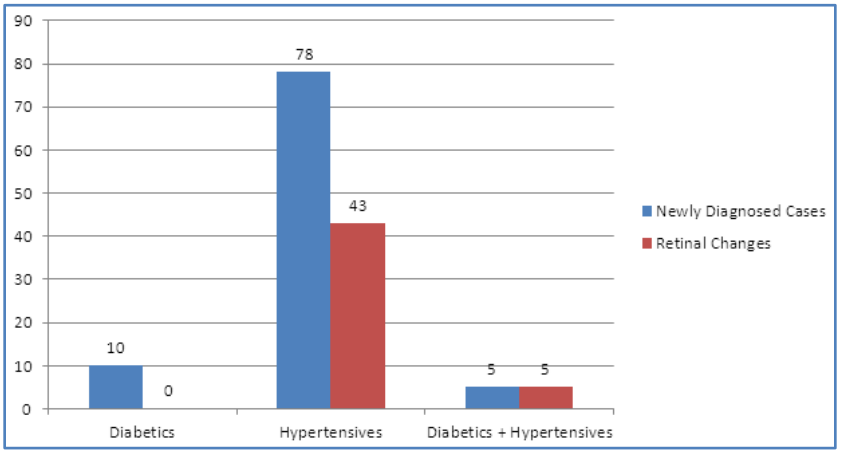
Ocular manifestations	Diabetes	Hypertension	combined
1. B.R.V.O.	2	2	3
2. C.R.V.O + Massive 3. vitreous haemorrhage	0	1	2
4. Vitreous haemorrhage	0	0	1
5. Sub - hyaloid haemorrhage	0	0	2
6. Sub- conj. Haemorrhage	0	0	1
7. C.R.A.O.	0	1	0
8. Circinate Retinopathy	4	1	4
9. Wet A.R.M.D.	0	4	0
10. Ischemic Optic Neuropathy	1	12	7
11. Malignant Hypertension	0	6	2
12. Severe N.P.D.R.	3	0	12
13. P.D.R.	3	0	5
14. C.S.M.E.	4	0	11
15. Neovascular glaucoma.	1	0	0
16. Chronic simple glaucoma.	2	2	3
Total	**20(16.94%)**	**30 (8%)**	**51(38.63%)**

Table 6: Disease specific causes of visual morbidity



Graph 1: Distribution of newly diagnosed cases (within 3 months) and the no. of cases showing retinal changes

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