Vol: 07, Issue 03
OPHTHALMOLOGY PAKISTAN

Original Article

Comparison of refraction between diabetic and non-diabetic mothers' children

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Purpose: To compare the visual status between diabetic and non-diabetic mothers' children.

Study Design: Comparative Cross sectional, analytical study.

Method: Refraction of 100 eyes of 50 patients (25 diabetic mothers' child and 25 non-diabetic mothers' child) visiting Mayo Hospital Lahore and College of Ophthalmology and Allied Vision Sciences (COAVS) Lahore. The parameters compared were spherical, cylindrical and contrast sensitivity value of children of diabetic mothers and those of non-diabetic mothers. Confidence level of 0.95 with α of 0.05 was taken.

Results: The mean spherical correction value was -1.0102 ± 1.49213 D (SE. 0.21316) and -1.2800 ± 1.98761 D (SE. 0.28109), The mean cylindrical value in non-diabetic and diabetic mothers' child was -1.0950 ± 0.88625 D (SE. 0.12533) and -1.3650 ± 0.83789 D (SE. 0.11850), The mean contrast sensitivity in non-diabetic and diabetic mothers' child was 3 ± 1.0102% (SE. 0.1429) or -1.52 log unit and 3.6 ± 1.2536% or -1.44 log unit (SE. 0.1773) in non-diabetic and diabetic mothers' child respectively. Mann Whitney-U test showed little or no statistically significant difference of sphere (p= 0.053) and cylinder (p= 0.05) but shows marked difference in contrast sensitivity value (p= 0.01) between diabetic and non-diabetic mothers' children.

Introduction

Addressing refractive errors is a common goal of world initiatives against this preventable cause of impaired vision[1-3] especially, in under developed countries like Pakistan where there are more chances of untreated refractive errors and so, associated with loss of productivity.[4] The expensive treatment can become a source of economic burden on individual.[5] Moreover, those who are at high risk of myopia are more probable of developing sight risking complication like glaucoma and cataract.[6,7] The prevalence of refractive errors, in particular, myopia, is increasing day by day in last three years in East Asia, affecting youngsters mostly.[8-10]

To measure the exact refractive error is a main diagnostic problem for the ophthalmologist as well as the optometrist. Identification and correction of refractive error is very important job for averting any visual impairment which is injurious to the patient's normal visual functioning.[11,12]

Astigmatism is very common and frequently occurring refractive error, but, it is very difficult to find its cause.[13] Uncorrected astigmatism induces problem of contrast of retinal image at both distance and near. It also creates significant Amblyopia[14] and myopia development. One of the main leading causes of astigmatism is corneal disease like Keratoconus. The pathology of Keratoconus is still unclear.[15] The prevalence of Keratoconus is between 4 and 60 per 10,000 affected patients.[16] Astigmatism is a condition in which the parallel rays entering into the eyeball focused on more than one point at retina which is perpendicular to each other. It may be associated with many ocular diseases like glaucoma and diabetic retinopathy.[17]

Diabetes mellitus is proving to be a burden internationally, not only in term of health, but also financially. A recent survey exposed that about 5.1 million people died due to diabetes and related complications or consequences. It also accounted for 11% health spending, worldwide, in 2013. Depression proved to be a key contributor as a burden of diabetes mellitus. Diabetic people with depression have poorer quality of life as compared to without depression diabetic people.[18] In another study, it is found that visual impairment was found in 83% of the persons with juvenile onset (type I) diabetes and in 33% among person with maturity onset (Type II) diabetes. Diabetic Retinopathy occurred in about seven to twenty nine percent of patients in general medical practice. About 2/3 of the diabetic patients have an increased possibility of visual impairment after thirty-five years.[19]

Type II diabetes is most common disease in the world and its prevalence is growing day by day. Many factors causing type II diabetes including dietary factors. Antioxidant vitamins and carotenoids are major component of fruits and vegetables and believed to be a major contributor to body's immunity system against oxidative stress. Oxidative stress was found to be a major key player in pathogenesis of type II diabetes by impairing secretion of insulin.[20]

This study mainly focused on refractive errors in diabetic and non-diabetic mothers' children. The relation between socioeconomic position and health is necessary in all countries (under developed or developed), including the prevalence of ocular conditions like diabetes, visual functioning loss and age-related eye diseases.[21] The United States population shows in a study that there is marked difference in socioeconomic position by age and gender with socioeconomic side effects focused on the children and married females. Moreover, such study importantly shows much more prevalence among women with diabetes.[22,23] The individual's basic necessities like income and education experienced by American females' citizen of all states (almost) affect their health status and access to health care centers.[24,25]

Patients and Methods

This community-based case-control study was conducted at College of Ophthalmology and Allied Vision Sciences (COAVS) Lahore from September to December 2015. Patients were selected from diabetic and healthy mothers' children in age group 12 years and above. Before the start of examination, the objectives and the process of research were explained to them in detail. They assured full cooperation in carrying out research.

Vision of all the subjects was checked using a distance log MAR visual acuity chart. Individuals below 12 years and those who could not give history or unable to perform examination were excluded from the study.

Retinoscopy and subjective refraction were done in the individuals having visual acuity less than 0.2 log MAR in one or both eyes. Individuals having refractive errors were prescribed glasses. The data was recorded on the Performa, fed on the computer using the SPSS 21.0 software. The results were analyzed and tabulated using the same software. Mann-Whitney U test was applied to this study.

Results

The data was arranged in tabulated form as well as graphical and diagrammatic form for the analysis of variables. We selected the individuals of age above 11 years of both genders.

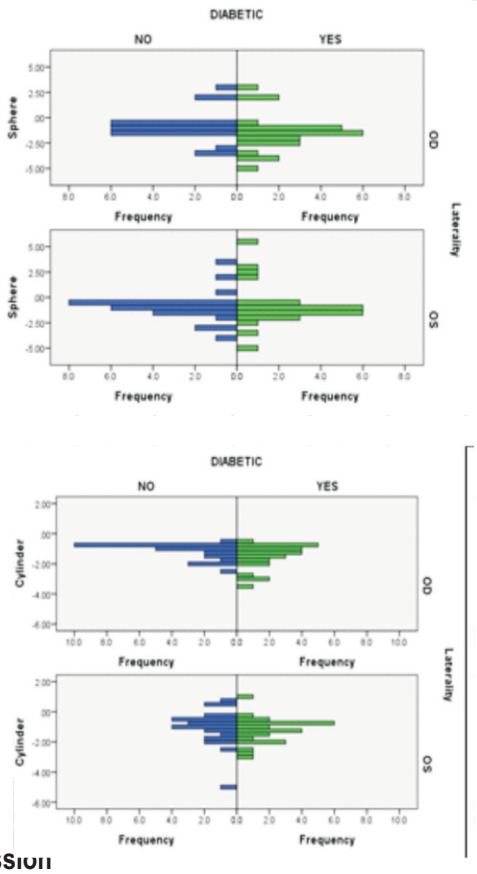
Spherical correction was compared between diabetic and non-diabetic mothers' child. The independent sample Mann Whitney -U test showed no statistically significant difference of sphere ($p=0.053$) but significant difference of cylinder ($p=0.05$) and contrast sensitivity ($p=0.01$) between diabetic and non-diabetic mothers' children., respectively. However, the non-diabetic mothers'

child experience less spherical number as compared to other.

Cylindrical correction is compared between diabetic and non-diabetic mothers' child. Independent sample Mann-Whitney U test was applied. The results showed that there is significant statistical difference between them (p=0.05). The mean cylindrical value in non-diabetic and diabetic mothers' child is -1.0950 ± 0.88625 D (SE. 0.12533) and -1.3650 ± 0.83789 D (SE. 0.11850), respectively. However, the non-diabetic mothers' child experienced less cylindrical number.

Table.1

	Sphere		Cylinder	
	Diabetics	**Non-Diabetics**	**Diabetics**	**Non-Diabetics**
N	49	50	50	50
Minimum	-4	-5	-5	-3.5
Maximum	3.25	5.5	0.75	1
Mean	-1.0102	-1.28	-1.095	-1.365
Std. Error	0.21316	0.28109	0.12533	0.1185
Std. Deviation	1.49213	1.98761	0.88625	0.83789
Mann-Whitney U Test	**p=0.53**		**p=0.05**	



Discussion

In this case-control study, the comparison was done in between diabetic and non-diabetic mothers' children. In another study, to observe neurobehavioral effect in diabetic and non-diabetic mothers' children, Fifty seven children born to forty eight well controlled mother while the thirty two children born to gestational diabetic mothers. Their development was compared with the same age group children of control group children. The IQ level was the same of children of diabetic and non-diabetic children, but the children born to gestational diabetic mother shows slightly less as compared to control group. Similarly, in motor functions, no difference was found; however, the diabetic mothers' children produce less efficient result as compared to control group. For the hyperactivity and inattention tests, the gestational diabetic mothers' child shows worse result as compared to controlled group. From this study, it is concluded that gestational diabetes has significant effect on motor function of children but not their cognitive abilities.[26,27]

Conclusion

There was no significant difference of sphere (p= 0.053) and cylinder (p= 0.05), between those who diabetic and non-diabetic children. However, the diabetic Mothers' children showed poor visual activity as compared to non-diabetic mothers' children.

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