

INFLUENCE OF HYPERTENSION AND DIABETES MELLITUS ON SENILE CATARACT

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Background: The aim of this study was to evaluate the influence of modifiable risk factors like hypertension and diabetes on senile cataract. **Methods:** This study was conducted in the Department of Physiology, Basic Medical sciences Institute, Jinnah Postgraduate Medical Centre (JPMC) in collaboration with Ophthalmology Department of JPMC and Physiology Department at Dow Medical College Karachi. After selection of the subjects by consecutive sampling, a proforma was filled. A complete eye examination was performed and the subjects were asked to attend the laboratory after 12 hour fasting. Samples were collected, sera were stored for analysis. Blood pressure was measured by mercury sphygmomanometer. Subjects were divided into 4 groups Normotensive, Normoglycaemic with Cataract as Control (Group-A), Hypertensive with Cataract (Group-B), Diabetics with Cataract (Group-C) and Hypertensive and Diabetics with Cataract (Group-D). **Results:** This study revealed that the Diabetes Mellitus and Hypertension are modifiable risk factors that influence positively on the development of senile cataract. **Conclusion:** Senile cataract is positively influenced by Diabetes Mellitus and Hypertension.

Keywords: Diabetes mellitus, hypertension, senile cataract

INTRODUCTION

Visual impairment is a global public health problem world wide, an estimated 45 million people are blind and in addition 135 million have severe visual impairment. The prevalence of blindness in developing countries is 10–40 times higher than in developed countries, and close to three quarters of the world's blindness. The majority of blinds on earth reside in the developing nations of Africa, Asia, and Latin America.¹

Out of different problems related to the eye, cataract is responsible for about 16 million blind people world wide, and the burden of blindness is more in remote rural communities of developing countries.² It is estimated that 41.8% of all global blindness is caused by cataract.³ Cataract is also a leading cause of blindness worldwide, with approximately half of the world, blindness caused by this condition.⁴ It is abundantly clear the blindness problem and that due to cataract specifically, remains at challenging high levels.⁵ In Africa and in Asia cataract is reported to be the main cause of blindness.⁶

A number of risk factors are associated with cataract like diabetes, hypertension and central obesity⁷, older age, race, smoking, alcohol use and low socioeconomic status, or educational attainment⁸. Identification of factors that could delay or prevent cataract development would be important both for increasing the well being of older adults and for reducing medical care costs.⁹

This study was carried out to evaluate the influence of hypertension and diabetes mellitus as modifiable risk factors.

MATERIAL AND METHODS

This study was conducted in the department of physiology basic medical sciences institute (B M S I), Jinnah post graduate medical centre (JPMC), Karachi in collaboration with department of ophthalmology, JPMC Karachi. This study was performed on consecutive sampling of 160 males aged 40 years and above. The written consent was taken after fulfilling the inclusion and exclusion criteria.

Patients with cataract of age 40 and above were included and all patients having visual loss due to the corneal disorders Glaucoma, lens abnormalities other than cataract, vitreous disorders and retinal disorders were excluded. The subjects were divided into 4 groups:

Group A: Normotensive normoglycemic with cataract.

Group B: Hypertensive with cataract

Group C: Diabetics with cataract

Group D: Hypertensive and diabetics with cataract.

After selection and fulfilling the Performa subject were asked to attend the laboratory in the morning with 12 hours fasting. Examination of eyes was performed by an ophthalmologist in the ophthalmology department at Jinnah postgraduate medical centre Karachi. Blood was collected after all aseptic precautions. Blood was centrifuged at 3000 round/min and sera were collected and stored for analysis. Confidentiality and anonymity were

maintained. Blood pressure was measured using the mercury sphygmomanometer.¹⁰ Serum glucose was estimated by enzymatic and colorimetric method using kit.

RESULTS

Table-1 shows the systolic blood pressure (mm Hg). The mean systolic blood pressure of group A is 128.5±2.006. Group B and D shows the increased systolic blood pressure $p<0.001$. Group C shows non-

significant result, mean diastolic BP of group B and D are 101.5±0.470 and 101.95±0.63 respectively with $p<0.001$ while group C shows non significant result. This Table also shows fasting blood sugar (in mg/dl). The mean of group A is 86.84±1.43, Group C and D shows mean value of 139.5±1.61 and 137.91±1.48 respectively with $p<0.001$ while group B shows the non significant results.

Table-1: Comparison of Age, BP and fasting blood sugar among normotensive subjects with cataract, Hypertensives with cataract, Diabetics with cataract and hypertensives as well as diabetics with cataract

Group	Age (Years)	Systolic BP (mm Hg)	Diastolic BP (mm Hg)	Blood Sugar Fasting (mg/dl)
Group-A(n=64)	61.45±0.711	128.5±2.066	81.65±0.740	86.84±1.436
Group-B(n=46)	61.434±0.798	168.63±0.946 $p<0.001$	101.50±0.470 $p<0.001$	87.456±1.188 NS
Group-C(n=26)	55.80±1.405	126.61±2.161 NS	82.23±1.20 NS	139.50±1.619 $p<0.001$
Group-D(n=24)	58.54±0.52	161.00±1.15 $p<0.001$	101.95±0.63 $p<0.001$	137.91±1.48 $p<0.001$

DISCUSSION

Cataract is an opacification of lens that causes decreased visual acuity and can lead to blindness.⁹ In Africa and in Asia cataract is reported to be the main cause of blindness.⁶ The three main causes of blindness are cataract, trachoma, and glaucoma which together account for more than two thirds of the world's blindness.¹¹

Age related cataract is the leading cause of blindness in the world, with an estimated 17 million individuals bilaterally blind.¹² The WHO and international agency for the prevention of blindness have developed a global initiative for elimination of avoidable blindness by the year 2020; 'Vision 2020: the right to sight.' The name is suggestive both of the goal, the prevention of avoidable vision loss and blindness by the year 2020 and notion of good vision, 20/20 (6/6) vision as target. Vision 2020 has identified five key areas for action—cataract, trachoma, onchocerciasis, childhood blindness and refractive error and low vision. Some 90% of blindness in the world occurs in developing countries.¹³

Diabetes and hypertension are related to cataract.⁷ Both the Framingham eye study and National Health and Nutrition Examination Survey¹⁴ reported a positive association between diabetics and cataract prevalence only in those younger than 65 years of age. At older ages the association was not significant in the Framingham eye study¹⁵ and became less significant in NHNES.¹⁴

Result of our study on diabetics with cataract somewhat consistent with Barbados eye study as our study also shows positive influence below 60 years of age on cataract.

No association was found between history of diabetes and cataract in the Italian-American cataract study group.¹⁶ Failure to find an association with diabetes in the above study may have resulted from the systemic exclusion of diabetics with any signs of retinopathy that could have caused a reduction in visual acuity.

Our study is inconsistent with Italian-American cataract study group¹⁶ as even after excluding diabetes with retinal disorder, we found a positive influence of diabetes mellitus on cataract.

The Framingham eye study¹⁵ found an association of high systolic blood pressure and senile cataract, while Clayton *et al*¹⁷ reported a significant relationship with high diastolic blood pressure. The NHANES study¹⁴ found high systolic blood pressure with cataract whereas the India-US case control¹⁸ reported an increased risk.

Barbados eye study⁷ suggested that a diastolic blood pressure of more than 95 mmHg was related to an increased risk of opacities. Our study is consistent with Framingham eye study¹⁵ regarding an association of high systolic blood pressure and senile cataract and also consistent with NHANES¹⁴, India-US case control study¹⁸, and study conducted by Clayton *et al*.¹⁷

CONCLUSION

There are many risk factors and associations for age related cataract. Our study supports the view of many researchers that Diabetes mellitus and Hypertension are risk factors for senile cataract. It was a cross sectional study therefore strong conclusion can not be made, however to authenticate our results a large scaled longitudinal study is desired.

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