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Editorial inquiries should be addressed to Prof. Dr. Tayyab Afghani, Department of Orbit and Oculoplastics, Al-Shifa Trust Eye Hospital, Jhelum Road Rawalpindi, Pakistan.
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EDITORIAL

Myopia Epidemic in Covid Pandemic

Tayyab Afghani

Myopia is a major health issue around the world. The World Health Organization estimates that 50% of the population of the world may be myopic by 2050. [1,2] In recent years, insufficient time spent in outdoor activities has been recognized as a major risk factor for myopia development. [3,4] The duration and intensity of near work activities are also associated with myopia. [5] Increased near work and insufficient outdoor activities are considered important risk factors for the incidence and progression of myopia according to several studies. [6,7] A combination of near work through computer uses and reading activity is known to increase the odds of myopia in children aged 9 years. [8] In addition, time spent using a smartphone was independently associated with myopia. [9]

The outbreak of COVID-19 has made it inevitable to hold all classes online and make children stay indoors. As a result, children are forced to use digital devices excessively under COVID-19 quarantine compared to the pre-COVID-19 period. In a recent landmark study by Wang et al [10], the prevalence of myopia appeared to be approximately 3 times higher in 2020 than in other years for children aged 6 years, 2 times higher for children aged 7 years, and 1.4 times higher for those aged 8 years. This was attributed to prolong home confinement due to lockdowns as well as the online format of the classes. However, such a substantial increase in the prevalence of myopia was not seen in the older age groups (9-13 years), despite the fact that the older children (grades 3-6) were offered more intense daily online learning courses (2.5 hours) compared with the younger students (grades 1-2, 1 hour daily). The authors hypothesize that younger children are more sensitive to environmental change than older children. In the setting of this specific study, the period of environmental change (home confinement) was 4 months and the children who appeared to be affected were aged 6 to 8 years. Children aged 6 to 8 years may be experiencing an important period for myopia development. Within this age window, the plasticity of myopia is high and myopia control may be easier. Beyond this age window, the plasticity of myopia is low and myopia is harder to control during environmental changes. This idea is supported by the study of VanderVeen et al, [11] which reported that orthokeratology may be effective in slowing myopic progression in children and adolescents, with a potentially greater effect when initiated at an early age (6-8 years). This potential requires further evaluation within other populations.

In an anecdotal observation from India by Sumitha et al. [12], the proportion of myopia diagnosis in the pediatric ophthalmic outpatient department was 63% in March and April 2020, similar to the proportion of 64% in March and April 2019. However, the authors concluded that a long-term change in the environment under COVID-19 might lead to an increased incidence of myopia and myopic progression in children over a long period. In fact, in another Chinese study with a large sample size conducted between June 2019 and June 2020, researchers have reported that the half-year incidence rate of myopia increased from 8.5% in the pre-COVID-19 period to 13.6% in the post-COVID-19 period [13]. We do not know whether this myopic shift is temporary or permanent. If there is such an important period for myopia development, strategies for myopia

control and intervention could be implemented with a possibly global influence.

It appears that increased time spent indoors, close contact with computers and smartphones, and restricted outdoor and physical activities is going to result in an epidemic of myopia during pandemic of Covid. However increased risk of myopia onset and progression may vary according to ethnicity. Therefore, it is necessary to monitor children's use of electronic devices (computers, tablets, and smartphones) and to promote their outdoor activities to prevent myopic progression worldwide.
I strongly recommend that those eye care institutions of the country that keep a robust medical record of the patients should undertake a multicenter study where they can see the incidence and trend of myopia over last few years. Al-Shifa Center for Community Ophthalmology has undertaken millions of school screenings almost at the rate of 150,000 annually. This department has unique opportunity to look into this phenomenon of myopic epidemic in Covid Pandemic.

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ORIGINAL ARTICLE

Mode, Type and Pattern of Ocular Trauma in Patients Presenting to Ophthalmology Department Benazir Bhutto Hospital, Rawalpindi

Kanwal Zareen Abbasi[1], Wajeeha Rasool[2], Mustafa Abdul Hameed Ismail[1], Maria Zubair[2], Kashif Ahmad Bhatti[2], Seher Umar[2]

Abstract:

Purpose: To assess the mode, type and pattern of ocular trauma.

Method: An observational prospective cohort study of 201 eyes of 201 injured patients managed at the Department of Ophthalmology, Benazir Bhutto Hospital, Rawalpindi. For the purpose of assessing mode and pattern of trauma, an Ophthalmologist examined each patient and appropriate investigations were carried out. Patients were analysed for age, sex, mode of injury, type of injury, part of the eye injured, IOP and the presence of intra-ocular foreign body.

Results: Road traffic accidents were the commonest mode of trauma found in 74(36.8%) of 201 patients while second most common being domestic accidents constituting 26.9%. According to type of injury, patients with blunt ocular trauma were 117(58.2%), with penetrating trauma were 83 (41.3%) and chemical injuries in only one patient (0.5%). As far as pattern of ocular trauma is concerned, sub-conjunctival haemorrhage was commonest of all, lid lacerations being 2nd most common and corneal tears3rd most common. Ocular trauma peaked in 3rd decade of life.

Conclusion: Study results seem to provide important data to enable concerned government organisations to make safety strategies and provide better health education in terms of domestic activities, traditional work, sports, and leisure environments for the prevention of serious eye injuries. *Al-Shifa Journal of Ophthalmology 2021; 17(4):150-156.*

1. *HBS Medical and Dental College, Islamabad*
2. *Benazir Bhutto Hospital, Rawalpindi*

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Correspondence to:
Dr Kanwal Zareen Abbasi
dr_maninoor_abbasi@yahoo.com

Introduction:

The eye can be taken as a direct extension of the white matter of the brain. [1] As it's a delicate structure, so it is very much prone to be damaged by different types of trauma. Depending upon the mode of trauma and the resultant extent of the damage to the eye, it affects the daily lifestyles badly as well as becomes a serious threat to the career and other daily routine activities of the patients.[2] Ocular trauma is one of the major leading causes of preventable blindness world-wide. According to a World Health Organization estimate, 750,000 cases of ocular trauma per year are hospitalized world-wide and 200,000 cases sustain open globe injuries.[3]

Anatomically, ocular trauma can be grossly classified into three major types; open-globe injuries, closed-globe injuries and chemical injuries. In open-globe injuries (penetrating injuries) there is full thickness discontinuity of the outer coat of the eye ball i.e., sclera, cornea and it can be with or without the prolapse of intraocular contents.[4] In closed-globe injuries (blunt injuries), the trauma is either just surface abrasion or damages the internal structures of the eye ball without causing the full thickness discontinuity of outer coat e.g., oedema or haemorrhage resulting from blunt injuries. Chemical injuries can cause any of the above type depending upon the type of chemical and severity of injury but usually it doesn't cause open globe and just abrades the surface.[5]

With the current scientific advances, very advanced and heavy machinery is used in many of the occupations, which increases the risk of occupational ocular trauma. In addition, domestic accidents and motor vehicle road accidents are a major risk for ocular damage, as eye ball structures are quite delicate and exposed as well.[6] Blast injuries are also a cause of ocular trauma and the mechanism is blast wave itself or the high speed projectile materials propelled by the shock wave of the blast with resultant hit to eyeball.[1]Ocular injuries can range from minor surface abrasions, sub-conjunctival hemorrhages and adnexal damage to vision threatening injuries like corneal tears, scleral tears, damage to uveal tissue, damage to crystalline lens, vitreous loss, retinal detachment and retinal tears.[2] Thus mode of trauma and the resultant ocular damage both are very important in determining the final visual outcome. [3]

Rationale of study is that knowing the mode, type and pattern of trauma will help us, on both government and individual levels, to take safety measures in future so that devastating eye injuries can be prevented.

Material and Methods:

After approval of synopsis from ethical committee of Rawalpindi Medical University, the study was started. It comprised a prospective analysis of 201 injured patients who presented with ocular trauma, diagnosed by an Ophthalmologist on the basis of history and careful eye examination including visual acuity, optic nerve function tests, extra-ocular movements, complete slit lamp examination of anterior and posterior segments. Intraocular pressure measurement and gonioscopy were also done where needed. These patients presented between 1stJan 2017 to 31stDec 2017 to the Department of Ophthalmology, Benazir Bhutto Hospital, Rawalpindi.

Visual acuity, in adults and school going kids, was assessed using the Snellen's chart and in pre-school kids, crudely by grading visual fixation, picture charts and following familiar objects. Findings were entered into a proforma, which included patients' socio-demographic data, mode and pattern of trauma, type of injury and other examination findings on ophthalmic evaluations. Diagnostic investigations carried out, when needed, included B-Scan, X-Ray, CT scan and MRI Orbit. Investigation to be carried out was decided according to the type and pattern of injury. Patients were managed according to their respective diagnoses. Those who presented with multiple organ involvement, after primary repair or initial conservative management, were also managed by the appropriate specialties in the same hospital.

Results:

The mean age of patients presenting with ocular trauma was 26.5 years. Ocular trauma noted to be quite uncommon in children, was at its peak during third decade of life, and continued declining thereafter (Figure 1). The patients encountered different ocular injuries with most patients involving more than one structures. So,

there was overlap of multiple injuries in most of the patients.

Traffic accidents were the most common cause of ocular trauma with 36.8%. Domestic accidents were26.9%, occupational accidents17.4%, sports accidents 12.9%, while fight was responsible for 6% of the patients (Table 1). Table 2shows type of injuries. Blunt trauma being the commonest (58.2%, 117/201). Penetrating trauma accounted for 41.3% (83/201) while chemical injuries were only 0.5% (1/201).

Table 3 shows frequencies and percentages of various parts of eye involved, observed in total of 201 cases. Sub-conjunctival haemorrhage was found in 98 patients. Lid lacerations in 55, corneal tears in 38, corneal foreign bodies in 37, lens/IOL trauma in 33, vitreous prolapse/ haemorrhage in 27, scleral tear in 24, iris prolapse/Iridodialysis in 22, retinal tear/detachment in 22, choroid injuries in 19 and intra-ocular foreign body in 3 patients. Figure 2 shows gender distribution of 201 patients. There were 149(74.1%) male and 52 (25.9%) female subjects showing that ocular trauma was more common in males.

Figure 1. Frequency of ocular trauma in different age groups

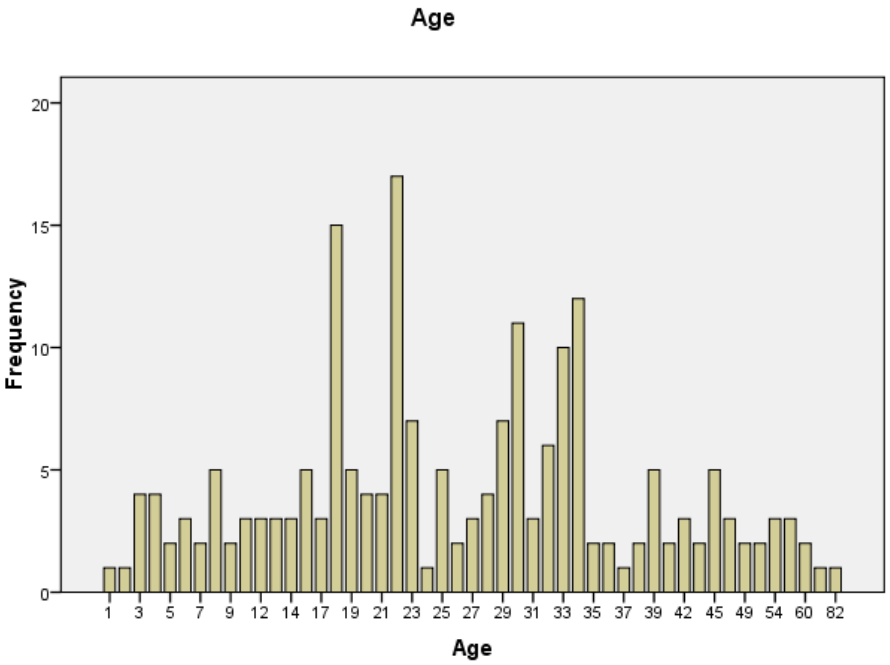


Table 1 Mode of ocular trauma

Mode of ocular trauma	Frequency	Percentage
Domestic accidents	54	26.9
Occupational accidents	35	17.4
Road traffic accidents	74	36.8
Sports accidents	26	12.9
Fights	12	6.0
Total	201	100

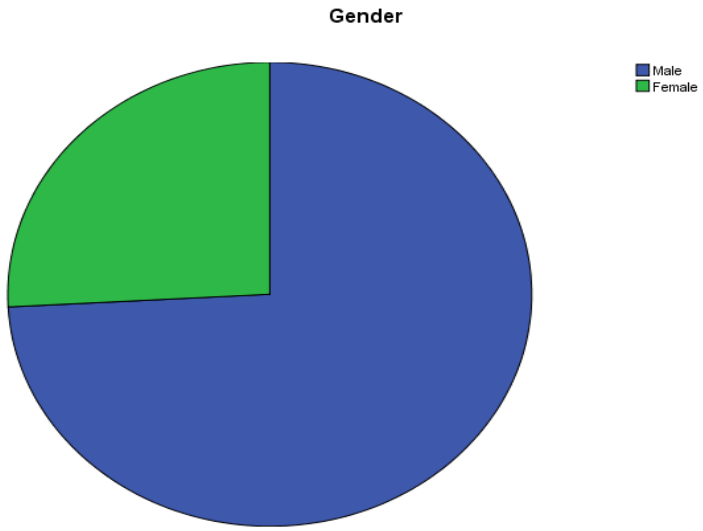
Table 2: Type of ocular injury

Type of injury	Frequency	Percentage
Blunt trauma	117	58.2
Penetrating	83	41.3
Chemical Injury	1	0.5
Total	201	100

Table 3: Pattern of ocular injuries

	Frequency	Percentage (%)
Lid lacerations	55	27.4
Subconjunctival haemorrhage,	96	47.76
Conjunctival tear	6	2.98
Scleral tear	24	11.94
Corneal tears	38	18.90
Corneal foreign bodies	37	18.40
Iris (torn, prolapsed, iridodialysis)	22	10.94
Choroidal injuries	19	9.45
Lens/IOL injuries	33	16.4
Hyphaema	13	6.46
Vitreous (prolapse, haemorrhage)	27	13.43
Retinal detachment	22	10.94
Intra-ocular foreign body	3	1.49

Figure 2: Gender distribution



Discussion:

One of the major public health problems is Ocular trauma and this major health problem needs prompt and best possible care. As far as epidemiological profile is concerned, its incidence is greater in developing as compared to developed countries. Mode of ocular trauma and the resultant extent of damage are the primary factors which determine the final visual

outcomes. That is why our study focuses on assessment of the mode, type and pattern of ocular trauma.

The mean age for ocular injury in our study was 26.5 years, which is in accordance with most other studies in which the mean age is 30 years. [7,8,9] This observation has a great importance because this economical age group is most productive and has an important impact on domestic finances as well as on society.

Another important observation noted in our study is that ocular trauma occurs more in males as compared to females which is very much consistent with some other studies. This male dominance of ocular trauma in our study is male: female ratio of about 2.8:1. This male preponderance is most likely related to comparatively more participation in contact sports, occupational hazards, more involvement in traffic accidents and having more risk-taking behaviours.

In our study, the most common mode of ocular trauma is Road traffic accidents (36.8%). Although this is contrary to the study of Katiyar V, et al where the most common mode of ocular trauma is agriculture field (40.7%) and work place related injuries are 43% but is consistent with study of Guly CM, et al where most common cause of ocular trauma is road traffic accident (57.3%).[10] In our study the second most common cause is domestic including assaults and other domestic accidents unlike assault as the second most common cause in their study (10%).[11]Studies 0f Cillino, et al and Titiyal GS, et al also supported our results of RTA's as the most common mode of ocular injuries.[12, 13] In UK, some studies show that motor vehicle-related ocular injuries were reduced up to 73% after the introduction of compulsory use of seat belts.[14]

Regarding the pattern of ocular injuries, most of the times it's actually the overlap of different patterns of ocular trauma because of the involvement of more than one structure of the eye ball. In our study, most commonly seen pathology after ocular trauma is sub-conjunctival haemorrhage which is not serious at all but it is a common associated finding with other serious injuries. We give more importance to second most common finding, which is corneal damage with 36.31% corneal tear and 34.8% corneal foreign bodies. Study of Voon LW, et al gives almost same information as our study, showing corneal foreign bodies and corneal tears as very common cause among ocular injuries and told that superficial corneal foreign bodies were 58.2%, corneal abrasion 24.9% and others 12.6%.[15] In study of Erderman FC,et al, hyphaema was most common finding in anterior segment injuries and retinal detachment in posterior segment injuries which is a bit contrary to our study where corneal tears and corneal foreign bodies are more common in anterior segment and vitreous haemorrhage in posterior segment injuries but at the same time in our study, retinal detachment is not that uncommon and has been noted as the second most common finding in posterior segment.[16]

As far as the types of ocular injuries are concerned, in our study, blunt trauma cases were 58.2%, penetrating trauma 41.3% and chemical injuries were only 0.5% but study of Loo SC, et al showed that there were 33.6% penetrating ocular trauma cases, 30.2% blunt trauma and 22.1% of chemical trauma cases.[17]

Another point to be highlighted is presence of ocular trauma in paediatric age group which is a very sensitive issue indeed. Our study along with some other studies has clearly shown the significant prevalence of ocular trauma in children which is quite worrying. Ocular trauma in children is usually accidental and occurs at home. Their ocular injuries can result in loss of vision, a cosmetic blemish which then gets associated with psychosocial problems.

Kaur A, et al. in their study, while describing the pattern of ocular trauma in children, revealed their results opposing to our results where incidence of penetrating trauma was quite high (73.67%) while of blunt trauma was 15.79% and chemical injuries 3%.[18]

Study of Omolase, et al has supported our study by telling that most of the ocular injuries were blunt trauma(84.1%), while penetrating injuries were only 12.1% and rest of2.3% were affected by chemical injuries.[19] Similarly, study of Mishra et al, also favoured our result but again study of Islam MS opposed our study by saying that penetrating injuries (81.4%) were more than non-penetrating and chemical injuries and have also stressed upon the occurrence of injuries in paediatric age group and told that nearly two thirds of the patients were 18 years or younger. [20,21]

Our study depicted different results that road traffic accidents are the most common of ocular trauma. Blunt trauma as well as the penetrating ocular trauma are mainly responsible for different extent of ocular injuries damaging vital structures of eyeball which can result in monocular blindness most of the times and binocular blindness sometimes. Men are affected more than women and young people are affected most of all but not to forget children who get affected too. Considering this all, public awareness programs are needed to be launched by the government through social media and through local bodies of different union councils of cities, etc. Domestic accidents causing ocular trauma in kids can be avoided by close surveillance of kids who get injured while playing or being part of some other activities at home while adult ocular trauma can be avoided by counselling sessions /programs on social media for behavioural changes in society so that medico legal aspect being cause of domestic ocular injuries, can be avoided. Workplace injuries can be avoided by proper training for machine users and availability of well-functioning machines. As far as road traffic accidents are concerned, these can be avoided by making seat belt use compulsory and by taking actions against the people who do not follow the traffic rules. Public awareness should be created about the risk of ocular as well as other injuries so that people can show careful and lawful behaviour on roads.

Conclusion:

Study tells us about the current burden of serious ocular injuries on our society showing different modes, types and patterns of ocular injuries. This data can be utilized to inform the concerned departments working for the provision of best eye health care and providing safety strategies for the prevention of the serious ocular injuries. Need of the hour is that safety strategies and health education, in addition to targeting the traditional work, sports, leisure environments and their related activities, should also target the home for the prevention of serious eye injuries.

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Authors Contribution

Concept and Design: Kanwal Zareen Abbasi
Data Collection / Assembly: Maria Zubair, Seher Umar
Drafting: Wajeeha Rasool
Statistical expertise: Kashif Ahmad Bhatti
Critical Revision: Mustafa Abdul Hameed Ismail,

ORIGINAL ARTICLE

Evaluating the Pharmacological Effectiveness and Local Side Effects of Topical Cyclosporine A 0.05% in Ocular Dryness Resistant to Lubricating Drops

Adnan Ahmad[1], Mubashir Rehman[1], Hamid Rehman[2]

Abstract:

Objective: To assess the therapeutic response and safety of topical cyclosporine A (Cs-A) 0.05% in ocular dryness resistant to topical lubricants.

Material and Methods: An interventional case series study was performed on the participants recruited from Eye OPD of Qazi Hussain Medical Complex, Nowshera from Sept. till Nov. 2019. All the patients were suffering from ocular dryness, resistant to standard therapy with topical lubricants. Topical cyclosporine A 0.05% was used twice daily. The participants were assessed at baseline, 4th week, 12th week and at 26th week. During these follow ups participants were examined for any changes from baseline with regard to Schirmer test, rose Bengal and fluorescein staining of ocular surface, tear film break up time (TBUT), ocular surface disease index (OSDI) and visual acuity.

Results: Mean age was 57.1 ± 11.8 (35.0 -80.0) years. A total of 30 (90%) of the patients were female and 6 (10%) were male. Mean Schirmer's test value was 4.0 ± 0.8 (0.5-10.0) mm at baseline and raised to 9.0 ± 3.8 (2.6-18.8) mm post therapy at 26th week (p =0.001). At the first visit, mean tear break-up time was 4.4 ± 1.8 (2-9) seconds. It increased to 11.8 ± 4.8 (4-22) seconds at the end of 26th week (p =0.001). Mean clinical score at baseline was 2.0 ± 1.0 (1.0-3.0) and this dropped down to 1.0 ± 0.8 (0-3) post therapy (p=0.001), similarly mean OSDI score was 31.2 ± 10.5 (10-52) before the treatment and 21.3 ± 11.0 (5-45) post therapy (p =0.001). Visual acuity also improved significantly after 26th week of therapy (p=0.01). No side effects were reported with topical therapy other than transient ocular burning and itching that resolved after a week of its initiation.

Conclusion: Topical cyclosporine A 0.05% is found to be therapeutically effective yet without having any local or systemic toxicity in management of dry eye disease refractory/resistant to conventional treatment. *Al-Shifa Journal of Ophthalmology 2021; 17(4):157-164.*

1. *Nowshera Medical College/ Qazi Hussain Medical Complex, Nowshera*
2. *Bannu Medical College, Bannu*

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Correspondence to:
Dr. Adnan Ahmad
Email: dradnanahmad@hotmail.com
Cell No. 03339121281,
Nowshera Medical College/ QHMAC,
near Kabul River, Mardan road Nowshera.

Introduction:

Some of latest trails proved that dry eye syndrome (DES) or kerato-conjunctivitis sicca (KCS) afflicts quite a no. of population throughout the world.[1] No. of patients are growing with dry eye states who are going to eye care facilities with the passage of time due to widespread use of visual devices.[2] Presenting symptoms includes ocular discomfort which includes a ocular grittiness depending upon the disease severity and length varying extent of corneal/conjunctival damage may also be anticipated[3,4] DES though common

entity is still under diagnosed and has been divided into two groups based on clinical evaluation though to some extent overlapping, includes evaporative loss and aqueous deficient dry eyes.[5]

Further insight into the pathogenesis of DES highlights the role of immune dysregulation due to cell mediated immunity and inflammatory mediators that affect tear glands and its components.[5,6] This could possibly cause altered tear film composition resulting in ocular surface damage. Management of DES mainly focuses on tear replacement therapy or tear preservation techniques although they can't ameliorate the main pathophysiological mechanism behind the disease.[7] It is observed that reduced lacrimation and its drainage triggers chronic inflammatory cascade which results in accumulation of neutrophils, lymphocytes and plasma cells which activates the corneal/conjunctival cells with enhanced expression of adhesins on their surfaces along with inflammatory mediators, increased amounts of these markers in the tears and exaggerated activity of matrix metalloproteinase (MMP), such as MMP-9 are the main triggers for inflammatory ocular surface damage.[14] The inflammatory damage in DES is not only associated with lacrimal gland destruction resulting in aqueous deficient dry eyes but also extends to the pathogenesis of evaporative dry eyes due to obstruction of the gland with bacterial invasion and inflammatory reaction. Lipases are the enzymes produced by the colonized bacteria inside the glands that converts the non-polar wax and sterol esters into triglycerides and free fatty acids (polar lipids), changing the composition of the meibum resulting in altered tear film composition with its associated pro-inflammatory characteristics. The altered meibum becomes thick and blocks the duct, resulting in activation of inflammatory cascade. Topical Cs-A acts as an immune-modulator that specifically targets T-cell population leading to reduction in the inflammatory infiltration of the glands and their obstruction.[5] Oral form of Cs-A is a stronger anti T-cell 158 engal-suppressive agent, but it's important side effects include high blood pressure and renal damage, although, when given in minimum dosage, these adverse effects can be reduced.[6] Oral form of Cs-A can be utilized in the management of some of ocular diseases due to immune dysregulation i.e. post keratoplasty immunological reaction , auto-immune uveitides and allergic eye disorders. Topical use of Cs-A bypass most of the adverse effects adherent to its systemic useage.[8] Immune dysregulation is the main pathological mechanism behind the inflammatory ocular surface damage in DES and therapy with topical Cs-A effectively targets the inflammatory cascade by inhibiting the T-cell mediated immune response with subsidence of the primary condition.[6,9,10]

Previous trails have shown the beneficial effects of topical Cs-A in the management of DES with both clinical and symptomatic improvement.[9,11,12] Numerous other studies suggested that topical Cs-A is highly effective in patients with moderate to severe DES. [5] All of these evidences suggest that topical Cs-A may effectively treat the DES as it acts primarily on the pathophysiology of the disease process itself. The minimum effective concentration of topical Cs- A is 0.05% which exerts its desired therapeutic response with minimum side effects both locally and systemically as compare to higher strength formulation. [7] In the present trail, we probed to evaluate the safety and clinical response of topical Cs- A 0.05% in the management of DES that is refractory/resistant to standard therapy with topical ocular lubricants.

Material and Methods:

We recruited 36 participants having DES in the Ophthalmology OPD of Qazi Hussain Ahmad Medical Complex, Nowshera from September till November 2019 in this

prospective interventional trial. We conducted the trial in accordance with the tents of Helsinki declaration and guidelines of good clinical practice (GCP), the study was conducted after approval from Institutional ethical review board (IERB). Prior to the study an informed written consent was obtained from all the participants and their follow up assessment ensured. After objective evaluation more affected eyes of the participants were selected for intervention and assessment. Selected participants in the trial were > 30yrs old. Participants having both Sjogren and non-Sjogren form of DES (based upon systemic evaluation and lab tests for auto antibodies) not responding to standard treatment. We included the patients as follows: 1) Schirmer's test value < 5 mm/5 min. (with- out anesthesia), 2) Corneal/conjunctival fluorescein and rose 159engal staining (ocular surface area involvement) over grade 1 on scale (scale 0= none (0%), 1= mild (25%), 2= moderate (50%) & 3= severe (> 50%); 3) TBUT < 10 sec. 4) OSDI scoring > 10, 5) DES symptoms like itching, burning sensation, feeling of dryness, light sensitivity, painful sensation and watery eyes. We excluded the participants having any major injury/infection to eyes in the past, underwent any major ocular intervention within the last 12 weeks, lactating and conceiving females. All the topical medications used by patients were stopped for 14 days prior to initiation of therapy. Ocular lubricants were used throughout the course of study along with topical 0.05% Cs-A (Ropsol, Atco Pharmaceuticals, Khi. Pak.). Patients were assessed at baseline, 4th week, 12th and 26th week. Patient symptoms, T-BUT, Schirmer test, OSDI score and Rose Bengal and Fluorescein staining pattern of ocular surface was assessed at each visit. Therapeutic monitoring for any systemic/local toxicity was evaluated by checking of BP, Renal functions tests, intra ocular pressure (IOP) and the visual acuity test by Snellen chart as markers of assessment.

The analysis was done using SPSS version 20. Descriptive analysis was conducted, wherein qualitative variables were presented in the form of frequencies and percentages, while numerical variables were presented in the form of mean (±SD). Descriptive statistical analysis was carried out for determining the importance of changes between pre- and post-intervention. Wilcoxon's test was applied for the analysis of numerical variables conducted in the trail, while Chi square test was utilized for association between various categorical variables. The p value was set at < 5% i.e. $p < 0.05$ was taken as an indicator of statistical significance.

Results:

Out of 36 recruited participants 30 were female comprising 90% of the study population while men were six in no. making 10% of the representation in our trial. Mean age of the participants were 57.1 ± 11.8 (35–80) yrs. (tab.1). Following were the main presenting complaints among participants in decreasing order of frequency itching in 12 cases, burning in 10 cases, feeling of dryness in 08 and watering in 06 cases respectively (tab. 2 and fig. 1). Amongst 36 cases of DES only two were found out to be Sjogren syndrome.

Mean Schirmer's test was 4.0 ± 0.8 (0.5–10 mm) pre-therapy and it improved to 9.0 ± 3.8 (2.6–18.8mm) after 26th week Cs-A therapy. This improvement achieved statistical significance ($p = 0.004$). On 1st follow up, mean TBU-T was 4.4 ± 1.8 (2–9) sec. It was extended to 11.8 ± 4.8 (4–22) sec. at 26th week follow up and achieved statistical significance ($p = 0.003$). Mean clinical score was 2.0 ± 1.0 (1 – 3) and this dropped down to 1.0 ± 0.8 (0 –3) post therapy. This reduction achieved a level of statistical significance ($p=0.001$) as shown in tab.3 and fig.2.Mean OSDI score documented at baseline was 31.2 ± 10.5 (10 –52) and 21.3 ± 11.0 (5–45) post therapy (tab.3 & fig.2). The difference was found to be statistically significant ($p = 0.001$).

Tab. 1: Patient characteristics and demographics

Characteristics	No.
Total no. of patients, n (%) Male, n (%) Female, n (%)	36 (100%) 06 (10%) 30 (90%)
Mean age of the pts. in years, Mean ± SD Age range	57.1 ± 11.8 35-80
Non-Sjogren dry eyes	34
Sjogren with dry eyes	2

Tab. 2 Patients with presenting symptoms of dry eyes

Presenting complaint	No. (%)
Itching	12 (33.3%)
Burning sensation	10 (27.7%)
Feeling of dryness	08 (22.2%)
Watering of eyes	06 (16.6%)

Tab.3 Patients mean outcome measures (pre & post therapy)

Mean outcome measures	Baseline	At 26th week	p value
Mean Schirmer's score, Mean ± SD	4.0 ± 0.8	9.0 ± 3.8	0.004
Mean TBUT, Mean ± SD	4.4 ± 1.8	11.8 ± 4.8	0.003
Mean Clinical score, Mean ± SD	2.0 ± 1.0	1.0 ± 0.8	0.001
Mean OS-DI value, Mean ± SD	31.2 ± 10.5	21.3 ± 11.0	0.001

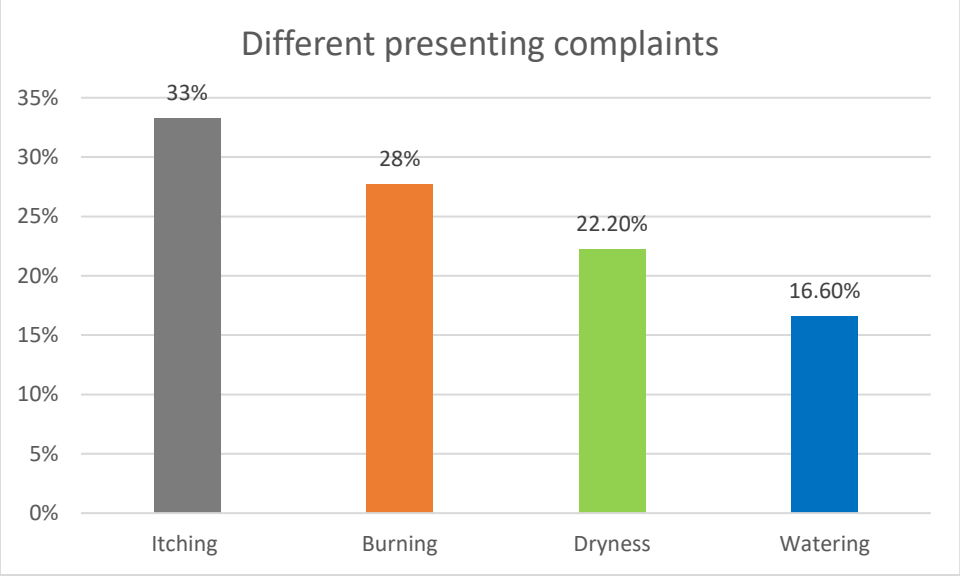

Fig. 1: Presenting complaints of the subjects

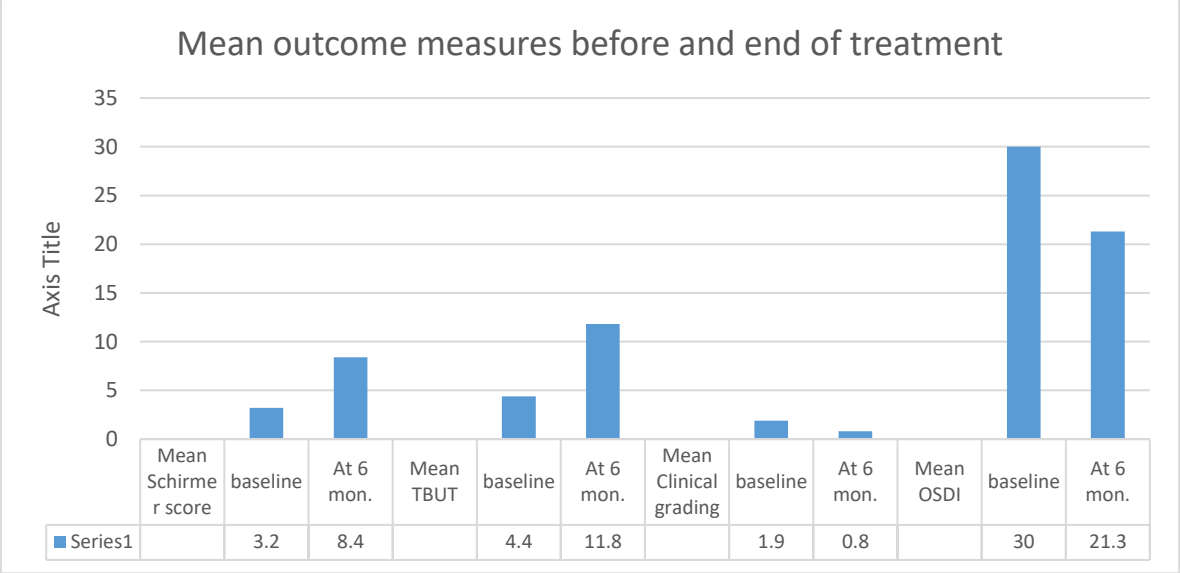

Fig. 2: Mean outcome measures before and end of treatment

Discussion:

Kerato- conjunctivitis sicca (KCS) is a fairly common condition being frequently presents in clinical practice. The international classification committee for eye diseases has classified KCS into two groups.[13] These includes aqueous deficient dry eyes and evaporative dry eyes, the former further divides into Sjogren-associated KCS (SS-KCS) and non-Sjogren associated KCS (NSS-KCS).

The current trial is undertaken to delineate the clinical response and local toxicity of topical Cs-A 0.05% 2 times/day in treatment of DES resistant to conventional treatment. Promising results were recorded from our trial regarding therapeutic effectiveness of therapy in the management of both types of KCS with sustained improvement lasting months even after cessation of therapy. We didn't observe any systemic side effects in the form of hypertension or nephrotoxicity. Stevenson et al.[7] explored the therapeutic effectiveness along with local and systemic toxicity of topical Cs-A in the management of moderate/severe KCS, in addition to that he also elaborated the minimum strength required for desired efficacy and dosage regimen for maximum response. Finding from his trail revealed that topical Cs-A 0.05–0.4% can effectively mitigate the signs and symptoms of moderate to severe KCS leading to improved quality of vision with enhanced functionality. These observations correlate with our study findings, by showing the efficacy topical Cs-A in the management of KCS.

Several other trails have also observed the therapeutic efficacy of topical Cs-A in both types of KCS (SS-KCS & NSS-KCS) with maximum response achieved in those with moderate to severe disease. Findings from these studies supports our trail observations in showing the effectiveness of topical Cs-A in the management of DES.[11,12]

The pathogenesis of DES is still unclear, but it has been revealed through various trails that the basic problem is the immune dysregulation leading to activation of an inflammatory cascade with production of numerous inflammatory markers adhesion molecular which underlies the ocular surface damage and hence the development of signs and symptoms of the disease. At a cellular level such inflammatory reaction leads to destruction of lacrimal glands and its components resulting in altered tear film which is the main factor responsible for ocular surface wear and tear. These

findings were supported by the facts from the histopathological specimens of the lacrimal glands, which revealed myriad of inflammatory cells along with cytokines.[15]

The efficacy of immune-modulatory agent, such as topical Cs-A in NSS-KCS further explored the pathogenesis of the dry eyes, highlighting the role of cell mediated immunity in its development in both types of KCS.[16] Studies conducted on histological specimens of lacrimal glands without systemic inflammatory disease revealed a localized immune dysfunction responsible for the disease.[17,18] The structural and functional alterations in the lacrimal glands in dry eyes resulting in progression of the disease. It is pertinent to mention that no local toxicity in the form of allergic reaction lasting more than 2 weeks were evident, a mild ocular stinging effect was present in some patients that resolved after 1 week of continued use, similarly no systemic adversity was noted in the form of either hypertension or nephrotoxicity. Stevenson et al.[7] observed no case of infection in any of his treated patients, similarly no systemic toxicity was noted with topical Cs-A even when used in higher strengths and blood samples revealed minimal systemic absorption in the treated patients.

Barber et al. and Sall et al. conducted their trails by using topical Cs-A 0.1% emulsion in moderate to severe DES for a duration that spans from 1 to 3 yrs. They assessed the outcome parameters such as corneal staining, Schirmer test, and grading of symptoms in the 1st yr. of trail. Biomicroscopic assessment, vision tests, IOP monitoring and local/systemic toxicity evaluation was performed at ½ yearly intervals. Results from the 1st yr. of study revealed significant improvement in the signs of DES, while no improvement was observed in the symptoms of disease, such findings were due to the fact prolonged duration is required for the symptoms to resolve, while the treated patients were using Cs-A emulsion (either 0.05% or 0.1%) for 6–12 months.[19,20]

We observed visual and IOP stability in our trail, the visual stability was due to less ocular discomfort in the course of treatment. Barber et al.[19] in his trail observed reduced VA with time rather than improvement. Although, reduced VA in these patients were mostly due to age related eye diseases i.e., age related cataract and macular degenerations. The goblet cell density as well as epithelial cells turnover rate in patients with NSS-KCS have been compared with SS-KCS, pre and post therapy with topical Cs-A for 06 months duration. Findings from the study revealed that topical Cs-A caused an increase in Goblet cells density in patients with NSS-KCS and SS-KCS, while it decreased epithelial cells turnover rate in those with NSS-KCS.[21]

Kujawa and Rozycki conducted a study by using topical Cs-A 0.05% 2 times/day in all of their patients, results from the trail showed that 0.05% concentration is effective in DES but without systemic disease. In such group of patients only 12 weeks of therapy is enough to bring significant improvement in the disease. However, in those patients with systemic involvement the course of therapy has to be extended up to 06 months in order to see visible improvement.[22]

Similarly, Wilson and Perry advocated that topical Cs-A therapy can improve both the objective and subjective features of DES. However, such patients should be monitored for a prolonged duration as there is recurrence of the disease once the therapy is stopped as the inflammatory process again becomes activated resulting in the reappearance of all the signs and symptoms.[23]

In contrast to some studies, we have observed an improvement in our patients both in clinical signs and symptoms with

stability in the course of disease even after cessation of therapy.

We must establish a standard and effective protocol by conducting multicenter trails in the management of KCS and a uniform consensus must be adopted based upon the study results. The management should go up in a stepwise manner depending upon the severity of the disease starting from simple ocular lubricants for mild cases, utilizing more omega 3 fatty acids in diet, avoidance of visual devices for prolonged duration with intervals between usage, contact lens wearers should be careful in their duration of wear as well as hygiene. For moderate to severe cases in addition to above measure topical Cs-A 0.05% should be used as a first line of agent for the management. In very severe cases, tear preservation/conservation techniques like punctual occlusions lower 1st followed by upper depending upon response should be tried it can be done on temporary and permanent bases depending upon the severity and patients' tolerability.

Conclusion:

Cyclosporine A 0.05% topically is found to be therapeutically efficacious and safe in decreasing signs and symptoms of dry eye disease as compare to conventional treatment with ocular lubricants alone which only improves the symptoms for the time being without actually targeting the underlying altered immune mechanism responsible for disease.

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Authors Contribution

Concept and Design: Adnan Ahmad, Mubashir Rehman
Data Collection / Assembly: Mubashir Rehman, Hamid Rehman
Drafting: Mubashir Rehman, Hamid Rehman, Adnan Ahmad
Statistical expertise: Mubashir Rehman, Hamid Rehman
Critical Revision: Adnan Ahmad

ORIGINAL ARTICLE

Visual Outcome after Manual Small Incision Cataract Surgery (MSICS) With Intravitreal Triamcinolone Acetonide in Complicated Cataracts

Hamid ur Rehman[1], Sana Ullah Jan[1], Nazli Gul[2], Waliullah Jan[3]

Abstract

Objective: To determine visual outcomes after manual small incision cataract surgery in eyes with complicated cataract with Intravitreal Triamcinolone Acetonide (IVTA).

Design: Descriptive, cross-sectional study, interventional case series

Place and duration: This study was carried out at Eye department Hayatabad medical complex Peshawar for duration of 6 months.

Material and Methods: A total of 196 patients were included. Patients with complicated cataract, base line visual acuity of at least positive projection to light in all quadrants (PL+ve), and male and female of any age were included. Eyes of patients with retinal detachment, intraocular inflammation, corneal opacity and dislocated or subluxated lens were excluded.

Results: In this study most of the patients (37%) were in age range 20 - 30 years followed by 32% patients were in age range of 31- 40 years. Mean age was 29 with SD ± 1.26. Sixty two percent were male patients, whereas female patients were 38%. Improvement in the visual acuity was noted in 40% of patients, while the rest 60% had stable visual acuity.

Conclusion: Our study concludes that, intravitreal triamcinolone acetonide improves visual outcome after manual small incision cataract surgery in complicated cataract. *Al-Shifa Journal of Ophthalmology 2021; 17(4):165-171.*

1. *Eye unit, MTI Hayatabad Medical Complex Peshawar*
2. *Khyber Teaching hospital Peshawar*
3. *LRBT Mansehra*

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Corresponding author:
Hamid UR Rehman
Email: hamidwaziry@hotmail.com
Phone: Pakistan
Mobile: 92 3335805872
hamidwaziry@hotmail.com

Introduction:

Chronic uveitis is commonly complicated by cataract.[1] Cataract may occur in up to 50% of eyes with uveitis.[2] The use of steroids is also assumed to increase the risk of cataract formation in addition to cataract formation secondary to uveitis.[3] Cataract extraction in uveitis is challenge for ophthalmologist. Cataract extraction with Intra Ocular Lens (IOL) implantation with adequate control of inflammation can improve visual outcome in adults and children with uveitis.[4] Visual Outcome and complications depend on the type and design of IOL used, intraocular lens fixation in the capsular bag and severity of inflammation.[5] Factors which effect the visual outcome in patients with uveitis include gender, age at cataract surgery, etiopathogenesis of uveitis, preoperative anterior segment pathology, macular pathology before operation and

preoperative Best Corrected Visual Acuity (BCVA).Common postoperative complications includes intraocular inflammation, raised intraocular pressure, posterior synechiae, capsular opacification and cystoids macular edema. Usually, inflammation control results in better visual and anatomical outcomes in such complicated cataract cases. IOL was preferred option in complicated cataract. Postoperative BCVA improvement of 3.6 lines (92%) was noted.[6]

Triamcinolone acetonide is a corticosteroid which is used in various medical and ocular diseases. It can be used as subconjunctival, subtenon, intravitreal and into retrobulbar space by injection. Indication of triamcinolone include uveitis and macular edema.[7]Okhravi N had reported that Intravitreal Triamcinolone Acetonide(IVTA) helps to prevent postoperative macular edema and helps in better ultimate outcome postoperatively in Uveitis eyes similar to those without uveal inflammation. Visual acuity of 20/40 was attained in Eighty nine % of eyes.[8] In patients with uveitis, postoperative inflammation after cataract surgery can be controlled by IVTA, improving visual acuity of two lines in 73.3% of patients.[9] Jonas [10] reported that IVTA during cataract surgery results increase in visual acuity in 50% of patients. He reported Lens zonules dialysis was seen in 4.5 % of eyes. Raised intraocular pressure was recorded in 36.4% of eyes which was controlled by topical antiglaucoma medications. IVTA is effective and safe route of steroid administration during complicated cataract surgery and can be used as alternate for postoperative oral steroids administration.[11]

Eye department, Hayatabad medical complex is a tertiary care unit and center of excellence. Our unit receives lot of referrals from all over the province, tribal belt and adjacent Afghanistan. As uveitis is one of the common ophthalmic pathologies. So, complications like complicated cataract and secondary glaucoma are common in the affected eyes. Complicated cataract is a challenge to treat and is associated with recurrent inflammation after surgery. Most of postoperative visual morbidity is related to associated inflammation. To counter intraoperative and postoperative inflammatory exacerbation, we thought to inject IVTA with the rationale that such interaction will improve the visual outcome in our patients with complicated cataract. Therefore, this study was aimed at assessing the visual outcome after MSICS in eyes having complicated cataracts together with intraoperative use of IVTA.

Visual outcome after MSICS and IVTA:
Improved visual outcome: Improvement of more than two lines on Snellen's visual acuity chart compare to initial preoperative VA after 60 days of follow up.
Stable visual outcome: Improvement or worsening of two or less than two lines on Snellen's VA chart after 60 days of follow up.
Worse visual outcome: Worsening of visual acuity more than two lines on Snellen's VA chart after 60 days of follow up.

Materials and Methods:

Hospital ethical and research committee approved this descriptive interventional case series. All patients that presented to our outpatient and fulfilling the inclusion criteria that is, with complicated cataract and baseline visual acuity of at least PL+ve, were made the part of the study. Consent obtained was written informed.
Visual outcome was determined in terms of improvement or worsening of Best Corrected Visual Acuity (BCVA) by at least 2 lines at 60 days of follow-up. It was categorized into improved: if there was improvement of more than two lines on Snellen's visual acuity chart compare to initial preoperative VA after 60 days of follow up, stable: if Improvement or worsening of two or less than two lines on

Snellen's VA chart after 60 days of follow up, and worse visual outcome: if worsening of visual acuity more than two lines on Snellen's VA chart after 60 days of follow up.

All patients with complicated cataract, baseline visual acuity of at least positive projection to light in all quadrants (PL+ve), male and female of any age group were included in the study.
Cases with retinal detachment diagnosed on indirect ophthalmoscopy, B-Scan ultrasonography., eyes with intraocular inflammation diagnosed on slit-lamp biomicroscopy, eyes with corneal opacities or corneal edema diagnosed on slit lamp biomicroscopy and eyes with dislocated or subluxated lens diagnosed on slit lamp biomicroscopy were excluded from study.

History and examination of all patients were carried out. MSICS was performed in all patients by single experienced surgeon. During surgery, 4mg/0.1ml of triamcinolone acetonide was injected intravitreally by same surgeon. Post operatively, patients were examined and advised treatment and regular follow up visits and final assessment was done at 60^{th} day post operatively to confirm final visual outcome (improved, stable or worse). All necessary information was recorded on proforma. Visual acuity was converted to Log MAR for data analysis.

The data was analyzed using SPSS version 13. Descriptive statistics was given of all variables. For quantitative data such as age mean and standard deviation was calculated. For categorical variable like gender and visual outcome (improve, stable and worse) frequencies and percentages were calculated. Visual outcome was stratified among age, gender and baseline visual acuity.

Results:

We included a total of 196 eyes of 196 patients and assessed the visual outcomes of cataract surgery in eyes with complicated cataract with intravitreal triamcinolone acetonide using manual small incision technique. Patients were followed up for at least 6 months, with the following results. Age distribution among 196 patients is shown in Table I. Gender distribution among 196 patients is analyzed in Table II. Status of pre-operative versus post-operative visual acuity among 196 patients was analyzed. (Table III). Visual outcome among 196 patients was recorded and 78(40%) patients had shown improvement while 118(60%) patients had stable vision. (Table IV)
Stratification of visual outcome with age, gender and baseline visual acuity is given in tables no. V, VI, and VII

Table1: AGE DISTRIBUTION (n=196)

AGE	NUMBER "n"	PERCENTAGE (%)
20-30years	73	37
31-40years	63	32
41-50years	39	20
51-60years	21	11
Total	196	100

Table2: GENDER-WISE DISTRIBUTION

GENDER	PERCENTAGE (%)
Male	62% (n=122)
Female	38 % (n= 74)
Total	100% (n=196)

Table 3: PRE Vs POST-OPERATIVE VISUAL ACUITY

VISUAL ACUITY	PRE-OPERATIVE n (%)	POST OPERATIVE n (%)
6/6 LogMAR (0.00)	0	78 (40)
6/9 – 6/18 LogMAR (0.17-0.47)	53 (27)	102 (52)
6/24 – 6/36 LogMAR (0.60-0.77)	67 (34)	16 (8)
<6/60 LogMAR (1.00)	76 (39)	0
Total	196	100

Vs = versus; n = number; % = percentage; LogMAR = logarithm of minimal angle of resolution; > = more than

Table4: VISUAL OUTCOME (n=196)

VISUAL OUTCOME	NUMBER ‘‘n’’	PERCENTAGE (%)
Improved	78	40
Stable	118	60
Worsened	0	0
Total	196	100

Table5: AGE WISE STRATIFICATION OF VISUAL OUTCOME *(n=196)*

VISUAL OUTCOME	20-30 yrs.	31-40 yrs.	41-50 yrs.	51-60 yrs.	Total
Improved	33	20	15	10	78
Stable	40	43	24	11	118
Worsened	0	0	0	0	0
Total	73	63	39	21	196

Chi square test applied (P value 0.003)

Table6: GENDER WISE STRATIFICATION OF VISUAL OUTCOME (n=196)

VISUAL OUTCOME	Male	Female	Total
Improved	45	33	78
Stable	77	41	118
Worsened	0	0	0
Total	122	74	196

Chi square test applied (P value 0.002)

Table 7: STRATIFICATION OF VISUAL ACUITY WITH VISUAL OUTCOME (n=196)

VISUAL OUTCOME	6/6	6/9 – 6/18	6/24 – 6/36	>6/60	Total
Improved	76	0	0	0	78
Stable	0	120	0	0	118
Worsened	0	0	16	0	0
Total	0	53	67	76	196

Chi square test applied (P value 0.004)

Discussion:

Cataract is amongst one of the common causes of visual morbidity in uveitic eyes.[1] Cataract develop in up to 50% of patients with uveitis, cataract removal has variety of complications like post operative macular edema, postoperative inflammation and Posterior Capsular Opacification (PCO) than in patient without uveitis.[2] Steroids are often linked to increase the risk of cataract formation in addition to cataract development secondary to uveitis.[3] Cataract extractions in patient with uveitis is challenge for ophthalmologist. In these patients cataract extraction with Intra Ocular Lens (IOL) implantation can improve visual outcome but need adequate control of inflammation.[4] In patients with complicated cataract secondary to uveitis, visual Outcome and complications rely on the type and design of IOL used, intraocular lens implantation in the capsular bag and severity of inflammation.[5] Factors, which affect the visual outcome in patients with uveitis include type of uveitis, gender, timing of surgery with regards to age of patient and control of inflammation cataract, preoperative anterior segment pathology, macular pathology before operation and preoperative Best Corrected Visual Acuity (BCVA).[1]

Quinones et al [6] stated that common postoperative complications include intraocular inflammation, petaloid cystic macular edema, iris adhesions in form of anterior and posterior synechiae, raised pressure and opacification of posterior capsule. Cataract surgery with IOL implantation improves postoperative BCVA of 3.6 lines (92%) provided intraocular inflammation is controlled.

In our study most of the patients (37%) were in age group 20-30 years, followed by (32%) patients in 31-40 years. Mean age was 29years with SD ± 1.26. Males were more than females (62% vs 38%). Pre-operative visual acuity was analyzed, 6/9 to 6/18 visual acuity was found in 27% patients, 34% had 6/24 – 6/36 and 39% patients had vision in range of 6/60 or more. But after MSICS with intravitreal triamcinolone acetonide; 40% patients had visual acuity 6/6, visual acuity of 6/9 – 6/18 was noted in 52% patients and 8% patients had visual acuity range of 6/24 – 6/36. This clearly shows that in our study 40% patients had improvement while 60% patients had stable vision, after the treatment of

intravitreal triamcinolone acetonide in manual small incision cataract surgery.

Similar results are also observed in other studies. Alkawas et al[9] had shown that approximately 87% cases respond positively to intravitreal triamcinolone when injected at the time of surgery and they showed visual improvement. Intravitreal triamcinolone injection also managed to control postoperative inflammatory signs for at least 3 months after surgery thus reducing the need for extensive oral and topical steroid regimen. Jonas et al[10]hadreported that intravitreal triamcinolone acetonide is safe and not associated with any increased rate of complications and patients also demonstrate visual benefit.

Okhraviet al[8] analyze the role of IVTA in patients with posterior uveitis. At final follow-up around 90% eyes had vision 6/12 or better. Follow-up was done for up to 41 months. Macular edema was not noticed in their study however, intraocular pressure elevation was noted in 3 eyes. Visual acuity deterioration wasn't noted in any case. Severe inflammation in the form of Ac reaction and fibrinous exudates was noted in 1 patient. He was put on aggressive topical therapy and responded well within 1 week. So, cataract surgery by phacoemulsification technique with IVTA seems a fruitful treatment option. As a result of Targeted delivery of corticosteroid to the site of inflammation the risks with systemic corticosteroid prophylaxis were avoided as well as risk of macular edema secondary to cataract surgery in these cases also significantly reduced.

Dada et al[11]in their study showed beneficial effects of intraoperative intravitreal injection of triamcinolone acetonide. Patients were randomized to receive IVTA at the of surgery vs oral steroids post operatively. Visual acuity improved in both groups but difference wasn't statistically significant (P = 0.74) postoperative anterior chamber reaction, IOP rise and macular thickness changes were also more or less the same in both groups. So, they concluded that a single intraoperative intravitreal injection of IVTA at time of cataract surgery is as efficacious as oral steroids.

The patients in our study showed better postoperative visual acuity at the final follow up. The improvement in visual acuity was more for the first 3 months postoperatively however some cases showed gradual improvement over 6 months. Visual acuity difference between preoperative and postoperative was statistically significant on final follow-up (p 0.02)

Increase in ocular pressure of 21mm Hg or more in Twenty-one (21%) eyes. This was the main side effect documented in our study. Raised intraocular pressure usually responds well to topical antiglaucoma drugs without permanent glaucomatous damage.[8, 12]

In conclusion, our study suggests that the intravitreal injection of triamcinolone acetonide improve visual outcome of patients having complicated cataract after injection. Further studies comparing different dosages of triamcinolone acetonide in such cases, need for intravitreal re-injections,[13] and comparison of intravitreal injection versus intravitreal slow release devices[14] are advised.

Conclusion:

Our study concludes that intravitreal triamcinolone acetonide improve visual outcome after manual small incision cataract surgery in eyes with complicated cataracts. The main complication in our study was raised intraocular pressure which was effectively control by using topical anti glaucoma medications.

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Authors Contribution
Concept and Design: Hamid ur Rehman,
Data Collection / Assembly: Nazli Gul, Waliullah Jan
Drafting: Hamid ur Rehman,
Statistical expertise:
Critical Revision: Sana Ullah Jan

ORIGINAL ARTICLE

Frequency of Hyperopia in Children Between 5 to 15 Years of Age

Muhammad Usman Arshad[1], Aunaza Maqbool[2], Rabia Sharif Bhatti[2], Sohail Zia[1], Masud Ul Hassan[3], Zameer Iqbal Awan[3]

Abstract:
Objective: To determine the frequency of hyperopia in children between 5 and 15 years of age.
Setting and Duration of Study: Al-Shifa Trust Eye Hospital Rawalpindi between March 2015 to September 2015 for a duration of 6 months
Methodology: This Cross-sectional study included 150 children between the ages of 5-15 years. All children with eye disorders like corneal opacity, retinoblastoma, cataracts, amblyopia, chronic metabolic disorders, and hemoglobinopathies were excluded from the study. The participants were assessed for visual acuity was checked through a LogMAR visual acuity assessment chart for each eye. Those who found to have decreased visual acuity their pin-hole visual acuity was determined and then they got thorough examination by slit lamp biomicroscopy and fundoscopy to rule out causes of decreased vision other than refractive errors. Magnitude of hyperopia was measured using cycloplegic refraction on an auto refractometer followed by retinoscopy and then subjective trials. Data obtained for both the normal and refractive error children in a specific Performa.
Results: A mean (SD) age of 8.57 (2.52) years with 106 (70.76%) children between 5-10 years and 44 (29.33%) were between 11-15 years of age. Males were predominant in our study with 90/150 (60%) male patients and 60 (40%) female population. The frequency of hyperopia I our study was 93 (62%). Out of 60 female patients, 35 (58.33%) had hyperopia whereas, out of the 90 male patients, 58 (64.4%) patients had hyperopia.
Conclusion: We reported that hyperopia is a very frequent refractive disorder found in children. Male are more frequently diagnosed with the disorder between the age of 5-10 years. Further large-scale cohorts should be conducted to determine the correlating factors that increase the risk of hyperopia and prognosis. *Al-Shifa Journal of Ophthalmology 2021; 17(4):172-177.* © *Al-Shifa Trust Eye Hospital, Rawalpindi, Pakistan.*

1. *Rapha International University Islamabad*
2. *Al-Shifa Trust Eye Hospital Rawalpindi*
3. *Bashiran Umer Eye Hospital, Islamabad*
4. *Islamabad*

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Email: usmanqureshi_cancer@yahoo.com

Introduction

Hyperopia is one of the most frequently occurring refractive errors in young children.[1-2] The refractive state depends on the power of the lens and corneal power, the anterior chamber depth, and the axial length.[1]

According to the World Health Organization, the most common cause of visual impairment and the second most common cause of visual loss, globally. The prevalence of visual impairment caused by refractive errors is as high as 43 percent. [2] Furthermore, an estimated 13 million children between the ages of 5 to 15 years,

are suffering from uncorrected refractive errors and are visually impaired.[3] In Pakistan, 11.4% people with visual loss are suffering from uncorrected refractive error.[4]

In a recent meta-analysis published in 2014, where forty studies were analysed, it was reported that the incidence of hyperopia decreased with increasing age with a prevalence of hyperopia between 8.4% at age 6, 2-3% at age between 9 -14 years and only 1 percent by the age of 15years.[5] It was also revealed that hyperopia was more frequent in children who lived in rural areas compared to urban residents.[5] However, the analysis was not consistent about the association between hyperopia and sex, family income and parental education. Other recent studies reinforced these findings. [6-8]

It is important to identify the factors associated with increased risk of hyperopia and other refractive errors among young children. Assessment by experienced paediatric ophthalmologist is necessary to establish diagnosis hence, providing timely corrective procedure.[7] A recent study by Jiang et al, in 2019 concluded that maternal smoking status during pregnancy and a positive family history of refractive disorders were associated with an increased risk of hyperopia ($P < 0.05$).[8] Ethnicities and race has also been indicated to have an impact on the incidence of the disease. [5, 8]

Hyperopia can lead to anisometropic amblyopia and strabismus in children. So that early detection and management of hyperopia can prevent blindness in children. Unfortunately, thereis limited data on the frequency of hyperopia in children and associated clinical and demographic profile of young children from Pakistan, hence the present study was conducted. The main purpose of this study was to find out the frequency of hyperopia in children between 5to 15 years of age so that we can manage this refractive error at an early stage to avoid ocular problems like amblyopia and strabismus.

Materials and Methods:

A cross-sectional observational study was conducted at Al-Shifa Trust Eye Hospital Rawalpindi between March 2015 to September 2015 for a duration of 6 months after obtaining ethical approval from the institutional review board of Al-Shifa Trust Eye Hospital. The sample size of 150 was obtained using the WHO sample size calculator, keeping the confidence interval of 95%, and the prevalence of hyperopia of 8%.[5] Children between the ages of 5 and 15 years were enrolled in the study using the non-probability consecutive sampling. All children with a history of progressive vision impairment for the past year were included in the study. Children with eye disorders like corneal opacity, retinoblastoma, cataracts, amblyopia, chronic metabolic disorders, and hemoglobinopathies were excluded from the study. Informed verbal and written consent from the child's legal guardian were procured prior to the child's enrolment in the study.

Data about sociodemographic variables like age, gender, residence, parental education, incomeof the household, and child's body mass index were recorded in a preformed electronic form along with clinical variables like presenting signs and symptoms.

Hyperopia was diagnosed and defined based on eye examination findings where children with spherical equivalent of +0.50 dioptres or greater established the diagnosis of hyperopia. Below are the brief details of the eye examination performed on participants.

i. Visual acuity (VA) was observed and recorded at 4 meters using ETDRS log MAR charts.
ii. The external eye examination was conducted using the slit-lamp examination for anypathology.

iii. Administration of proparacaine (0.5%) and 2 drops of cyclopentolate (1%) was done for both eyes to determine the refractive errors.

iv. Cycloplegic refraction (a procedure where patient's eyes are temporarily paralyzed to determine the refractive error) was performed with an autorefractometer, which was performed by an experienced optometrist who was blinded to the objective of the study.

v. The estimated refractive error was confirmed by Post Mydriatic Testing (PMT) by subjectiverefinement.

All variables were converted to excel sheets and entered into SPSS version 26. The continuousvariables such as mean age and the mean BMI of children were presented as mean and standard deviation. For categorical variables like gender, incidence of hyperopia, education, smoking status of mother during pregnancy were all illustrated in graphical or tabular forms in frequency and percentages.

Results:

A total of 150 children between the age of 5-15 were included in the study, with a mean (SD) age of 8.57 (2.52) years. 106 (70.76%) children were between 5 to 10 years of age and 44 (29.33%) were between 11 to 15 years of age. Males were predominant in our study with 90/150 (60%) male patients and 60 (40%) female population. See table 1 and figure 1.
The frequency of hyperopia I our study was 93 (62%). Out of 60 female patients, 35 (58.33%)had hyperopia whereas, out of the 90 male patients, 58 (64.4%) patients had hyperopia.

Table 1. Demographic characteristics of study population (n=150)

Age group 05-10 years 11- 15 years	 106 (70.67%) 44 (29.33%)
GenderMale Female	 90 (60.0%) 60 (40.0%)
Refractive StatusNormal Hyperopia	 57 (38.0%) 93 (62.0%)
Maternal Smoking status during pregnancy Yes No	 10 (6.67%) 140 (93.33%)
Parental Education No formal educationUp to Highschool College or Higher	 25 (16.67%) 68 (45.33%) 57 (38.00%)
ResidenceRural Urban	 121 (80.67%) 29 (19.33%)

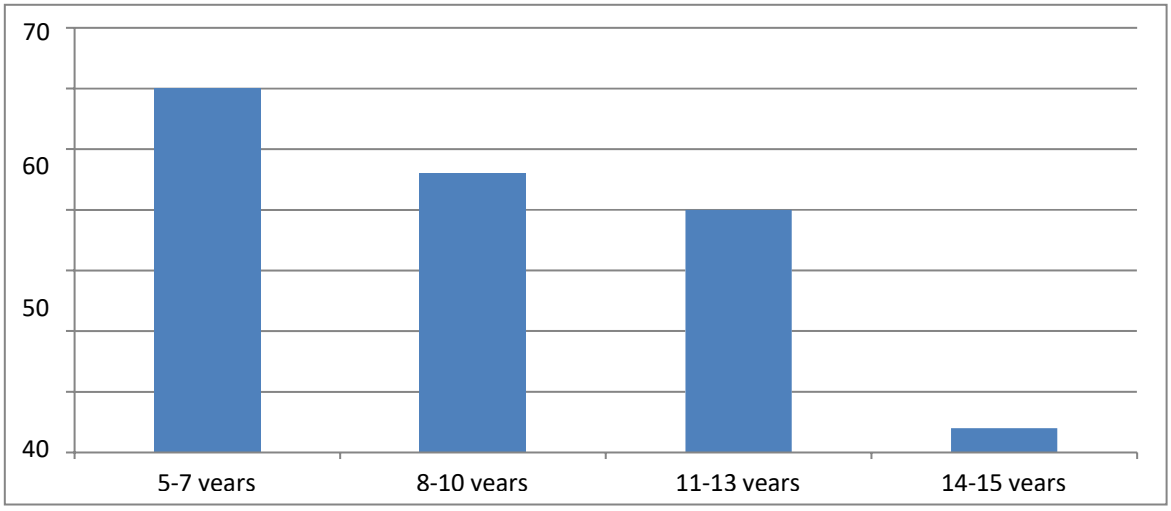

Figure 1. Age distribution of Study Population n=150

Discussion:

The frequency of hyperopia in our study was 93 (62%). Furthermore, we reported a higher male frequency with hyperopia in our study compared to female population with a mean age of 8.57 years and a range between 5-15 years. In a study from the Agency hospital Landikotal, the authors revealed comparable frequency of hyperopia of 58 percent. However, the age of children in their study was between 1-15 years.[9] Hence, the present study reported a higher frequency of hyperopia.

A study on prevalence of hyperopia done in Southern Brazil showed increased prevalence of hyperopia between 5 to 11 years of age which is consistent our study.[10] In our study 106 children out of 150 children were between 5 to 10 years of age and 78 (73.6 %) of them werehyperopic.

In our study 60 % were males and 40 % were females the reason is that our society is male dominant and female population in Pakistan does not have very easy access to healthcare in our society. The finding was different from the multi-centre survey of refractive error defects from China, Chile, and Nepal where hyperopia was significantly higher in female patients.[11,12] In another study conducted in Eye Unit Lady Reading Hospital Peshawar shah also found that 56% were male and 44 %were female.[13]

We found that the majority of the patients in our study belonged to urban region. In a study fromNepal addressing the patterns of refractive errors in school going children it was reported that prevalence of hyperopia was higher in urban students compared to the rural areas.[14]

Our findings slightly differ from the studies previously conducted because there is a huge sociodemographic difference between developed and developing countries like Pakistan. People have awareness in developed countries of world and they prefer ocular examination of their children properly by ophthalmologists and do proper follow ups. There is no sex discrimination while in underdeveloped countries there is no much awareness regarding vision problems in children. There are a lot of financial problems similarly most of the female children do not have access to education, proper healthcare, consume less nutritious food as comparedto their male counterparts. Therefore, it is very difficult to compare the results of refractive error studies from developed countries with poor-income countries.

In one local study, conducted in Lahore, the refractive error was more prevalent in male

patients who played video games frequently. This could be because of the strain video playing puts on eyes.[15] However, further studies would have to be conducted to ascertain these claims.

Compliance with glasses was much better in children belonging to educated families and mostof them already using glasses. The frequency of hyperopia decreased with increasing age.
Similar findings were reported in a meta-analysis where significant association was foundbetween younger age and incidence of hyperopia.[5]

In short, we concluded that hyperopia is a very frequent refractive disorder in children in Rawalpindi, Pakistan. Male are more frequently diagnosed with the disorder between the age of 5-10 years. Further large-scale cohorts should be conducted to determine the correlating factors that increase the risk of hyperopia and prognosis.

Despite many strengthening points of the study, there are some weaknesses. The present studywas hospital-based; therefore, it raises the question of generalizability of the findings. Another factor which was a hindrance in our study was age of children. Small children usually afraid of hospital setting. They are shy and do not allow for examination. It took time to make these children comfortable in a hospital environment for proper ocular examination.

Conclusion:

We reported that hyperopia is a very frequent refractive disorder found in children. Male are more frequently diagnosed with the disorder between the age of 5-10 years. Further large-scale cohorts should be conducted to determine the correlating factors that increase the risk of hyperopia and prognosis.

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Authors Contribution

Concept and Design: Muhammad Usman Arshad
Data Collection / Assembly: Sohail Zia, Masud Ul Hassan,
Drafting: Muhammad Usman Arshad
Statistical expertise: Aunaza Maqbool, Rabia Sharif Bhatti
Critical Revision: Zameer Iqbal Awan

ORIGINAL ARTICLE

Prevalence of Myopia in Urban and Rural School Going Pediatric Population in Four Districts of Azad Jammu and Kashmir

Saba Haider Tarar[1], Waseem Ahmed Khan[1], Shazia Siddiq[2], Muhammad Irfan Sadiq[1], Syeda Marrium Batool[3], Zain Qayyum[3]

Abstract:

Objective: To assess the Prevalence of myopia in Urban and Rural School going Pediatric Population in District Mirpur, Bhimber, Kotli and Pallandri, AJK.

Study Design: Cross-sectional Descriptive Study.

Place and Duration of Study: Study was conducted on school going pediatric Population in District Mirpur, Bhimber, Kotli and Pallandri, AJK from 1st March ,2016 to 30th June,2021

Materials and Methods: After taking permission from hospital ethics committee, a community-based study was carried out in both private as well as public sector schools of 04 districts including Mirpur, Bhimber, Kotli and Pallandri, AJK after informed consent. After taking consent, data was collected through a self-designed proforma from schools. A team of teachers from each school was trained by conducting workshops to detect visual deficits. The initial screening was carried out at the community level and then the affected children were referred for further examination to Divisional Headquarters Teaching Hospital Mirpur, AJK, Pakistan. Data was analyzed by using SPSS 20.

Results: 155,776 children were screened from the schools from 04 districts including both public as well as private schools. 6043 (03.87%) children were found to have refractive error. Among these, 3259 (53.93%) children were myopic. The affected children in Urban Areas were 2070 (63.52Prevalence of myopia was less1419 (43.54%) in Males and higher 1840(56.46%) in Females.

Conclusion: School screening programs at the community level can play a significant role in improvement of eye health care. This will also help in treatment of preventable blindness among school going Pediatric population of Pakistan. *Al-Shifa Journal of Ophthalmology 2021; 17(4):178-182. © Al-Shifa Trust Eye Hospital, Rawalpindi, Pakistan.*

1. *Mohtarma Benazir Bhutto Shaheed Medical College, Mirpur AJK*
2. *Poonch Medical College, Rawalakot AJK*
3. *Divisional Headquarters Teaching Hospital, Mirpur AJK*

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Correspondence to:
E-mail: waseemabbasi2001@yahoo.com

Introduction:

Refractive errors are generally considered to be a part of treatable ocular conditions leading to visual disabilities in school going children. It seems that the provision of spectacles to the affected Pediatric population is a cost-effective health intervention. Therefore, the VISION 2020 initiative to eliminate avoidable blindness has awarded a priority towards correction of refractive errors and has assigned it the category of "childhood blindness."[1] Many children suffering from uncorrected refractive errors are usually asymptomatic. School screening helps in early detection

and timely intervention of these asymptomatic children. It is recommended that, along with other general health parameters, monitoring and integration of vision screening should also be incorporated in school screening programs. However, due to paucity of availability of access to eye care services, the magnitudes of refractive errors in rural as well as urban students are ignored.[2]

Globally, Myopia is the most common ophthalmic refractive error with an estimated 22.90% of the world population, or 1.406 billion people, being affected. Additionally, 2.7% of people, 163 million, are screened to have high myopia.[3] The projected economic impact of uncorrected refractive errors is estimated to be around a loss of $202 billion of global gross domestic production. Costs of spectacle correction tend to affect low-income patients disproportionately. If left uncorrected, myopia can lead to deterioration in academic performance as well as poor grades in schools. A careful survey shows that visual impairment among Pediatric population will increase by 26% by 2060 with refractive errors responsible for 69% of morbidity.[4]

Both genetic as well as environmental factors are responsible for the development of myopia, like more time spent on near work, gadgets, less time spent on outdoor activities and games, racial differences, and positive family history of high myopia. Literature review reveals that prove a definite correlation between higher educational level or higher academic achievements with higher prevalence of myopia.[5]

A high prevalence of Myopia is reported in East Asia as compared to South Asia and western countries. It has been reported the lowest prevalence of Myopia is reported in Africa. The prevalence of myopia in urban areas is generally as higher as 78.40% as compared to rural areas where it is found to be lower. [6]

Materials & Methods:

Study design: Cross-sectional Descriptive Study

Sample size: 6043 students out of 155,776 screened children had refractive errors and were referred to our hospital for diagnosis of refractive errors.

Place and Duration of Study:

The study was conducted in school going children in District Mirpur, Bhimber, Kotli and Pallandri, AJK, Pakistan from 1st March, 2016 to 30th June, 2021. After taking permission from hospital ethics committee, a community-based study was carried out in both private as well as public sector schools of 04 districts including Mirpur, Bhimber, Kotli and Pallandri, AJK after informed consent. After taking consent, data was collected through a self-designed proforma from schools of District Kotli and Bhimber, Mirpur and Pallandri. A team of teachers from each school was trained by conducting workshops to detect visual deficit. Eye examination kit consisting of vision chart and three-meter rope was provided. The screening was carried out at the community level initially and the affected children were referred for further examination to Divisional Headquarters Teaching Hospital Mirpur, AJK, Pakistan. Data was analyzed by using SPSS 20.

Results:

This was a cross sectional study with the aim of enrolling children studying in different schools of four district of Azad Kashmir including Mirpur, Bhimber, Kotli and Pallandri, AJK. A total number of 155,776 were screened from the selected schools in the study. Out of which 6043(03.87%) have refractive error. Among these total 3259(53.93%), children were myopic. The children in Urban Areas were 2070 (63.52%). The number of children in Rural Area was 1189 (36.48%). Difference in the prevalence of refractive errors in urban and rural settings was significant (p=0.00012) in our study. Prevalence of myopia was higher in

females, 1840 (56.46%) as compared to males, 1419 (43.54%). Most of the myopia was present in Age 13-16 years age group 1798(55.17%) followed by 9-12 years age group 1140 (34.98%) and the lowest percentage of myopia was present in the age 5-8 years age group 321(09.84%). Myopia was significantly associated with age of child (p-value:0.001). The prevalence of female in our study was higher than males. The prevalence of Myopia in Urban Areas was higher than Rural Areas.

Table 1: Rural Versus Urban Distribution of Myopia		
Area	**Frequency**	**Percent**
Urban	2070	63.52%
Rural	1189	36.48%
Total	3259	100.0%

Table 2: Gender Distribution of Myopia in Pediatric Population:		
Gender	**Frequency**	**Percent**
Female	1840	56.46%
Male	1419	43.54%
Total	3259	100.0%

Table 3: Age distribution of Myopia in Pediatric Population:		
Age	**No. of Children**	**Percent**
13-16 yrs.	1798	55.17%
9-12 yrs.	1140	34.98%
5-8 yrs.	321	09.84%
Total	3259	100.0%

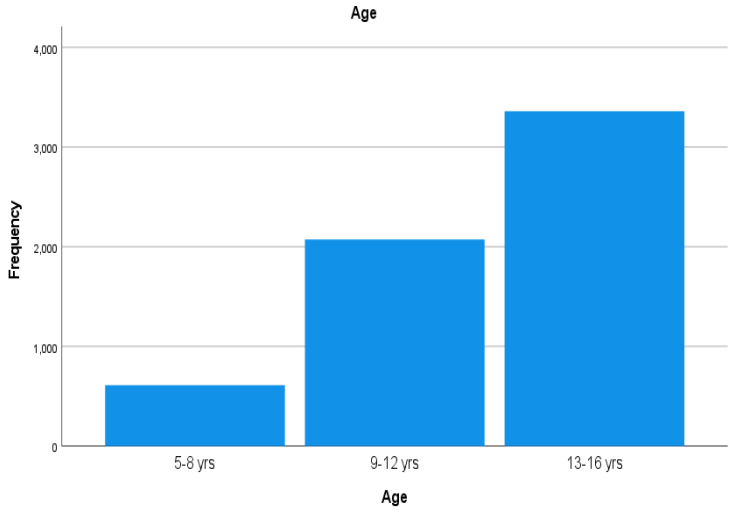

Figure 1: Frequency of Myopia in various age groups

Discussion:

This community-oriented study was carried out for screening of Pediatric population of school going children in four districts of Azad Kashmir, Pakistan. A total number of 155,776 were screened from the selected schools in the study. Out of which 6043 (03.87%) have refractive error. Among these total 3259 (53.93%), children were myopic. Our study results are comparable with another study where Latif et al in Lahore, Pakistan, showed refractive errors

in 24.4% and myopia 52% was the major type of refractive error.[7] In contrast, another local study revealed the prevalence of refractive errors in school going children of Faisalabad to be as high as 51.5%[8], 41.9% [9] respectively. The results of our study were comparable with a study done in Cambodia where total prevalence of refractive error was 6.57% (95% CI 5.91-7.22%) [10]. Saxena R et al showed a prevalence of 13.1% myopia in school going children[11].

Prevalence of myopia was higher in females (56.46%) as compared to males (43.54%) in our study. These results are comparable with studies done by Gao Z [10], Sexana R [11] and Hung HD et al [12] who showed a female predominance of Myopia. Most of the myopia prevalence in our study was present in Age 13-16 years (55.17%) followed by 9-12 years (34.98%) and the least myopia was present in 5-8 years (09.84%). These results are comparable to Theophanous C et al study in which myopia has tendency to increase with age (59.00%)[9] and Padhye AS et al where 13-15 years old children attending urban schools were suffering from uncorrected myopia[13].

The prevalence of Myopia in Urban Areas was higher than Rural Areas in our study. The number of children in Rural Area was 36.48% whereas the children in Urban Areas were 63.52%. Difference in the prevalence of refractive errors in urban and rural settings was significant (p=0.001) in our study with similar comparable results from Latif et al (p=0.00002) Lahore, Pakistan.[7] Uzma et al showed the prevalence of refractive error was greater (25.2%) in the urban than the rural group (08%). In that study, Myopia measured with auto-refraction was observed in 51.4% of urban children and 16.7% in rural children. Increased literacy rate, duration of study hours, and older age of the child were found to have contributed more to the prevalence of myopia in the urban group[14]. In another study, the cluster-weighted prevalence of uncorrected refractive error in urban and rural Pediatric population was 05.46% and 02.63% respectively[13]. Similar results were shown by Gao Z et al who showed a significant difference between urban (13.7%, 95% CI 12.2-15.2%) and rural (2.5%, 95% CI 2.03-3.07%) schools (P < 0.0001). Like our study, Myopia was associated with increased age, female gender and urban schooling[10].

In another study, although not differentiated as rural or urban, prevalence of myopia was higher in private schools compared to government schools, higher in girls as compared to boys and among children more than 11 years of age. Positive association of presence of myopia was recorded in children reading more than 5 hours a day, watching television for more than 2 hours every day and playing computer games. An inverse association of myopia was observed with outdoor activities, children playing outdoors around 2 hours everyday[11].

Conclusions:

Provision of health education, periodic visual screening programs, and primary eye care by trained health care personnel in the elementary schools will lead to early detection, proper treatment and prevention of avoidable blindness from uncorrected refractive errors in school going pediatric population. School eye health screening Programs should be incorporated in the community health care and community health workers should be trained to screen common ocular conditions.

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Authors Contribution

Concept and Design: Saba Haider Tarar, Waseem Ahmed Khan
Data Collection / Assembly: Muhammad Irfan Sadiq
Drafting: Syeda Marrium Batool, Zain Qayyum
Statistical expertise: Shazia Siddiq
Critical Revision: Waseem Ahmed Khan

ORIGINAL ARTICLE

Effect of Ametropic Spectacles Correction on Contrast Sensitivity

Rafia Batool[1], Sadaf Qayyum[1], Qurat- ul- Ain[1], Shahid Iqbal[1], Sohail Ahmad[1]

Abstract

Background: The disruption of normal visual experience may lead to the development of refractive error. Contrast sensitivity is a vital visual function for accurate vision in normal and dim light. Early detection of decrease in contrast sensitivity and taking measures at early stage help the patient to perform their daily activities easily even if they have 6/6 visual acuity.

Objectives: To find out the effect of ametropic spectacle correction on contrast sensitivity.

Methodology: A descriptive cross-sectional study was carried out Al-Shifa Eye Trust Hospital Rawalpindi within the duration of six months. Total of 90 ametropic patients, including 56 (62.2%) females and 34 (37.8%) males were included in the study after qualifying on the basis of inclusion and exclusion criterion. The refractive errors were categorized in to mild (+_0.25 D to +_2.00D), moderate (+_2.25D to +_4.00D) and severe (>+_4.00D) degrees and the contrast sensitivity was measured for each group. Descriptive and inferential statistics was used to analyze the result. A self-structured Performa was used and analyzed using SPSS version 26.

Results: The results showed that there was no significant (p=0.145) decrease of contrast sensitivity in myopic spectacle correction 27 (30.0%), while in Hypermetropic spectacle correction 33 (36.7 %) had considerable decrease in contrast sensitivity which was significant (p = 0.018 While in astigmatic spectacle correction 30 (33.3%) had more significant decrease in contrast sensitivity than the non-astigmatic ones (p=0.017).

Conclusion: Contrast sensitivity is very important to measure and should be taken in to consideration while doing subjective correction for the correction of refractive errors. Despite the fact that the measure of visual acuity gives essential clinical data, the ability to quantify contrast sensitivity in a clinical setup has much significance in all ages. *Al-Shifa Journal of Ophthalmology 2021; 17(4):183-190.*

1. *Pakistan Institute of Ophthalmology, Al-Shifa Trust Eye Hospital, Rawalpindi*

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Correspondence to:
Email: sohailahmad583@gmail.com

Introduction:

Ametropia refers to vision disorders characterized by the eyes inability to correctly focus the images of object on the retina [1]. Refractive errors are the most common ocular problem affecting all age groups. They are considered a public health challenge. Recent studies and WHO reports indicate that refractive errors are the first cause of visual impairment and the second cause of visual loss worldwide as 43% of visual impairments are attributed to refractive errors. A review study showed that uncorrected refractive errors were responsible for visual impairment in 101.2

million people and blindness in 6.8 million people in 2010[2].

The national review on the predominance of visual impairment and its causes reported that the refractive errors are the major cause of low vision in Pakistan. The prevalence of myopic refractive errors is 17-25% in general population, there is a racial variation between the people living in different countries, e.g., in Asia its prevalence is 40% and is higher in student population ranging up to 80% [3].

Contrast sensitivity is the ability to perceive slight changes in the luminance between the regions that are not separated by the definite borders and is of equal importance [4]. Contrast sensitivity is frequently shown in log units to make the values linear and permit examination at low and high level of contrast. Contrast sensitivity is an essential measure of visual capacity, particularly in circumstances of low light, mist or glare, when the contrast among objects and their background is decreased. Contrast sensitivity is required to carry out daily activities, e.g., reading, writing and driving etc. especially in dim light where high contrast is required [5].

As the visual acuity also gives the information about the visual function of a person, but it gives the information of recognition pattern of highly contrast smallest letters or pattern and not a reliable indicator of capacity to differentiate between visual targets or execution of task requiring far objects judgment, night driving and portability: these parts of visual function might be better related with contrast sensitivity [6].
Indeed, visual acuity is normally considered a measure of the clarity of vision, and it essentially relies upon the finest point of interest that an eye can resolve. Weather the CSF is a more complete metric since it is a measure of the threshold contrast required to see spatially frequencies stimuli [7].

The6 Mars Letter Contrast Sensitivity Test14—initially marketed as the Lighthouse Letter Contrast Sensitivity Test—has several features that might make it desirable for use in clinical practice, including its small size, durability, and portability. It uses the same Sloan letter set as the Pelli Robson test, but the manner in which the contrast of the letters varies is slightly different. All of the features make the Mars test fairly versatile and likely more convenient for use in a wide variety of patient care settings.
The Mars Letter Contrast Sensitivity test measures approximately 23 35.5 cm and is printed on rigid plastic. It consists of 48 letters, 1.75 cm high, arranged in eight rows of six letters each. Stated contrast varies from 91% (–0.04 log units) to 1.2% (1.92 log units) with the contrast of each letter decreasing by a constant factor of 0.04 log units [8].

Participants and Methods:

A cross sectional study was conducted from September 2020 to February 2021 at Al-Shifa eye trust hospital Jhelum Road, Rawalpindi Pakistan. The study population was composed of respondents who visit Al-Shifa eye trust hospital Jhelum Road, Rawalpindi Pakistan. A total of 90 individuals participated in this study. Sampling was done through convenient sampling technique. Sample size was calculated using open EPI sample size calculator keeping confidence level of significance 99.9% All the patients visiting Al-Shifa eye trust hospital Jhelum Road Rawalpindi were included into the study. Data was collected using self-structured patient Performa, typed in English. The Performa was constructed based on previous literature. It was validated for content and face validity by circulating them to experts in the field including the supervisor. A pilot study was also conducted for this purpose. The Performa collected information on Demographics, visual Assessment e.g., visual acuity, refraction, assessment of Contrast

sensitivity. Outcome variables include Contrast sensitivity. Independent variables include age, gender, occupation, area of residence, ametropic spectacles. Inclusion criteria include Subjects with refractive errors of following ranges**,** Patients with myopia from -0.50 up to -7.00DS, Hypermetropia from +0.50 up to +7.00DS. Astigmatism from ±0.50 up to ±7.00C with other refractive errors and simple astigmatic refractive error i.e., myopic and hyperopic astigmatism, Patients with age 10 years old to 30 years old, visual acuity at least 6/9 or more than this. Exclusion criteria included subjects following ocular diseases were not included in this study, Anterior segment diseases e.g., any infection of conjunctiva, eyelid and other diseases e.g., cataract, glaucoma, uveitis, lacrimal gland diseases, vitreous related diseases and trauma to the eye. Posterior segment diseases e.g., retina and its related diseases e.g., retinal detachment, artery and vein occlusion, tumor and other pathologies of fundus were all excluded and those who were not willing to participate. The data was collected the by self-administered Performa and filled by the researcher.

After collection of the data, it was coded and entered into SPSS software and saved thereafter. Data was cleaned by generating frequencies, any error or discrepancy if found, was corrected by reconsidering the proforma. Hard copy of the data was secured in the cupboard with access only to the researcher. Soft copy saved and was password protected. Data analysis was done using Statistical Package for Social Sciences (SPSS) version 26. Before analysis data transformations were carried out and continuous variables were transformed into categorical variables for statistical analysis. Analysis was done in two phases, descriptive analysis followed by inferential analysis. Categorical data was presented in the form of frequencies and percentages while Chi square test for independence was used for finding associations between outcome variables and independent variables. The test was applied to all applicable independent variables and outcome variables.

Results:

Total 90 ametropic patients were included having an age from 10 to 30 years. The patients age range from 10 to 20 years were 39 (43.3%) and from 20 to 30 years 51 were (56.7%). The subjects were categorized into three types of refractive errors in which for myopia 27 (30.0%), hypermetropia 33 (36.7%) and astigmatism 30 (33.3%) of patients of each type of refractive error (Myopia, hypermetropia and astigmatism) were included. Contrast sensitivity is categorized as shown in Fig 1.

To see the effect of ametropic spectacles correction on contrast sensitivity, the contrast sensitivity values were divided into three classes. Patients with mild decrease in contrast sensitivity were categorized as (1.72-1.92), similarly for moderate decrease in contrast sensitivity were categorized as (1.24-1.68) and for severe (1.0-1.20). There were total 90 subjects, out of which, 6 (6.7%) cases had a mild decrease in contrast sensitivity. Moderate decrease was noted in 49 (54.4%) subjects and severe decrease in 35 (38.9%) subjects.

Regarding refractive errors, 27 (30.0%) patients had myopia. Myopia was categorized in to mild (-0.25D to _2.00D), moderate (-2.25D to _4.00D), and severe (>-4.00D) according to which 9(10.0%) had mild myopia,9 (10.0%) had moderate myopia and 9 (10.0%) were patients of severe myopia. Degree of hypermetropia was measured by categorizing the refractive error in to three degrees mild, moderate and high hypermetropia.

Patients with refractive error from (+0.25D to +2.00D) were categorized as mild Hypermetropia, for Moderate (+2.25D to +4.00D) and high hypermetropia patients with >+4.00 were included. Patients with

mild hypermetropia were 11 (12.2%), moderate 13(14.4%) and severe 9 (10.0%).

There were total 30 patients with astigmatism and categorized into mild (+\-0.25D to +\-2.00D), moderate (+\-2.25 to +\-4.00D) and high (+\->4.00D). There were 13(14.4%) subjects with mild astigmatism,13 (14.4%) with of moderate and in 4 (4.4%) subjects severe astigmatism was present.

Frequencies of various grades of myopia, hypermetropia and astigmatism with different levels of contrast sensitivities are shown in table 1,2 and 3 respectively.

Chi-square test was used to see the association between contrast sensitivity of myopia hypermetropia and astigmatism. The results showed that there no significant association (P=0.145) between myopia and contrast sensitivity while significant association (p=0.018) was found between hypermetropia and contrast sensitivity. There was also a significant association (P=0.017) between the degree of astigmatism and contrast sensitivity. (Table 4)

Pearson Chi square test was used to see he association between gender and contrast sensitivity in myopic, hyperopic and astigmatic patients. The results showed that there was no significant association (P=0.895), (P=0.710), (P=0.526) between gender and contrast sensitivity in all type of refractive errors. (Table 5)

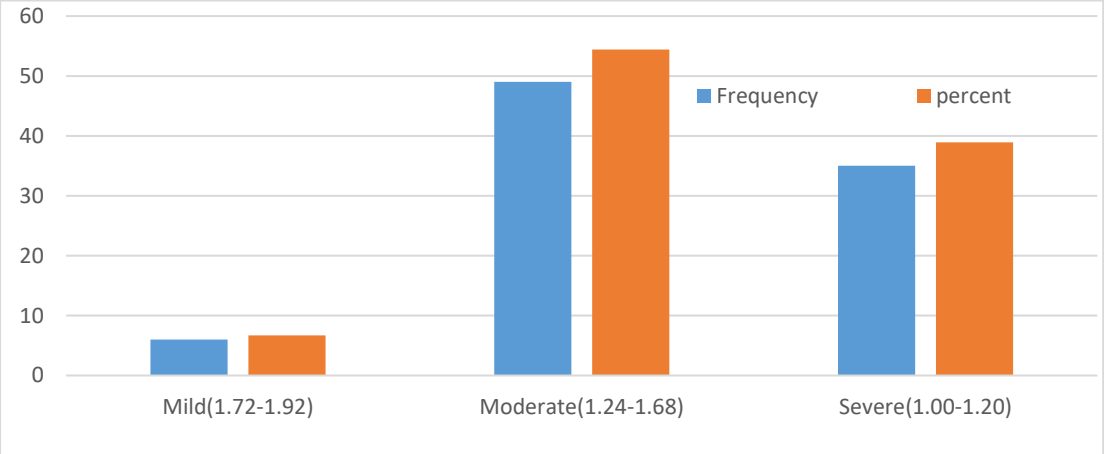

Figure 1: Categorization of contrast sensitivity

Table 1: Degree of myopia and decrease in contrast sensitivity of myopic patients

Degree of myopia	Mild decrease (1.72 -1.92)	Moderate decrease (1.2-1.6)	Severe decrease (1.00-1.20)	Total
Mild myopia	3	6	0	9
Moderate myopia	3	6	0	9
Severe myopia	0	9	0	9
Total	6	21	0	27

TABLE 2: Degree of Hypermetropia decrease in contrast sensitivity

Degree of Hyperopia	Mild decrease (1.72 -1.92)	Moderate decrease (1.24-1.68)	Severe decrease (1.00-1.20)	Total
Mild hyperopia	0	11	3	14
Moderate hyperopia	1	5	8	14
Severe hyperopia	0	0	5	5
Total	1	16	16	33

Table 3: Degree of astigmatism: Contrast sensitivity of astigmatic patients

Degree of astigmatism	Mild decrease (1.72 -1.92)	Moderate decrease (1.24-1.68	Severe decrease (1.00-1.20)	Total
Mild Astigmatism	0	9	4	13
Moderate Astigmatism	1	5	7	13
Severe Astigmatism	0	0	4	4
Total	1	14	15	30

TABLE 4: Chi-Square test to see the association between Myopia, Hyperopia Astigmatism and Contrast sensitivity

S.NO	Type of refractive error	p-value
1	Myopia	0.145
2	Hypermetropia	0.018
3	Astigmatism	0.017

Table 5: Chi-square test to see association between gender and contrast sensitivity in subjects with various types of refractive errors

S.NO	Type of refractive error	p-value
1	Myopia	0.895
2	Hypermetropia	0.710
3	Astigmatism	0.526

Discussion:

There are many researches which showed the relationship between the refractive errors and the contrast sensitivity. Myopia, hypermetropia and astigmatism cause a decrease in contrast sensitivity even after correction with spectacle lenses.

A patient may have visual acuity 6/6 but shows decrease in contrast sensitivity, due to which patient may complain of visual problems. So, contrast sensitivity is very important to measure of refractive errors patients.

Nio.et-al in 2003 conducted a study in the Netherlands showed that low myopic patients showed no difference in contrast sensitivity or visual acuity but high refractive errors had an effect on contrast sensitivity [10]. The results of this study resembled with the present study in the sense that there was no significant decreased in contrast sensitivity of low myopic patients. The present study results showed that there was no significant statistical decrease in contrast sensitivity of myopic patients in low as well as high degree of myopia when the results were statistically analyzed. (P=0.145).

Russell, also conducted research on contrast sensitivity of hypermetropia and myopia. Their results showed the decreased in contrasts sensitivity with the increment of degree of myopia and hypermetropia [11]. The present study showed that, although there was decreased in contrast sensitivity of myopic patients but when compared the results with hypermetropia then there was significant (p=0.018) decrease in contrast sensitivity of patients as compared to the present study the total sample size was of 90 of each category of refractive error (myopia 27, hypermetropia 33 and astigmatism 30).

The above study showed the decrease of contrast sensitivity in myopia. The present study also showed decrease in contrast sensitivity but the change is not significant, while in hypermetropia and astigmatism there was significant decrease of contrast sensitivity

Research done by Niall C.et al. reported decrease in the contrast sensitivity. In this study three subjects with age ranges from 42 were included. The results of this study showed that there was a more decrease in contrast sensitivity in Hypermetropic patients [12]. The results of this study correlate with the present study as the results were more significant with hypermetropia than myopia in present study.

There are many other studies that showed the relationship between refractive errors and contrast sensitivity. Many studies strengthen the present study e.g., a study carried out by Tomidokoro proved that astigmatism reduced the contrast sensitivity [13]. The present study results showed that the decrease in contrast is more significant in astigmatic patients (p=0.017) as compared in Hypermetropic (p=0.018) while no significance in myopia (p=0.145). Another study conducted by Ravalico G et al at the University of TriesteIthaly showed that astigmatism decreased contrast sensitivity. The study conducted on the patients who had astigmatism and had surgical correction with monofocal IOL implantation. Study also shows that there is a decrease in contrast sensitivity of astigmatic patients [14]. The results showed that decrease in contrast sensitivity was more significant in astigmatism (p=0.017), then hypermetropia(p=0.018) and no significant for myopia (p=0.145).

The reason of decreased contrast in hypermetropia as compared to myopia is due to lens magnification. As the minus lens cause minification. There is no significant decrease in myopic and due to magnification of plus lens, the image clarity is affected that is why the contrast sensitivity of the hypermetropic patient is affected and also the latent accommodation.

The study conducted also shows that there is no effect of socio-demographic on contrast sensitivity. This study shows that there is no effect of gender on contrast sensitivity. According to this study there was no association between gender and contrast sensitivity in myopia(p=0.895), also not for the hypermetropia (p=0.710) and astigmatism (p=0.526).

Conclusion:

The results of the present study shown that there is a decrease of contrast sensitivity due to refractive errors. As the degree of refractive error is increased, the reduction of contrast sensitivity increases.

Through the comparison of the results of the study between the refractive errors it is found that the decrease of contrast sensitivity in myopic patients is not significant (p=0.145). However, the decrease of contrast sensitivity is more significant in astigmatism (p=0.017) then hypermetropia (p=0.018).

The results of the present study shows that there is no effect of socio demographic on contrast sensitivity. According to this study there was no association between gender and contrast sensitivity in myopia (p=0.895), also not for the hypermetropia (p=0.710) and astigmatism (p=0.526).

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Authors Contribution

Concept and Design: Rafia Batool, Sadaf Qayyum
Data Collection / Assembly: Qurat- ul- Ain, Shahid Iqbal
Drafting: Rafia Batool, Sadaf Qayyum
Statistical expertise: Rafia Batool, Sadaf Qayyum
Critical Revision: Sohail Ahmad

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