



Original Article

Association of different Refractive Errors with Parental Cousin Marriages

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ABSTRACT:

OBJECTIVE: To correlate the consanguinity history with different refractive errors in parental cousin marriages, and to find out which component of refractive error is more compromised due to consanguinity.

METHOD: It was an institution based study conducted on 50 patient having consanguinity history and age from 18 years to 40 years. This study explains the association of different refractive error in parental cousin marriages. Distance (6m) and near (33cm) visual acuity was measured by using Snellen distance and near visual acuity charts. Results were obtained by asking the patient to fill a semi structured proforma.

RESULTS: Consanguinity is found more in myopic patient as compared to hyperopic patients. Some patients show myopic astigmatism. Mostly patient having consanguinity history show myopia and myopic astigmatism. No case of hypermetropia was seen having consanguinity history. Percentage of refractive error in a total family member having consanguinity history was 68% myopia and 32% astigmatism.

CONCLUSION: Consanguinity is associated with major refractive errors such as myopia and also myopic astigmatism in some cases.

KEYWORDS: Refractive errors, problems due to parental cousin marriages.



INTRODUCTION:

Presence of refractive error is called Ametropia. Visual acuity is affected when parallel rays of light coming from infinity are not focused on the retina. The failure of the eye to focus light on retina and form an object clear image on the retina is known as refractive error. In refractive error the eye is unable to focus light properly on the retina due to optical imperfections which causes blurred vision. Refractive errors occur due to the change in the length of eyeball, the shape of the cornea also changes but the shape of lenses changes mostly due to aging, these changes prevents the light to focus on retina.¹ Ametropia can be divided into Myopia, Hypermetropia & Astigmatism.

Malfuction of Emetropization and extreme eye growth causes images from remote objects to be focused in front of the retina. This is called myopia, also known as nearsightedness.^{2,3} Myopia or nearsightedness is a condition of refractive error which is measured by the spherical power in Diopter of the diverging lenses i.e. concave lenses needed to focus light exactly on the surface of the retina.⁴ The myopic eye is generally having increased axial length, but sometimes there may be some changes in refractive properties of lens and/or cornea.⁵ Hyperopia or farsightedness is a state in which image is formed behind the retina. Hyperopics mostly have amblyopia and strabismus and some patient also shows anisometropia i.e. dissimilarity of refractive power in both eyes.⁶ Hyperopia in growing age causes severe accommodative and binocular dysfunctions. It is a predecessor of visual motor and sensory sequelae which include accommodative esotropia, anisometropia and unilateral or bilateral amblyopia. The hyperopic children may show asthenopic symptoms.^{7,8,9} Astigmatism is present when parallel rays of light coming from infinity are focused on multiple points instead of focusing on a single on the retina. In myopic astigmatism both meridians are shortsightedness. On the other hand in hyperopic astigmatism both meridians are long-sightedness. The last and third one is known as mixed astigmatism. In mixed astigmatism one meridian is shortsighted and other meridian is longsighted.⁹

In a first-cousin relationship between the parents the children may inherit conditions like retinitis pigmentosa, refractive error, squints, keratoconus, and, abnormality in the size and thickness of the corneal shapes etc. Therefore consanguinity causes major ocular pathologies.¹⁰ In consanguinity the eyes are not small in many cases although the patient exhibit hyperopia and sometimes these patients also have early-onset nystagmus. Some patients also have deviations and the retina is dysplastic with numerous atrophic punched-out lesions, attenuated retinal vessels, and thin pigmentation, large retinal folds also seen in many patients which developed retinal detachment.¹¹

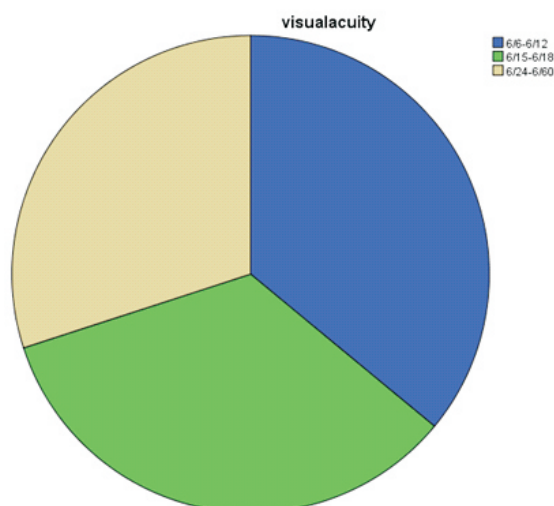
In a study involving first cousin relationship, visual acuity

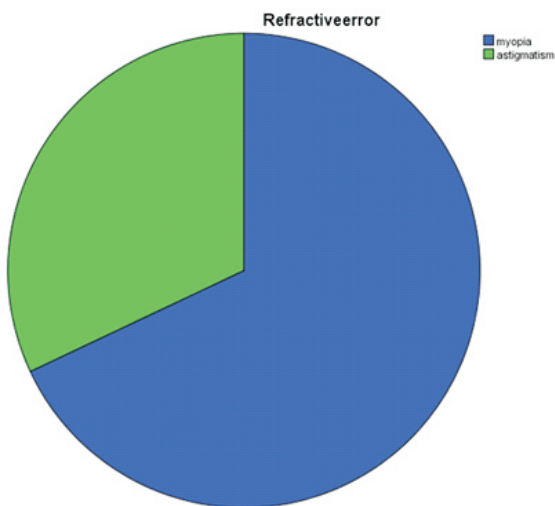
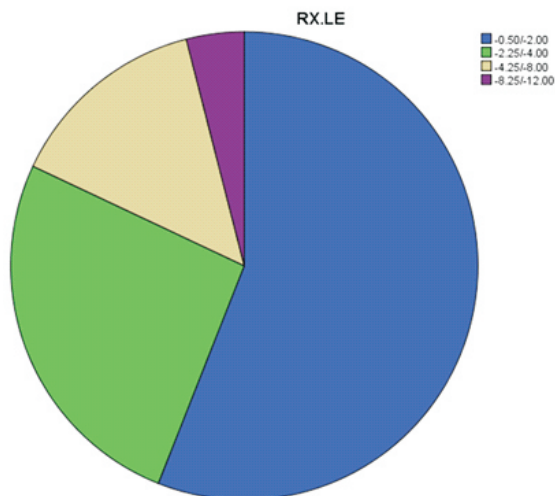
ranged from NLP to 6/6 and the range of Refractive errors from +8.25 to +15.50 D (mean +11.8 D) in many cases and the axial length range from 16.90 to 18.46 mm with a mean of 17.6 mm. Night blindness due to retinitis pigmentosa and angle closure glaucoma was also seen. Microcornea and thickened sclera, with prominent scleral vessels, were seen in many family members. Optic nerve drusen and enlarged tortuosity of the retinal vessels was frequently seen.¹² The thinning and the resultant changed shape of the cornea makes it conical and due to this change caused astigmatism. Abrasions of the eye are responsible for enophthalmos mostly seen in older children.¹³ In consanguinity both parents are carriers of a mutant allele at the same locus and autosomal recessive traits cause development of abnormalities resulting in corneal ectasia (keratoconus and keratoglobus).¹⁴ Consanguinity results in many blinding disorders like retinitis pigmentosa, refractive error, night blindness, Leber congenital amaurosis, Lawrence-Moon-Bardet-Biedl syndrome, Stargardt disease, Usher syndrome etc.¹⁵ It increases the susceptibility to any one of the autosomal recessive genetic disorder and may affect any part of the body. Myopia is a main refractive disorder which can cause blindness due to retinal detachment, chorioretinal deterioration, premature cataracts, and glaucoma.

MATERIALS AND METHODS:

It was an institutional based study conducted on 50 patient having consanguinity history and age from 18 years to 40 years. This study explains the association of different refractive error in parental cousin marriages. Distance (6m) and near (33cm) visual acuity was measured by using Snellen distance and near visual acuity charts. Results were obtained by asking the patient to fill a semi-structured proforma.

RESULTS:





AGE:

Age in yrs	Frequency	percent
11.00 – 15.00	0	0
16.00 – 20.00	12	24
21.00 – 25.00	17	34
26.0 – 30.00	9	18
31.0 – 35.00	10	20
36.0 – 40.00	2	4
Total	50	100

DISCUSSION:

Different studies have been done and different methods have been used to find the effect of consanguinity on the refractive errors but current study shows that consanguinity mainly causes myopia and astigmatism. No hyperopes were seen in my sample having age 18 to 40 years. But some previous studies' results suggested that it may be associated with hyperopia.¹⁶ Due to autosomal recessive disorder consanguinity also causes myopia i.e. the axial length is increased so that the size of the eyeball is increased and parallel rays of light coming from infinity are focused in front of retina. The current study also tells that 32% patients have astigmatism. Mostly patients have myopic astigmatism. The causes of astigmatism are mostly keratoconus or keratoglobus and many other associated diseases which cause the thinning of the cornea. Previous studies also support my study that consanguinity is associated with development of astigmatism.¹⁷

CONCLUSION:

Consanguinity is associated with refractive errors and astigmatism. It is also associated with other ocular diseases but further studies with larger sample size and diverse population is needed for such research.

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