VARIATION IN INTRAOCULAR PRESSURE BY GENDER, AGE, BMI, AND BLOOD PRESSURE IN DIABETIC ADULTS.

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Abstract:

To evaluate the relationship between age, gender, BMI, BP and intraocular pressure in diabetic adults presenting to the Outpatient department of Government medical college Srinagar. This was a comparative cross sectional analytical study based on prospective observational design. The present study was conducted in the Post graduate Department of Physiology in collaboration with the postgraduate department of ophthalmology in Government Medical College, Srinagar. The study design involved 360 subjects, and was categorized into two groups, namely: Group A: This was an experimental group comprised of Diagnosed Type-2 Diabetic patients. This study group was obtained from Outpatient department (OPD) at Shri Maharaja Hart Singh (SMHS) Hospital Srinagar. Patients who satisfied any one of the inclusion criteria were selected. Group 2 This was a healthy controlled group, non diabetic (n=150). which were compared with Group A on similar parameters. Height, weight, blood pressure and intraocular pressure (IOP) were recorded in these patients.IOP was measured using Goldmann applantation tonometer. The correlation between gender, age, BMI, Blood pressure and IOP was calculated and statistical analysis was done. It was observed that 83.34 per cent (f=203) men and 31.65 per cent (f=94) women reveal moderate IOP Right Eye; 13.99 per cent (f=34) men and 13.68 per cent (f=16) women revealed high IOP Right Eye. IOP Left Eye of subjects, 80.25 per cent (f=195) men and 82.05 per cent (f-96) women, revealed moderate IOP; 15.23 per cent (f=37) men and 0.26 per cent (f=12) women depict high IOP. The present study shows significant differences in IOP of men and women subjects. Among diabetic patients, age is highly and significantly associated with the IOP Of their right as well as left eyes. The present study also shows that height and weight is significantly associated with IOP of diabetic women than diabetic men. BMI was also seen to be significantly associated with IOP of both eyes. When looking at the association of IOP with BP measurements, significant differences were observed in Right Eye IOP of subjects and highly significant differences among Left Eye IOP of subjects. This study shows that obesity is an independent risk factor for increasing IOP in both men and women. We consider this finding particularly pertinent in the context of the current obesity epidemic.

Keywords: Intraocular pressure, Diabetics, blood pressure, height, weight, BMI, Glaucoma

INTRODUCTION:

Elevated intraocular pressure is a feature of glaucoma. A sustained increase in IOP may be due to increased formation of the aqueous humour, difficulty in its exit, or a raised pressure in the episcleral veins. Of these, the first and last rarely occur, and it follows that raised intraocular pressure is essentially due to an increased resistance to the circulation of the aqueous at the pupil and/or to its drainage through the angle of the anterior chamber. If the outflow pathway via the trabecular meshwork is blocked, some drainage does occur through the uveoscleral outflow, but these alternative channels are not efficient and they are incapable of dealing with sudden changes of intraocular pressure. Increased IOP in most cases is caused by decreased facility of aqueous humor outflow. Increased

resistance or reduced facility of outflow is seen between anterior chamber and lumen of Schlemm's canal. Because trabecular meshwork prolapses into Schlemms' canal, it occludes the lumen and prevents circumferential flow of aqueous humour to collector channels (1). Glaucomatous damage to optic nerve in most cases is a result of increased IOP. Some nerves, however, can withstand high pressures for a remarkably long time, whereas others seem to develop pathologic cupping at normal or even low normal intraocular pressures. Thus the resistance of nerve head to pressures is a key factor that determines whether an individual will develop progressive damage. The coats of the eye can withstand fairly high intraocular pressures except at the lamina cribrosa - the fenestrated region through which optic nerve fibres enter the eye. Here, the nerve fibres are supported by glial tissue and have to blend over the edge of the disc. Increased IOP leads to mechanical pressure on lamina cribrosa, altering capillary blood flow and reduced axoplasmic flow in the initial stages (2) Normal intraocular pressure is considered between 10 mmHg and 21 mmHg. An IOP >21 mmHg is often referred to as ocular hypertension.Risk Factors For IOP a) Age: Age is considered a significant factor for progression of intraocular pressure (IOP) and incidence of ocular hypertension (OHT).However, the direction of correlation is not consistent throughout previous population-based studies. In studies composed of Caucasians, blacks or Irish populations, a positive correlation between increasing age and IOP is reported (3-9) In contrast; an inverse relationship of age and IOP is generally reported in Asian populations. IOP is found to decrease with age in cross-sectional studies and one longitudinal study in Japan (10-13)

Blood Pressure: Several population based studies have consistently reported cross sectional and longitudinal associations between increased systolic or diastolic blood pressure with higher IOP (14-17). The positive correlation between systolic blood pressure (SBP), diastolic blood pressure (DBP) and IOP observed in both healthy individuals and OAG patients also appears to be present across all races. However, the actual change in IOP with increasing BP is relatively small. In cross-sectional studies, each 10 mm Hg increment in SBP leads to a mean of 0.23 to 0.32 mm Hg rise in IOP, and each 10mm Hg increment in DBP leads to a mean of 0.19 to 0.55 mm Hg rise in IOP. In longitudinal analysis of Beaver Dam Study, each 10 mm Hg increase in SBP from baseline leads to a 0.21 mm Hg rise in IOP over a 5-year interval. If we assume that the mean IOP at baseline is 15 mm Hg, then the change is about 1.4% over a year interval.

Obesity: Previous cross-sectional studies have consistently shown that obesity and increasing BMI are risk factors for elevated IOP .5 (18-21) Interestingly, although BMI is a riskfactor for higher IOP, BMI may have a U-shaped association with glaucoma (22). The U shape could be related to the fact that underweight individuals may be more likely to have chronic or infectious disease, which may affect their susceptibility to ocular hypertension. Potential mechanisms include excess intra-orbital fat tissue, increased episcleral venous pressure, and increased blood viscosity with increased outflow resistance of episcleral veins. These factors could result in decreased in outflow facility. Another study suggested that the breath holding and thorax compression while tonometry is performed at the slit lamp on obese patients may cause transitory elevations of IOP, thus increase IOP readings using Goldmann tonometer (23) High IOP is the most important risk factor for primary pen-angle glaucoma, which accounts for >50% glaucoma cases. Since open-angle glaucoma is a chronic condition, it must be monitored for life, which makes IOP a key component of regular eye examination. Ocular hypertension is common in the elderly. About 2% of the population ages 40-50 and 8% over 70 have ocular hypertension. The prevention of ocular hypertension and IOP control has public health significance in reducing incidence and progression of glaucoma. However, the underlying mechanism for cardiovascular risk factors to impact ocular pressure remains elusive.

MATERIAL AND METHODS:

This was a comparative cross sectional analytical study based on prospective observational design. The study was based primary data collected directly from the subjects. Written informed consent was obtained from all participants.Place of Study; the present study was conducted in the Post graduate Department of Physiology in collaboration with the postgraduate department of ophthalmology in Government Medical College, Srinagar. For the purpose, Institutional Ethical Clearance was obtained through proper channel. Sample Size and Group: The study design involved 360 subjects, and was categorized into two groups, namely: Group A: This was an experimental group comprised of Diagnosed

Type-2 Diabetic patients. This study group was obtained from Outpatient departmentment (OPD) at Shri Maharaja Hart Singh (SMHS) Hospital. Srinagar Patients who satisfied any one of the inclusion criteria were selected Group 2 This was a healthy controlled group, non diabetic (n-150). Which were compared with Group A on similar parameters. Sample: Men as well as women comprised the sample. The age group under study were adults Group A as well as for Group B. Inclusion Criteria: > Diagnosed Type-2 diabetic Patients > IOP 21 mmHg (by Applanation Tonometry) > Normal IOP with asymmetry of IOP in both eyes of > 5 mmHg. Age >40 years . Exclusion Criteria ; Closed angle on gonioscopy, Drug induced (corticosteroids) ,Myopia, Hypertension, Any Ocular Surgery, other intra ocular pathology .Tools Used: Tonometry with Applanation tonometer ;This test measures fluid pressure in your eye. The test involves using a slit lamp equipped with forehead and chin supports and a tiny, flat-tipped cone that gently comes into contact with cornea. The test measures the amount of force needed to temporarily flatten a part of cornea.

RESULTS AND OBSERVATIONS

(I) IOP of Subjects under Study

Table 1 show the IOP of subjects under study. It was observed high at 82.50 per cent (f=297) in right eye and 80.83 per cent (f=291) in left eye, average (12-20) IOP by 13.89 per cent (f=50) in right eye and 13.61 per cent (f=49) in left eye. Only among 3.61 per cent (f-13), IOP was observed low in right eye and 5.56 per cent (f=20) in left eye (below 12) IOP.

IOP	Right Eye		Left Eye	
	No.	%	No.	%
Low (Below 12)	13	3.61	20	5.56
Average (12-20)	50	13.89	49	13.61
High (Above 20)	297	82.50	291	80.83
All	360	100.00	360	100.00

Table 1

(II) IOP of Subjects as per their Health Status It was found that 74.44 per cent (f=14) diabetic subjects. have High IOP in their left eye. While as, 88.89 per cent (f =160) right eye and 90 per cent (f=162) left eye having normal IOP were found in non diabetic subjects. similarly subjects having normal IOP 21.11 per cent (f=38) in right eye and 25.56 per cent (f=46) in left eye were found diabetic. While as 8.33 per cent (f=15) right eye IOP and 2.78 per cent (f=5) left eye IOP were found non-diabetic. In context to IOP of diabetic and non diabetic subjects, highly significant differences were found between their health statuses under study.

(1) Association of IOP with Gender

Table 2 depict the association of IOP with gender. It was observed that 83.34 per cent (f=203) men and 31.65 per cent (f=94) women reveal moderate IOP Right Eye; 13.99 per cent (f=34) men and 13.68 per cent (f=16) women revealed high IOP Right Eye. Only 2.47 per cent (f=6) men and 3.61 per cent (f=7) women depict low IOP Right Eye. In view of IOP Left Eye of subjects, 80.25 per cent (f=195) men and 82.05 per cent (f-96) women, revealed moderate IOP; 15.23 per cent (f=37) men and 10.26 per cent (f=12) women depict high IOP. About 4.53 per cent (f=11) men and 7.69 per cent (f-9) women revealed low IOP. Considering the association of Right and Left Eye IOP of subjects insignificant differences were found between men and women. Table 3

IOP	Men		Women	
	F	%	F	%
IOP Right Eye				
Low	6	2.47	7	3.61
Moderate	203	83.34	94	31.65
High	34	13.99	16	13.68
Chi Square Analysis	χ^2 =2.804, df = 2, p-value = 0.246			
IOP Left Eye				
Low	11	4.53	9	7.69
Moderate	195	80.25	96	82.05
High	37	15.23	12	10.26
Chi Square Analysis	χ^2 = 2.889, df = 2, p-value = 0.236			

Table 2

(2) Association of IOP with Age : Table 3 depict the association of IOP with age. It was observed that 97.73 per cent (f=86) subjects up to 30 years old; 78.23 per cent (f=97) under the age of 30-50 years and 77.03 per cent (f=114) under > 50 years of age have moderate IOP Right Eye. Whereas, 20.16 per cent (f=25) under the age of 30-50 years and 16.89 per cent (f =25) under > 50 of years age reveal high IOP Right Eye. About, 2.27 per cent (f=2) subjects up to 30 years old; 1.61 per cent (1-2) under the age of 30-50 years and 6.08 per cent (f= 9) under 50 >years of age reveal low TOP Right Eye. In view of IOP Left Eye, 94.32 per cent (f=83) subjects up to 30 years old; 79.03 per cent (f=98) under the age of 30-50 years and 74.32 per cent (f

=110) under >50 years of age reveal moderate IOP Left Eye. Whereas, 13.71 per cent (f=17) under the age of 30-50 years and 21.62 per cent (f=32) under > 50 years of age reveal high IOP Left Eye. About, 5.68 per cent (f=5) subjects up to 30 years old; 7.26 per cent (f=9) under the age of 30-50 years and 4.05 per cent (f= 6) under > 50 years of age reveal low IOP Left Eye. With reference to age, highly significant differences were observed in Right Eye IOP of subjects.

IOP	Up to 30 Yrs		30-50 Yrs		>50 Yrs	
	F	%	F	%	F	%
IOP Right Eye						
Low	2	2.27	2	1.61	9	6.08
Moderate	86	97.73	97	78.23	114	77.03
High	-	-	25	20.16	25	16.89
Chi Square Analysis	χ^2 = 24.289, df = 4, p-value =0.000					
IOP Left Eye						
Low	5	5.68	9	7.26	6	4.05
Moderate	83	94.32	98	79.03	110	74.32
High	-	-	17	13.71	32	21.62
Chi Square Analysis	χ^2 = 23.011, df = 4, p-value =0.000					

Table 3

(3)Association of IOP with Weight Table 4 depict association of IOP with weight. It was observed that 83.61 per cent (f=102) subjects having weight of 55-65 kgs; 79.72 per cent (f=114) having weight of 65-75 kgs; 82.50 per cent (f=52) having weight >75 kgs and 9.76 per cent (f= 29) weighing up to 55 kgs; reveal moderate IOP Right Eye. Whereas, 12.30 per cent (f=15) subjects having weight of 55-65 kgs; 16.08 per cent (f=23) having weight of 65-75 kgs; 14.75 per cent (f=9) havingweight >75 kgs and 8.82 per cent (f= 3) having weight up to 55 kgs reveal high IOP Right Eye. Considering IOP Left Eye, 88.24 per cent (f=30) respondents having weight up to 55 kgs; 88.11 per cent (f =126) having weight of 65- 75 kgs; 78.69 per cent (f=96) having weight of 55-65 kgs; and 63.93 per cent (f =39) having weight >75 kgs reveal moderate IOP Left Eye. Whereas, 13.11 per cent (f=16) respondents having weight of 55-65 kgs; 9.79 per cent (f=14) having weight 65-75 kgs; 27.87 per cent (f= 17) having weight >75 kgs and 5.88 per cent (f= 2) having weight up to 55 kgs reveal high IOP Left Eye. In association of weight of subjects, highly significant differences were observed in Left Eye IOP of subjects.

IOP	Up To 55 Kgs		55-65 Kgs		65-75 Kgs		>75 Kgs	
	F	%	F	%	F	%	F	%
IOP Right Eye								
Low	2	5.88	5	4.10	6	4.20	-	-
Moderate	29	9.76	102	83.61	114	79.72	52	82.50
High	3	8.82	15	12.30	23	16.08	9	14.75
Chi Square Analysis	χ^2 =4.524, df =6, p-value =0.606							
IOP Left Eye								
Low	2	5.88	10	8.20	3	2.10	5	8.20
Moderate	30	88.24	96	78.69	126	88.11	39	63.93
High	2	5.88	16	13.11	14	9.79	17	27.87
Chi Square Analysis	χ^2 = 20.932, df = 6, p-value =0.002							

Table 4

(4)Association of IOP with Height. It was observed that 83.87 per cent (f-26) subjects having height up to 5.0 feet; 84.18 per cent (f=149) having height 5.1-5.5 feet and 80.26 per cent (f= 122) having height 5.6 -6.0 feet reveal moderate IOP Right Eye. Whereas, 9.68 per cent (f=3) subjects having height up to 5.0 feet; 11.30 per cent (f-20) having height 5.1 5.5 feet and 17.76 per cent (f= 27) having height 5.6 -6.0 feet reveal high IOP Right Eye. Moreover, that 87.10 per cent (f-27) respondents having height up to 5.0 feet: 79.66 per cent (f=141) having height of 5.1 5.5 feet and 80.83 per cent (f=123) having height of 5.6-6.0 feet reveal moderate IOP Left Eye. Whereas, 9.68 per cent (f=3) subjects having height up to 5.0 feet, 10.73 per cent (f=19) having height of 5.1-5.5 feet and 17.76 per cent (f=27) having height of 5.6 -6.0 feet reveal high IOP Left Eye. Considering the height of subjects, highly significant differences were observed in Left Eye IOP of subjects.

(5) Association of IOP with BMI Table 5 depicts the association of IOP with BMI. It was observed that majority of the respondents i.e, 100 per cent (f=5) mildly thin; 79.70 per cent (f=157) normal; 84.09 per cent (f=111) over weight and 92 per cent (f=24) obese depicted moderate IOP Right Eye. Similarly, 100 per cent (f=5) mildly thin; 80.71 per cent (f=159) normal; 81.82 per cent (f=108) over weight and 72 per cent (f 19) obese people reveal

moderate IOP Left Eye. Considering the association of BMI of subjects, highly significant differences were observed in Right and Left Eye IOP of subjects.

IOP	Mild Thin		Normal		Over Weight		Obese	
	F	%	F	%	F	%	F	%
IOP Right Eye								
Low	-	-	10	5.08	1	0.76	2	8.00
Moderate	5	100.00	157	79.70	111	84.09	24	92.00
High	-	-	30	15.23	20	15.15	-	-
Chi Square Analysis	χ^2 =11.134, df =7, p-value = 0.006							
IOP Left Eye								
Low	-	-	13	6.60	4	3.03	3	12.00
Moderate	5	100.00	159	80.71	108	81.82	19	72.00
High	-	-	25	12.69	20	15.15	4	16.00
Chi Square Analysis	χ^2 =5.908 , df =7, p-value = 0.000							

Table 5

(6) Association of IOP with BP Measurements Table 6 portrays association of IOP with BP measurements. It reveals that majority i.e. 85.43 per cent (f=211) patients having moderate IOP Right Eye revealed Hypotension; 78.05 per cent (f=32) depicted Normotension and 75 per cent (f=54) revealed Pre hypertension/Hypertension. Moreover, 85.83 per cent (f=212) patients having moderate IOP Left Eye revealed Hypotension; 73.17 per cent (f=30) depicted revealed (f=54) Normotension and 68.06 per cent hypertension/Hypertension. In association of IOP with BP measurements, Pre significant differences were observed in Right Eye IOP of subjects and highly significant differences among Left Eye IOP of subjects.

IOP	Hypotension		Normotension		Prehypertension/ Hypertension	
	F	%	F	%	F	%
IOP Right Eye						
Low	10	4.05	2	4.88	1	1.39
Moderate	211	85.43	32	78.05	54	75.00
High	26	10.53	7	17.07	17	23.61
Chi Square Analysis	χ^2 =9.353, df = 4, p-value =0.053					
IOP Left Eye						
Low	17	6.88	2	4.88	1	1.39
Moderate	212	85.83	30	73.17	49	68.06
High	18	7.29	9	21.95	22	30.56
Chi Square Analysis	χ^2 = 30.122, df = 4, p-value =0.000					

Table 6

DISCUSSION

Association of IOP with Age Intraocular pressure (IOP) is the key modifiable risk factor for glaucoma, and understanding its distribution with age is important for definition of "normal values." In this regard, previous population-based studies in Caucasians have generally reported a positive correlation between increasing age and IOP.(24-28) In contrast, an inverse relationship of age and IOP has been reported in Japanese populations.(29-31) The reasons for this apparent discrepancy are unclear. Intraocular pressure may increase or decrease with age. The study of Quraishi (32) (1995) reveals that as age increases, intraocular pressure also increases, with an average of 0.28 mmHg per decade. Knowledge of the normal range of intraocular pressure in various age groups will help glaucoma screeners. This study also shows that moderate increase of IOP with age particularly among diabetic patients. Control of IOP is the mainstay of glaucoma therapy. (33-34)Many studies have reported that the prevalence of glaucoma increases with aging. (35)Therefore, it would be necessary to implement studies on changes in IOP due to aging to understand the normal distribution of IOP. changes There have been many studies about IOP change with aging.***Association of IOP with Gender*** The present study shows significant differences in IOP of men and women subjects. While the study of Ejimadu et.al (2018)(36)reveal insignificant diiferences in IOP in males than females. Several studies have shown conflicting results; while some showed higher IOP in males (37-38) others showed higher values in females (39-43)and some showed no association (44-45)It has been hypothesized that the higher IOP in men association could be due to a higher prevalence of cardiovascular risk factors in men (42-47)Hormonal differences and the effect of menopause may also explain some gender differences in IOP (48)Estrogen may affect the inflow of aqueous humor, the ciliary body, and the trabecular meshwork (49) .An Indian study showed that the IOP in postmenopausal women was higher compared with premenopausal women and attributed this difference to the higher levels of testosterone and the decrease in estrogen and progesterone levels with the onset of menopause (50). The present study shows, the IOP of males higher than that of females although the differences are statistically non-significant. Gender wise difference reported in IOP in studies from various regions has down variable results. Some studies

report higher IOP among females while others report higher IOP in males. The gender wise difference in JOP could be due to hormonal factors, environmental conditions (51) ***Association of IOP with Diabetic and General Pollution*** This study showed that the patients with diabetes had a significantly higher mean intra ocular pressure (IOP) than the non-diabetic persons and such difference is statistically significant. A significant difference in mean intraocular pressure was observed in patients with diabetes when compared with non-diabetic patients. Vidhya et. Al (2010) also revealed that the patients with diabetes had a significantly higher mean intra ocular pressure (IOP) than the non-diabetic patients and also in his study, there was statistically significant increase in mean intraocular pressure in the diabetic patients than non diabetic patients. (52) The results of present study are also similar with that of the study conducted by Neeetans et al in 1997, (53) The positive relationship between diabetes and increased intraocular pressure has been well documented in several other studies than non-diabetic persons in general population. (54,55) ***Association of IOP with Height, Weight and BMI*** A recent study (56) found that IOP is significantly correlated with body mass index, waist circumference and diastolic blood pressure and are the factors that are more easily identifiable for the general population. In the study, the researchers noted that elevated IOP is a known risk factor for glaucomatous optic neuropathy, and it's also associated with obesity and cardiometabolic diseases. The study population had a 5.5% prevalence of body mass index, and was significantly correlated with IOP. The researchers found that body mass index was correlated with IOP, independent of systemic blood pressures. Thus researchers concluded that body mass index is an independent risk factor for elevated IOP. Results of Iqbal et. al (2016) (157)showed that the IOP is strongly affected by increased weight. This relationship was strongly statistically related. George reported in 2015 that increase in weight increases blood pressure and intraocular pressure may result in hypertension and glaucoma. Similarly, Mori also reported there is strong relationship between IOP and obesity in 2000.(58)***Association of IOP with Blood Pressure*** In several studies Intraocular pressure (IOP) has been found to be associated with systemic blood pressure levels. (59-68) The relation appears to be reasonably consistent across the range of values of IOP and both systolic and diastolic blood pressures. It has been postulated that management of hypertension may place the eye at relatively increased risk of visual field deficits because of an imbalance in the relation of blood pressure to IOP.(69) This thought has been given credence, in part, because of the clinical dictum that sudden lowering of blood pressure is associated with loss of visual field in some people.(70) Hyperinsulinemia can increase blood pressure (BP) via several mechanisms, including increased renal sodium reabsorption, activation of the sympathetic nervous system, alteration of transmembrane ion transport, and increased vascular resistance. (71-73) Hypertension control has a complex relationship with diabetes mellitus. Control of hypertension can influence hyperinsulinemia and the subsequent risk for other insulin-resistant states such as diabetes mellitus, (74) In present study, blood pressure is significantly associated with Diabetic subjects. Hypertensive diabetic subjects have also shown adverse effect on IOP of their eyes.

CONCLUSION

IOP in relation to Age; The mean age of diabetic patients is 57.05 years, which is significantly different from non diabetic subjects. Highly significant differences are observed in the age groups of diabetic and non diabetic subjects. Diabetes is found more among adults above 40 years of age. Age has also shown significant association with weight of diabetic subjects. Age is significantly associated with IOP of left eyes of all subjects. However, among diabetic patients, age is highly and significantly associated with their right as well as left eyes. ***IOP in relation to gender*** IOP is observed more in right eyes of diabetic men than their left eyes. Diabetic women have shown more IOP in their left eyes than their right eyes .***IOP in relation toWeight*** The mean weight of diabetic patients is more than non diabetic subjects.

Weight of diabetic and non diabetic subjects is statistically significantly different. Majority of diabetic subjects are above 70 kgs in weight. Diabetic subjects are more in weight than non diabetic subjects. Weight is significantly **correlated** with IOP of right eyes of diabetic patients. ***IOP in relation to Height*** Mean height of all subjects is 5.44 ft. However, there is no significant difference in the mean score of height of diabetic and non diabetic subjects. Insignificant differences are found in height of diabetic and non diabetic subjects. Insignificant association is also observed in heights

of men diabetic and non diabetic subjects. However, significant association is revealed by heights of women diabetic and non diabetic . Height of diabetic patients is correlated with IOP of their right eye. Height is also correlated with weight of diabetic patients. ***IOP in relation to BMI*** The mean score of BMI is significantly higher than mean scores of BMI among non diabetic subjects. Diabetic subjects are found overweight than normal subjects. Significant differences are found in weight of men and women diabetic and non diabetic subjects. BMI is significantly associated with IOP of right eyes as well as left eyes of subjects. ***IOP in relation to Blood Pressure Measurements*** :Highly significant differences are observed in BP measurements of diabetic and non diabetic subjects. More diabetic patients are found pre-hypertensive and hypertensive than normal subjects. Men diabetic patients are more hypertensive than men non diabetic subjects. Women diabetic patients are more hypotensive than men diabetic patients. Blood Pressure measurements show highly significant association with IOP of diabetic and non diabetic subjects.

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