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- **Editorial: Evolving paradigms in Retinoblastoma management**
- **Manual Small Incision Cataract (MSICS) Surgery**
- **Awareness of Diabetic Retinopathy in Diabetic Patients**
- **Papilledema in Meningitis in Paediatric Patients**
- **Prevalence of Astigmatism in School Going Children**
- **Strabismus in Patients with Low Vision**
- **Frequency of Retinopathy in Known Diabetics**

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Editorial: Evolving Paradigms in the Management of Retinoblastoma 63
Sorath Noorani Siddiqui

Comparison of the Ruit and Modified Blumenthal Techniques of Manual Small Incision Cataract (MSICS) Surgery 66
Munir Amjad Baig, Shakeel Ahmad Faiz, Qazi Waheedullah

This was a prospective, non-randomized study of 20 months duration was conducted to report the place and relevance of manual small incision cataract surgery (SICS) in our setup. Two groups of equal halves were made. Group 1, n=250 undergoing Blumenthal and the other group, n=250, Ruit technique. Postoperative visual acuity, surgically induced astigmatism and intraoperative and postoperative complications were compared. Satisfactory results were obtained with Blumenthal (82%) and Ruit (85%) techniques.

Awareness of Diabetic Retinopathy in Diabetic Patients at Divisional Headquarters Teaching Hospital, Mirpur, AJK 72
Saba Haider Tarar, Waseem Ahmed Khan, Muhammad Irfan Sadiq, Mussarat Jabeen, Muhammad Usman Sadiq, Sara Najeeb

This cross-sectional observational study was conducted over a period of one year on diabetic patients visiting a Divisional Headquarters Teaching Hospital. A questionnaire was filled by a skilled interviewer who recorded the information including demographic details, education level and patients' awareness about ocular complications of diabetes followed by fundus examination using non-mydratic fundus camera. The patients were divided into 5 groups according to their educational levels and 3 groups according to the duration of disease. The knowledge about diabetic retinopathy and its treatment was inadequate along with poor compliance with annual fundus examination. This was directly related to the educational level of the patient and the duration of diabetes.

Papilledema in Meningitis in Paediatric Patients admitted at a Tertiary Care Hospital 80
Ashfaq ur Rehman, Usman Attique, Afzal Qadir, Abdul Aziz, Mohammad Israr, Amir Shehzad

This prospective descriptive study was conducted to determine the frequency of papilledema in meningitis in child age group admitted at paediatric unit, Hayatabad Medical Complex, Peshawar. Fundi of 178 patients admitted in paediatric units and clinically diagnosed as having meningitis were thoroughly examined either with the help of direct ophthalmoscope or slit-lamp. Different

aetiologies based on lumbar puncture included; 43 % patients having bacterial meningitis, 33% TB meningitis and 15 % having viral meningitis. Papilledema was observed in 5.61 % of patients.

Prevalence of Astigmatism in School Going Children in Azad Jammu and Kashmir **86**

Mohammad Irfan Sadiq, Waseem Ahmed Khan, Saba Haider Tarar, Kanwal Abbasi, Muhammad Usman Sadiq, Sara Najeeb

This cross-sectional observational study was conducted in school going children in Azad Jammu and Kashmir to assess the prevalence of astigmatism and most common type of astigmatism. Each eye was considered as a separate individual data. Total 1000 eyes were taken for the study with the age ranging from 5 – 16 years. Astigmatism was detected in 308 eyes (30.8%), 212(68.83%) were females and 96(31.16%) were male. Predominantly, With the rule myopic astigmatism was seen in 135eyes (43.83%).

Strabismus in Patients with Low Vision Visiting a Tertiary Eye Care Setting in Rawalpindi **92**

Saman Malik, Ume Sughra, Sumaira Altaf, Sultana Kausar, Amna Ahmad, Muhammad Imran

A descriptive cross-sectional study was conducted to estimate the frequency of strabismus in patients with low vision in a tertiary eye care setting. One hundred and seventy patients with decreased vision from the Low vision department from June 2016 to December 2016 were included. Cover test was performed at both short and long distance to assess strabismus. Out of 170 patients, strabismus was found to be in 114 patients (67%). Out of 114 strabismic patients, 64 patients (56%) were diagnosed with acquired strabismus while 50 patients (44%) had congenital strabismus. Retinitis pigmentosa was found in 34% of the patients while 12% had myopic degeneration.

Frequency of Diabetic Retinopathy Among the Known Diabetic Patients at a Tertiary Care Eye Hospital **99**

Mahmood Ali, Sarah Zafar, Muhammad Sadiq, Farah Akhtar, Wajid Ali Khan

This cross-sectional observational study was conducted to report the frequency of diabetic retinopathy among the known diabetics presenting for the first time at Al-Shifa Trust Eye Hospital (ASTEH) Rawalpindi. Diabetic Retinopathy was graded according to International Clinical Diabetic Retinopathy and Diabetic Macular Edema Disease Severity Scale. Out of 200 total participants, retinopathy was detected in 105 (52.5%) patients among which 44 (22%) patients had Proliferative retinopathy and 57 (28.5%) patients had diabetic macular edema. Severity of diabetic retinopathy was significantly associated with age ($p=0.004$), duration of diabetes ($p>0.001$) and blood sugar status ($p=0.001$).

Evolving Paradigms in the Management of Retinoblastoma

Sorath Noorani Siddiqui

Retinoblastoma is the most common malignant intraocular tumor in children with reported universal incidence of 3.4 to 42.5 per million children.¹ World-wide, about one case of retinoblastoma is recorded per 15,000 – 20,000 live births.² It most commonly affects young children but can rarely occur in adults. During the normal development of retina, the retinoblasts multiply to make new cells and these cells grow into mature retinal cells. Rarely, something goes wrong with this process. Instead of maturing, some retinoblasts continue to grow out of control, and result in retinoblastoma. The normal *RBI* gene keeps cells from growing out of control, but a mutation in the gene disturbs the normal growth of retinal cells.³ Depending on when and where the change in the *RBI* gene occurs, it can result in heritable (bilateral) or non-heritable (unilateral) types of retinoblastoma. Hereditary retinoblastoma is passed from parents to children in an autosomal dominant pattern. If one parent carries a mutated gene, each child has a 50 percent chance of inheriting that gene. Although a genetic mutation increases a child's risk of retinoblastoma, it does not mean that cancer is inevitable.

The diagnosis of retinoblastoma is mostly clinical. Calcification in the tumor is picked up by the ocular ultrasound. Orbit and brain neuroimaging is used to assess the extent of disease. The most commonly used classification of Retinoblastoma is international intra ocular classification of retinoblastoma.⁴ The common presenting features of retinoblastoma are leukocoria, orbital cellulitis and strabismus.⁵ Retinoblastoma is a treatable cancer if it is diagnosed on time. In our country, late

presentation of the disease leads to high number of enucleations and deaths of children when children present with metastatic disease in brain and bones. There are many factors attributed to the late presentation of retinoblastoma such as lack of awareness, lack of screening guidelines, lack of routine eye screening of children to detect pediatric eye diseases, inadequate resources, unavailability of tertiary eye care in remote areas and inadequate referral system.

At Al-Shifa Trust Eye Hospital Rawalpindi, we diagnose approximately 40-45 new cases each year. In our experience >75% of the cases fall in the category of late presentation.⁶ Unfortunately, we don't know the exact number of new Retinoblastoma cases diagnosed each year in our country due to unavailability of retinoblastoma registry in Pakistan at a national level. This is our prime responsibility to start working on it at a national level. In western countries where RB cases are very less as compared to Asian countries their number of enucleations and mortality is quite low. Moreover, survivors of retinoblastoma have the privilege of prenatal diagnosis of retinoblastoma when they plan to increase their families.

The management of retinoblastoma requires a tumor board in each hospital for multidisciplinary approach to reduce the morbidity and mortality associated with this lethal disease. The retinoblastoma management team includes ophthalmologist, oncologist, radiation oncologist, radiologist, interventional radiologists, histopathologist, ocularist and a genetic counselor. Treatment of

retinoblastoma requires specialized skills. Treating physician needs to be familiar with diagnostic workup, staging of malignancy to provide appropriate treatment.⁷

Treatment of retinoblastoma has evolved in decades from enucleation and external beam radiation to the latest targeted intra vitreal and intra-arterial chemotherapy. New treatment options offer the possibility of eye salvage.⁸ Depending on the grouping of retinoblastoma at the time of first presentation combination of treatment modalities are used. The treatment options are focal laser and /or cryopexy, systemic intravenous chemotherapy, subtenon chemotherapy, enucleation, exenteration and external beam radiotherapy. Recently, in the west, ophthalmic artery chemosurgery and intravitreal chemotherapy have completely replaced external beam radiotherapy, reduced the use of systemic chemotherapy, and diminished enucleations by 90% without evidence of compromising patient survival.⁹ Intravitreal chemotherapy using Malphalan as a chemo agent was used for retinoblastoma for the first time in Pakistan at Al Shifa Trust eye Hospital Rawalpindi. In my personal experience it works excellently against vitreous seeds and we have managed to save many eyes with retinoblastoma from enucleation. Intra-arterial chemotherapy has also been started in a few centers in Pakistan.

In our country, despite the availability of skills and technology, enucleation remains the commonly used treatment option for advanced intraocular retinoblastoma to save the lives of affected children.^{9,10} This is due the late presentation of our patients with advanced intraocular disease. Surgeons involved in performing enucleation for retinoblastoma emphasize to remove the large stump of optic nerve to prevent the recurrence of the disease. In my practice I intend to remove 17 to 18 mm of optic nerve and prefer to do primary orbital implant. In 1884, implants were introduced

by Mules.¹¹ The implant can be inserted directly after enucleation (primary implant), or at a later stage (secondary implant). One must remember that the treatment does not end after performing enucleation. This is the point where histopathologists play an important role and depending on the histopathology report, metastatic work up and the laterality of the disease, treating ophthalmologist will plan further treatment and/or long-term follow up for the child. Moreover, parental counseling is a major component in the management of retinoblastoma.

Early presentation of the affected child is the need of the hour to save the eyes and vision of our future generation. This is only possible when government and non-government organizations, ophthalmological and oncology societies of Pakistan, philanthropist and media will work together to increase the awareness regarding retinoblastoma, start screening of children for eye diseases, formulate treatment guidelines for retinoblastoma and provide resources to the affected population for referral and treatment of this silent killer.

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Comparison of the Ruit and Modified Blumenthal Techniques of Manual Small Incision Cataract (MSICS) Surgery

Munir Amjad Baig¹, Shakeel Ahmad Faiz¹, Qazi Waheedullah²

ABSTRACT

Background: Modern cataract surgery is aimed to bring early recovery, good visual results, and minimal complications. Manual small incision cataract surgery has a short learning curve, better safety and lower costs.

Objectives: To report the place and relevance of manual small incision cataract surgery (SICS) in our setup.

Study Design: A prospective, non-randomized study of 20 months duration conducted at Federal Government Services Hospital Islamabad.

Subjects and Methods: This was a review of 500 uncomplicated patients waiting for routine cataract extraction after taking their consent and permission from Ethical committee. Patients with previous history of ocular surgery, diseases as glaucoma, corneal or retinal disorders were excluded. Two groups of equal halves were made. Group 1, n=250 undergoing Blumenthal and the other group, n=250, was offered Ruit technique. Postoperative visual acuity, surgically induced astigmatism and intraoperative and postoperative complications were compared. Data was entered SPSS version 17 and analyzed for frequencies and percentages.

Results: Satisfactory results were obtained with Blumenthal (82%) and Ruit (85%) techniques. Surgically induced astigmatism was calculated by simple subtraction. Both groups showed Elschnig pearls 8% and 10%, irregular pupils 7% and 5% respectively. Five percent did not require glasses in Blumenthal group. There were no cases of posterior capsule rupture, dropped nucleus or suprachoroidal hemorrhage in either group.

Conclusion: Both Ruit and the Blumenthal techniques showed good visual results with minimal complications. *Al-Shifa Journal of Ophthalmology* 2018; 14(2): 66-71. © Al-Shifa Trust Eye Hospital, Rawalpindi, Pakistan.

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Introduction:

The word cataract comes from the Greek word *κатарάκτις* (kataráktēs) meaning the fall of water.¹ Among 39 million blind people, 18 million are due to cataract in the world and 82% of all blinds above the age of 50 years live in developing countries.² Worldwide about 15 million cataract operations are performed annually with an increase of 5 million in 5 years.³ About 570000 adults are blind (V<3/60) as a result of cataract in Pakistan.⁴

Developing countries have limited facilities to cope with high demands of cataract surgery.⁵ These countries have long lists of cataract surgeries which include intumescent, mature and hyper-mature

lenses (white cataracts).⁶ MSICS gives better uncorrected visual acuity, is economical and can be performed in all types of cataracts. Another benefit is the shorter duration of time making it ideal for high volume cataract surgery.⁷ The Blumenthal technique (superior sclera tunnel incision) was developed in 1987 and is effective for all types of cataracts.⁸ While RUIT technique (temporal sclera tunnel incision) was developed in 1999 in developing countries.⁹ SICS was developed in the United States and Israel and was popularized in India.¹⁰

In general, patients with senile cataracts have an against-the-rule astigmatism and surgical methods that decrease postoperative against the rule astigmatism have good results. In Pakistan where earnings by patients are low, 70% of population live in rural areas, SICS with IOL is safe procedure in our setup.¹¹ In the current study, efficacy of both these techniques was compared in producing better visual results and reduced complications.

Subjects and methods:

Review of 500 willing cataracts patients (n=500; female 260, male 240, mean age 60.3 years; range 40-78 years) with no co-existing eye disease, booked for routine cataract extraction in Federal Government Services Hospital Islamabad from Jan 2013-Jun 2014 were included. Patients' consent and permission from Ethical committee was taken. Those with history of ocular surgery or diseases affecting visual acuity such as glaucoma, corneal or retinal disorders were excluded from the study. Baseline characters and detailed eye examinations like Snellen visual acuity, pupil and slit-lamp examinations, intraocular pressure checkup and fundus examinations were performed in all scheduled cases. Two groups of equal halves with equal gender distribution were made. A 6.0-mm PMMA intraocular lens (IOL) implanted in all cases through a 6.5

to 7.0 mm unsutured superior (Blumenthal) or temporal (Ruit) scleral tunnel straight incisions 2 mm away from limbus. Patients in both groups took the same postoperative medications. All surgeries were performed by a single surgeon under peribulbar anaesthesia. No patients withdrew from the study.

Uncorrected and corrected visual acuity, surgically induced astigmatism calculated by simple subtraction and intraoperative and postoperative complications were compared. Postoperative data was recorded on the first day, 1 week, 1 month and finally 3 months visit. On each visit, uncorrected visual acuity and pin-hole improvement was recorded along with slit lamp and fundus examination. On the last follow-up best-corrected visual acuity was noted and glasses were prescribed. Visual acuities were analyzed according to the WHO definitions of good (6/18 or better), borderline (less than 6/18-6/60), and poor (less than 6/60) outcomes.

Results:

Both Blumenthal and Ruit methods showed minimum complications with good visual results. Preoperative visual acuity was 6/60 in 11%, counting fingers in 40% and Hand movements in 49%.

In Blumenthal group, post-operative uncorrected visual acuity was 6/18 in 50%, which improved to 6/12 or better with spherical correction while 32% improve to 6/12 by cylindrical correction. Regarding complications, 8% patients developed Elschnig pearls, 7% had irregular pupils and 5% did not require glasses.

In Ruit group, 52% improved to 6/12 with spherical correction and 33% improved to 6/12 by cylindrical correction. Regarding complications, 10% had Elschnig pearls while 5% had irregular pupils. Surgically induced astigmatism calculated by simple subtraction and it was low ranging from +/- 0.75 to +/- 2.75 cylindrical correction.

Various complications of both the techniques are compared in Table 2. All cases exhibit within the range Intra ocular pressure. There was not much difference in

the complications between the two groups. There were no cases of posterior capsule rupture, dropped nucleus or suprachoroidal hemorrhage in either group.

Table:1 Postoperative best corrected visual acuity

Vision	1 week	6week	3months
6/6-6/18	390(78%)	400(80%)	410(82%)
6/18-6/60	70(14%)	70(14%)	55(11%)
< 6/60	40(8%)	30(6%)	35(7%)

Table-2 Complications

COMPLICATIONS	BLUMENTHAL- n-%	RUIT- n-%	TOTAL-%
Hyphaema	7-- 1.4%	5--1.0%	2.4%
Corneal edema	5---1.0%	3--0.6%	1.6%
Iris prolapsed	3---0.6%	3--0.6%	1.2%
Capsulorrhexis	4---0.8%	2--0.4%	1.2%
Striate keratitis	3---0.6%	2--0.4%	1.0%

Discussion:

Pakistan is a developing country. Blindness due to cataract is a major problem. There are long waiting lists for cataract surgeries in public hospitals. The prevalence of bilateral cataract blindness (VA <3/60) among people over 50 years was 4.8% (95% CI: 3.8% to 5.9%), which is highest reported in Pakistan.¹¹

The World Health Organization defines visual impairment as vision worse than 20/60. Both surgical techniques in this study achieved unaided visual acuity of better than or equal to 20/60. Also, in this study both Blumenthal and Ruit techniques achieved >80% visual results according to WHO definitions of good (6/18 or better), borderline (less than 6/18-6/60), and poor

(less than 6/60) outcomes (WHO definition of good vision).

There was no difference in both groups in terms of age, gender, and pre-operative visual acuity. In this study, on first postoperative day more than three quarters of the patients had good visual outcome similar to Zawar et al (2011).¹² Both groups showed no difference in UCVA or BCVA at the 1-week, 1-month and 3 months. Venkatesh et al.¹³ study showed better final uncorrected visual acuity as well as lesser postoperative astigmatism in majority of SICS patients is supported by this study also.

In a 2007 report from the Tilganga Eye Centre Kathmandu Nepal, 85% of patients undergoing MSICS had an uncorrected

visual acuity (UCVA) of 20/60 or better and 98% had BCVA of at least 20/60.¹⁴ Asian studies of cataract extraction have shown that visual acuity following surgery is less than 6/60 in 15–20% of eyes.¹⁵ Many poor outcomes are due to uncorrected refractive error. This study results in 7% poor visual outcomes (<6/60) which is more than the WHO recommendations.

Zawar and Gogate (2011)¹² conducted a study on the safety and efficacy of temporal manual small incision cataract surgery (SICS) in relation to visual outcome, astigmatism and related complications. Intraoperative and postoperative complications were minimal in both groups. There were no cases of posterior capsule rupture, dropped nucleus, or suprachoroidal hemorrhage in both groups.¹⁶ IOP values in the early postoperative period remained on the lower side in this study is similar to findings of Das et al.¹⁷

In contrast to other study conducted by Ruite et al, this study had more hyphaema cases 2.4% in both groups.¹⁸ The appearance of Elschnig pearls in this study is in agreement with other study.¹⁹ Iris prolapse (2.74%) was the most frequent intraoperative complication in Gogate et al,²⁰ This study has same findings where 1.2% cases of Iris prolapse occurred during the removal of the nucleus.

According to Henning et al the most significant postoperative complication was transient corneal edema.²¹ In this study corneal edema located at the wound was short lived occurring in 1.6% of cases. Gogate et al. stated that short-lived corneal edema met in their study cannot be related to endothelial cell loss.²² A 2012 study of 127644 cataract surgeries at Aravind Eye Hospital compared complication rates as 1.11% while the complication rate in this study was 1.4% for both procedures.²³

Thirty-two percent patients in the Blumenthal group and thirty-four patients in the Ruit group had astigmatism up to 0.75D. Postoperatively, the Blumenthal group had slight against-the-rule astigmatism, whereas the Ruit group exhibited slight with-the-rule astigmatism. The manual SICS group with temporal incision had with-the-rule shift in astigmatism.²⁴ The average astigmatism was 0.88 D for SICS in the Nepal study²⁵ and was of 1.5 D in Pune study, though the average was 1.2 D, respectively.⁹

Ruit et al.¹⁸ and Venkatesh et al.¹³ in their studies concluded that SICS gives lesser postoperative astigmatism and better final uncorrected visual acuity in greater number of patients which is supported by our study as well. Gogate et al.¹⁵ in their study stated that the average cost of both the surgeries is almost the same, which is supported by our study.

This study is akin to Singh et al (2009) saying that SICS with implantation of rigid IOL is a suitable surgical technique in developing countries.²⁵ Striate keratitis during nuclear delivery on 1st postoperative day in this study was about 1% in both groups which cleared the very next day. This study also reported that a temporal based scleral tunnel may be appropriate for patients with very deep orbits.¹⁰

Wilson et al mentioned that advances in surgical techniques, intraocular lens material and design have reduced the rates of PCO or, at least, have prolonged its onset.²⁶ similar to this study. In this review patients with soft to medium-hard cataracts (nuclear grading I-III) were good candidates for SICS. The primary outcome measures were postoperative visual acuity and intraoperative and postoperative complications. The secondary outcome measure was astigmatism 3 months after cataract surgery. Until recently, SICS was considered as a low-tech, unproven poor cousin to the gold standard phacoemulsification. Several recent articles

have compared SICS to phacoemulsification and reported almost equal outcomes.²⁷

Conclusion:

SICS with IOL is a safe method in expert hands. It is useful in any type of hard cataract among developing countries where people have limited facilities to deal with high demands of cataract surgery.

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Awareness of Diabetic Retinopathy in Diabetic Patients at Divisional Headquarters Teaching Hospital, Mirpur, AJK

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Abstract

Objective: To determine the awareness of Diabetic Retinopathy in Diabetic Patients at Divisional Headquarters Teaching Hospital, Mirpur, AJK

Study Design: Cross sectional observational study.

Place and Duration of Study: The study was conducted over a period of one year on diabetic patients visiting the outpatient department of Divisional Headquarters Teaching Hospital, Mirpur, AJK.

Subjects and Methods: This study was done using a questionnaire filled by a skilled interviewer who recorded the information after taking consent from the patients. The demographic details were recorded including the education level. Patients' awareness about ocular complications of diabetes was recorded on a 10 points questionnaire before their fundus examination using non-mydratic fundus camera. The proforma was designed to observe the specific knowledge about ocular complications of diabetes, diabetic retinopathy, its treatment, modalities, disease complications and its prevention. The patients were divided into 5 groups according to their educational levels and 3 groups according to the duration of disease.

Results: Among the enrolled 300 patients, 146 (48.7%) were male and 154 (51.3%) patients were female. The mean age of the participants was 49 + SD 10.01 years. According to the data, p-value was significant for level of education versus knowledge about normal range of blood glucose level (p-value 0.000) and effect of Diabetes Mellitus on vision (p-value 0.003). Duration of diabetes Mellitus was significantly associated with increased awareness of knowledge about Ocular complications of Diabetes (p-value 0.001), DR (p-value 0.001), screening (p-value 0.002), and fundus examination (p-value 0.002).

Conclusion: The knowledge about diabetic retinopathy and its treatment was inadequate along with poor compliance with annual fundus examination. This is directly related to the educational level of the patient and the duration of diabetes. *Al-Shifa Journal of Ophthalmology 2018; 14(2): 72-79. © Al-Shifa Trust Eye Hospital, Rawalpindi, Pakistan.*

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Introduction:

Prevalence of diabetes mellitus is rapidly accelerating, and it is becoming a global public health problem. Presently, there are about 280 million diabetic patients across the world and it is estimated to rise twofold by 2025. It is estimated that more than 30% of the diabetic patients in 2025 will be in the Asian Pacific region.¹ Diabetic retinopathy (DR) is the leading cause of visual impairment and blindness amongst diabetic patients worldwide.^{2,3} Previous Research has reported the prevalence of DR as follows: the USA (28.5%),⁴ the UK

(30.3%)⁵ Australia (32.2%),⁶ Japan (39.6%)⁷ and Malaysia (39.3%)⁸. In comparison with other parts of the world the prevalence of diabetes in Pakistan in adult population ranges from 8.6% to 13.9%.⁹ In Pakistan, about 7 million diabetic patients were reported in 2015 and this figure is increasing at an alarming rate. Furthermore, if the rates of diabetes remain uncontrolled, by the year 2030, Pakistan would be at fourth position in world as having the highest number of diabetic patients in a country.¹⁰

Diabetic retinopathy (DR) is a chronic incapacitating complication of diabetes. It can lead to visual impairment and blindness. DR in the working age group is responsible for significant disability and can lead to serious socioeconomic burden on the community. It is an ocular complication in which the human retina is affected due to a high glucose level in blood. Thus, an early screening and diagnosis of DR is a prerequisite to save the vision of diabetic patients.¹¹

Early diagnosis of ocular changes can prevent blindness. The patients should be highly motivated to contact healthcare personnel, in the initial stages of the disease and adhere to the regular monitoring regimens suggested by ophthalmologists. Early screening has a key role in the prevention as well as control of retinopathy.^{12,13} Lack of awareness about blood glucose control as well as ocular complications is associated with suboptimal control of DR. There is substantial area of improvement in DR prevention by regular screening as well as increasing patient education.^{14,15} As the awareness of DR is very less, specific knowledge about DR is so deficient, that many patients have already developed some vision defect by the time, they are screened.¹⁵

Adequate knowledge about the disease can lead to early diagnosis and proper treatment

which will ultimately decrease the burden on eye health care. If DR is detected early during disease, its further progression and blindness can be stopped by appropriate interventions.¹⁶ Disease onset and progression can be halted by increasing knowledge about the risk factors amongst patients. Awareness about diabetic retinopathy, visual deficit and blindness will necessarily lead the diabetics to seek early and in time ocular checks ultimately having early disease detection.¹⁷

A significantly less amount of research has been reported on awareness of eye complications and the diabetic retinopathy among diabetics in Pakistan although there is a high prevalence of diabetic retinopathy in Pakistan.¹⁸ The rationale of this article is to assess the awareness of diabetic retinopathy in this developing country.

Subjects and Methods:

The study is Descriptive cross sectional and consists of diabetic patients both type 1 (including pediatric age group) as well as type 2 Diabetes Mellites attending various OPDs of Divisional HQ, teaching Hospital, Mirpur, Azad Kashmir, Pakistan. The duration of study was 1 year. The ethical consideration was permitted from the Research Ethical committee Divisional HQ, teaching Hospital, Affiliated with Mohtarma Benazir Bhutto Shaheed Medical College, Mirpur Azad Kashmir, Pakistan.

After taking consent and recording demographic details, an interviewer-based questionnaire was used to assess patients' awareness about ocular complications of diabetes on a 10 points questionnaire before their fundus examination using non-mydratic fundus camera in the eye clinic. The questionnaire included demographic details, occupation, level of education and duration of Diabetes Mellitus. The questions were designed to observe the knowledge and awareness about normal blood glucose levels and ophthalmological benefits of good glycemic control. Ocular

complications of diabetes, diabetic retinopathy, the availability of its treatment, treatment modalities, disease consequences and its preventive measures were asked from patients to check their knowledge about DR.

It also included that if any medical personnel have ever recommended ophthalmological screening to them. The patients were divided into 5 groups according to their educational levels (illiterate, Primary Education, middle grade, high school, graduate and above) and 3 groups according to the duration of disease (newly diagnosed, Less than 5 years, more than 5 years).

A total of 300 patients were screened. Sample size was calculated by WHO sample size calculator. All data was entered and analyzed by using SPSS version 16.

Results:

Among the enrolled 300 patients, 146 (48.7%) were male and 154 (51.3%)

patients were female (Table I). The mean age of the participants was $49 \pm SD 10.01$ years. Maximum number was seen in 41-60 years age group i.e. 131 patients (Table II). There were 44(14.7%) patients with newly diagnosed Diabetes, 124(41.3%) patients with less than 5 years diabetes durations and 132(44.00%) patients had diabetes for more than 5 years.

Out of 300, 117 (39.0%) patients were totally illiterate, 183(61.0%) were educated. Out of these 61.0% literate patients, 25(8.30%) were having Primary education, 23(7.70%) had middle grade education, 49(16.31%) were having high school certification while 85(28.30%) were graduates and above.

Duration of diabetes Mellitus was significantly associated with increased awareness of knowledge about Ocular complications of Diabetes (p-value 0.001), DR (p-value 0.001), screening (p-value 0.002), and fundus examination (p-value 0.002) (Table III and IV).

Table 1: Gender Distribution.

Gender	Frequency	Percent
Male	146	48.7
Female	154	51.3
Total	300	100.0

Table II: Age Distribution.

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid <20 years	15	5.0	5.0	5.0
21-40	87	29.0	29.0	34.0
<41-60	131	43.7	43.7	77.7
>60	67	22.3	22.3	100.0
Total	300	100.0	100.0	

Table III: Association between patients' education and knowledge regarding diabetic retinopathy

Question	Response Group A (Illiterate) n= 117	Group B (Educated) n= 183	P value
Do you know about the normal range of blood sugar level? Yes/No	Yes: 82(70.08%) No: 35(29.91%)	170 (92.89%) 13(7.10%)	0.001
Do you have any information about diabetic eye disease?	Yes: 90(76.92%) No: 27(23.08%)	155(84.69%) 28(15.31%)	0.062
Is your vision affected by diabetes?	Yes: 87(74.35%) No: 30(25.65%)	108(59.01%) 74(40.99%)	0.003
Do you know if diabetes can cause Blindness?	Yes: 68(58.11%) No: 49(41.89%)	113(61.74%) 70(38.26%)	0.306
Has any doctor ever recommended you the regular eye examination?	Yes: 28(23.93%) No: 89(76.07%)	63(34.42%) 120(65.58%)	0.035
Do you go for regular fundus examination?	Yes: 13(11.11%) No: 104(88.89%)	37(20.21%) 146(79.79%)	0.027
Have you any information about early cataract development due to diabetes?	Yes: 61(52.13%) No: 56(47.87%)	104(56.83%) 79(43.17%)	0.249
According to you, is diabetic retinopathy is corrected with glasses?	Yes: 25(21.36%) No: 92(78.64%)	65(35.51%) 118(64.49%)	0.006
Do you have any idea about the laser and injection treatment of Diabetic retinopathy?	Yes: 18(15.38%) No: 99(84.62%)	39(21.31%) 144(78.69%)	0.130
Do you think that only good control of diabetes is sufficient for control of blindness with diabetic retinopathy?	Yes: 97(82.90%) No: 20(17.10%)	162(88.52%) 21(11.48%)	0.114

Table IV: Association between Duration of Diabetes and knowledge regarding diabetic retinopathy

Question	Response Group A Newly Diagnosed n= 44	Group B < 5 years n= 124	Group C > 5 years N= 132	P value
Do you know about the normal range of blood sugar level? Yes/No	37(84.09%) 07	106 18	109 23	0.670
Do you have any information about diabetic eye disease?	25 19	102 22	118 14	0.001
Is your vision affected by diabetes?	13 31	72 52	110 21	0.002
Do you know if diabetes can cause Blindness?	13 31	61 63	107 25	0.001
Has any doctor ever recommended you the regular eye examination?	03 41	25 99	63 69	0.001
Do you go for regular fundus examination?	05 39	11 113	34 98	0.002
Have you any information about early cataract development due to diabetes?	13 31	58 66	94 38	0.020
According to you, is diabetic retinopathy is corrected with glasses?	04 40	29 95	57 75	0.010
Do you have any idea about the laser and injection treatment of Diabetic retinopathy?	05 39	11 113	41 91	0.005
Do you think that only good control of diabetes is sufficient for control of blindness with diabetic retinopathy?	39 09	109 15	115 17	0.340

Discussion:

Diabetic retinopathy is a common cause of blindness and most of the patients are

unaware of the risk factors and complications of DR. Lack of knowledge lead to misconception that DR will cause

symptoms and after that they will seek ophthalmological advice and treatment.¹⁹ Among the enrolled 300 patients, 146 (48.7%) were male and 154 (51.3%) patients were female. Hakeem R et al. conducted a similar study in Karachi, Pakistan in which the sample consisted of 59 (31.6%) males and 128 (68.4%) females.¹¹

As far as the age of the patients was concerned, 5% were from less than 20 years including both Type 1 Insulin dependent DM as well as type 2 DM, 29% from 21-40 years, 43% from 41-60 years and 22.3% were more than 60 years. Type 1 diabetic patient's data was obtained from Pediatric OPDs. Hakeem R et al also demonstrated that Out of 180 patients 18 (10.00 %) were having Insulin Dependent Diabetes Mellitus (IDDM) and 162 (90 %) were having Non-Insulin Dependent Diabetes Mellitus (NIDDM).¹¹ The mean age of the participants was 49 + SD 10.01 years. This contrasts with a study done in Jordan where Bakkar MM et al had a mean age of 54.51±10.28 years.²⁰ Maximum numbers was seen in 41-60 years age group i-e 131 patients.

There were 44(14.7%) patients with newly diagnosed Diabetes, 124(41.3%) patients with less than 5 years diabetes durations and 132(44.00%) patients had diabetes for more than 5 years. Mian et al showed similar study with 60% patients had diagnosed diabetes mellitus for more than 5 years, 27% patients had diagnosed diabetes mellitus for duration of less than 5 years and 13% patients were freshly diagnosed to have the disease.¹

Out of 300, 117 (39.0%) patients were totally illiterate, 183(61.0%) were educated. Out of these 61.0% literate patients, 25(8.30%) were having Primary education, 23(7.70%) had middle grade education, 49(16.31%) were having high school certification while 85(28.30%) were graduates and above. According to the data, P value was significant for level of education versus knowledge about normal

range of blood glucose level (p- value 0.000) and effect of Diabetes Mellitus on vision (p-value 0.003).

Duration of diabetes Mellitus was significantly associated with increased awareness of knowledge about Ocular complications of Diabetes (p-value 0.001), DR (p-value 0.001), screening (p-value 0.002), and fundus examination (p-value 0.002). Hakeem et al also had a strong association between good awareness with duration of Diabetes (42%, $P < 0.026$).¹¹

In this study, most of the patients were knowing the normal range of blood glucose level although they were illiterate (70.08%) or literate (92.89%). This contrasts with a study done in India where (49.9%) had knowledge of DM.²¹

Most of the patients were aware about diabetic eye disease (84.69%) as well as effect of diabetes on vision (p-value 0.03). this is in comparison with a study done in Nigeria where 84.3% patients were aware of diabetic retinopathy and 80.5% knew it could lead to blindness.²²

Awareness of patients regarding regular fundus examination (11-20%) as well as treatment of DR (15-21%) was significantly lacking. This is comparable with another study done at Hayatabad Medical Complex Peshawar in which 53% of known diabetic patients had never had their eyes examined.²³ Screening was not recommended by physicians to most of the patients (65-76%), This is comparable with a study done in Saudi Arabia where only 24% of physicians correctly referred patients with type 1 diabetes to an ophthalmologist.²⁴ however majority of the patients knew that uncontrolled diabetes will lead to cataract formation (52-56%).

In this study, there was a significant association between duration of disease and awareness of DR, its complications (p-value<0.05). Addoor et al. demonstrated that awareness was significantly associated

with duration of diabetes, educational status and age of the patient.²⁵

Conclusion:

There is a need for awareness of DR among Diabetic patients to minimize ocular complications. The diabetic patients in Pakistan, although aware of the fact that diabetes affects the eye, have poor knowledge about diabetic retinopathy. The diabetic patients in Pakistan need more counseling regarding Diabetes as well as diabetic retinopathy

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Papilledema in Meningitis in Paediatric Patients Admitted at a Tertiary Care Hospital, Peshawar.

Ashfaq ur Rehman¹, Usman Attique¹, Afzal Qadir¹, Abdul Aziz¹, Mohammad Israr¹, Amir Shehzad¹

ABSTRACT

Purpose:

To determine the frequency of papilledema in meningitis in child age group admitted in paediatric unit, Tertiary Care Hospital, Peshawar.

Subjects and Methods: A prospective descriptive study was conducted in Hayatabad Medical Complex, Peshawar for a period of 9 months from January 2017 to September 2017. Fundi of 178 patients admitted in paediatric units and clinically diagnosed as having meningitis were thoroughly examined either with the help of direct ophthalmoscope or slit-lamp. The details of patients including age, gender, causes and types of infection, grades of papilledema were evaluated.

Results: A total of 178 patients with meningitis had different aetiologies based on lumbar puncture including; 43 % patients having bacterial meningitis, 33% TB meningitis and 15 % having viral meningitis. Papilledema was observed in 5.61 % of patients. Early grade papilledema was observed the most common (6 cases) of 10 observed cases.

Conclusion: An accurate clinical appreciation of papilledema is very important both on part of ophthalmologists and paediatricians to avoid expensive, anxiety-provoking additional testing and to reduce the risk of systemic and visual sequelae. *Al-Shifa Journal of Ophthalmology 2018; 14(2): 80-85. © Al-Shifa Trust Eye Hospital, Rawalpindi, Pakistan.*

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Introduction:

Meningitis is a severe acute infection of meninges caused by several microorganisms, including bacteria, viruses, parasites and fungi affecting any age group. Paediatric bacterial meningitis is a neurological emergency which still has a significant morbidity and mortality, despite advances in medical management. Untreated, its mortality approaches 100%, and even with current antibiotics and advanced paediatric intensive care, the mortality rate of the disease is approximately 5–10%.¹ Worldwide, the risk of neurological sequelae in survivors following hospital discharge approaches 20%.² Early diagnosis and appropriate management of the child with meningitis is therefore critical.

The presentation of meningitis in children depends on the age of child and duration of

disease. The clinical features vary from nonspecific signs of tachycardia and fever, poor feeding, vomiting, irritability and lethargy to classical signs of nuchal rigidity, bulging fontanelle, photophobia, and a positive Kerning's or Brudzinski's sign (more common in children older than 12 to 18 months).^{3,4} Ocular features include loss of vision, strabismus, nystagmus and papilledema. Early visual acuity loss may occur due to papilledema-related macular oedema, retinal pigment epithelium changes, choroidal neovascularization, or choroidal folds; however, colour vision is typically spared.⁵

The diagnosis and cause of meningitis is made based on a combination of clinical and CSF findings (CSF protein and glucose levels, cell count and differential, microscopy, and culture). Bacterial meningitis must be differentiated from viral meningitis and encephalitis, tuberculous and fungal meningitis. Although, clinically present with similar symptoms, they can be differentiated with lumbar puncture (LP) which is a valuable method of differentiating empirically between common bacterial and other causes of meningitis and encephalitis.

Papilledema is swelling of the optic nerve head secondary to raised intracranial pressure. It is nearly always bilateral, although it may be asymmetrical.⁶ Ophthalmologists are commonly requested by paediatricians for funduscopy to rule out papilledema, an important clinical sign, caused by high intracranial pressure secondary to severe cerebral oedema, obstructive hydrocephalus, or impaired CSF absorption by inflammation at the level of the arachnoid granulations. Papilledema represents a harbinger of life-threatening meningitis and preclude lumbar puncture (LP) which is performed for the definitive diagnosis of clinical suspicious meningitis which also helps to distinguish the infectious and non-infectious aetiology of meningitis and encephalitis.

The aim of this study was to determine the frequency of papilledema in meningitis in paediatric age group to highlight importance of funduscopy for establishing an organized diagnostic approach of lumbar puncture to confirm aetiology of disease.

Materials and Methods:

A prospective descriptive study was conducted in Hayatabad Medical Complex, Peshawar for a period of 9 months from January 2017 to September 2017. All the patients admitted to paediatric and clinically diagnosed as having meningitis were included in this study. Patient's age, gender, clinical features and all relevant investigations apart from CSF analysis (taken through lumbar puncture procedure) documented in treatment charts were recorded in a designed proformas. Fundi of all the patients admitted in paediatric units were thoroughly examined after the pupillary dilatation with topical Tropicamide (Mydracil 1 % eye drops) either with the help of direct ophthalmoscope or slit-lamp biomicroscopy. Patients that were not easily examined with ophthalmoscope were examined on slit-lamp in Eye unit. The fundi of the patients were examined for the presence of papilledema and its grades. Data on lumbar punctures results were obtained later for aetiological causes once lumbar punctures were performed by paediatricians. The age groups, gender distribution, grades of papilledema and aetiological causes were evaluated from data. All the patients received their treatments in paediatric units as needed according to the type and causes of infection.

Data analysis was done using SPSS version 20.0. Mean \pm Standard deviation was calculated for numerical variables like age. Frequencies and percentages were calculated for categorical variables like gender, papilledema, grade of papilledema and etiological agents.

Results:

A total of 178 patients diagnosed with meningitis were examined thoroughly for disc swelling. Mean age of the patients was 5.21 ±3.15 years with age ranging from 1 month -16 years. Male gender with age group below 5 years was the most common affected patients. (Table 1)

Papilledema with various grading was observed in 5.61 % of patients (Figure:1).

Patients with papilledema were also labelled with regards to their grade of Papilledema on ophthalmic funduscopy examination (Table 2).

Meningitis with different aetiologies based on lumbar puncture included; 43 % patients having bacterial meningitis, 33% TB meningitis and 15 % having viral meningitis (Figure:2)

Table 1: Age Groups with gender distribution of the patients

Age Groups	Male	Female
0-5 years	4	2
6-10 years	2	1
11-16 years	0	1

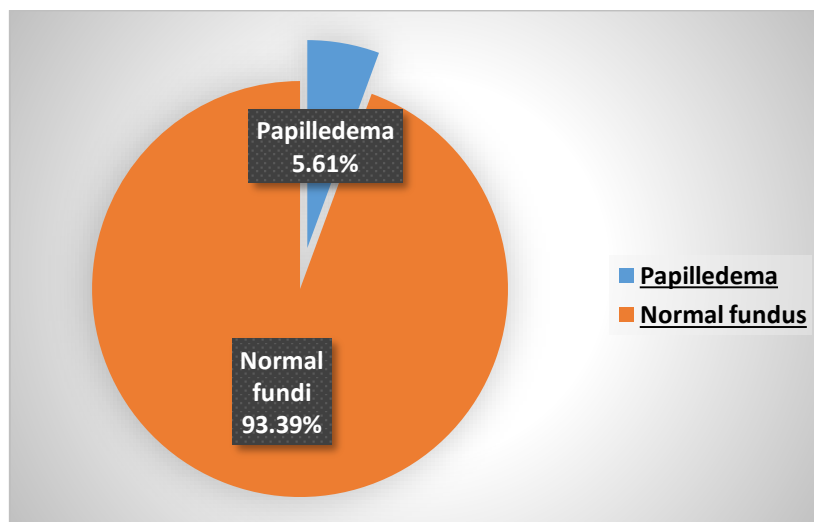


Figure 1: Frequency (percentage) of Papilledema on funduscopy

Table 2: Grades of Papilledema in Meningitis

Grades	Frequency
Grade 1: Early	6
Grade 2: Established	3
Grade 3: Chronic	1
Grade 4: Atrophic	0

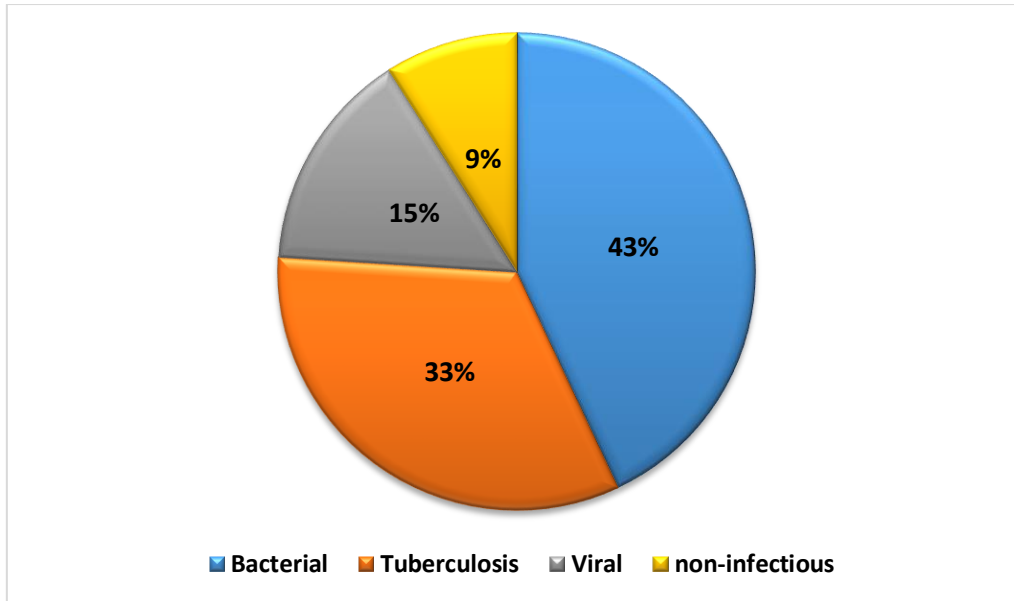


Figure 2: Etiological Causes of Meningitis in Children

Discussion:

Papilledema is optic disc swelling caused by an increased intracranial pressure. Patients usually present with headache, blurred vision, or diplopia (from a non-localizing sixth nerve palsy) or may even be asymptomatic. Papilledema ranges in its manifestations from slight to severe. A four-tier grading scheme ranging from slight to moderate to severe and atrophic papilledema has been used. Clinically detectable papilledema develops over a period of week of increased ICP. The swelling of the disc first begins at the lower pole and progresses over the upper pole to the nasal pole. Temporal disc elevation is a later sign and blurring of the disc margin occurs after significant disc oedema.

The reported frequency of papilledema with meningitis is small, and the papilledema in these cases tends to be mild and transient but is highly variable. In one study of 2,178 cases of meningitis, only 2.5% of patients had papilledema.⁷ The evaluation of papilledema in a child is a common, but often stressful endeavour for the patient, parents, and ophthalmologist alike, despite the rarity of papilledema in the paediatric population.⁸ In our study, 10

patients (5.61 %) with meningitis had papilledema. Of which 6 patients had early grade papilledema, 3 had advanced, while one had chronic grade papilledema.

To distinguish between papilledema and pseudo-papilledema is an important skill for ophthalmologists to avoid anxiety-provoking and expensive testing. In true papilledema, fundus examination characteristically shows variable findings, including elevation of the optic disc, blurring of the disc margin, telangiectasia and obscuration of small vessels at the disc margin, thickening and opacification of the RNFL, blurring of the retinal vessels. Conversely, the presence of spontaneous venous pulsations and the absence of hyperemia suggest the absence of papilledema. The presence of a physiologic cup and retinal or choroidal folds strongly support the diagnosis of true papilledema versus pseudopapilledema.⁹

Sometimes it is very challenging for ophthalmologists to clinically differentiate between true and pseudo-papilledema. Several imaging modalities such as optical coherence tomography (OCT), Orbital computed tomography (CT) and B-scan

ultrasonography can facilitate the diagnosis of pseudo-papilledema. Orbital computed tomography (CT) and B-scan ultrasonography both may demonstrate calcification within the optic disc though ultrasound is much more sensitive and reliable than CT imaging at detecting ODD and avoids radiation exposure.¹⁰ Acoustic shadowing at the junction of the retina and the optic nerve is a telltale sign of ODD on ultrasound. Another distinguishing sign includes the “30° test” during the B-scan, in which the patient is directed to look 30° laterally. In cases of true Papilledema, the intraorbital segment of the optic nerve is enlarged and the fluid will compress with eccentric gaze and the nerve diameter will become smaller.¹¹ However, the 30° test often requires an experienced echo grapher to perform.

Optical coherence tomography allows excellent imaging of peripapillary and sub macular fluid in patients with papilledema. It shows increased RNFL thickness, total retinal thickness, and optic nerve head volume. However, a follow-up scan week to months later are required that may show increase in these parameters in true papilledema and stable measurements in pseudo-papilledema. Any variety of field defects can occur, with concentric enlargement of the blind spot being the most common and earliest defect, thought to be attributable to a papilledema related anterior shift of the peripapillary retina.

In our study, 43 % patients had bacterial meningitis, 33% had TB meningitis, 15 % had viral meningitis while remaining cases were due to other miscellaneous causes. These findings were near to results of another study, where TB meningitis was the most common cause of meningitis (39%) followed by bacterial meningitis (27%), viral meningitis (18%), and cryptococcal meningitis (16%).¹²

Conclusion:

In meningitis, papilledema is an important sign of raised intracranial pressure. Its

clinical appreciation is therefore very important both for paediatricians and ophthalmologists to avoid the systemic and visual sequelae of this fatal entity of meningitis.

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Prevalence of Astigmatism in School Going Children in Azad Jammu and Kashmir

Muhammad Irfan Sadiq¹, Waseem Ahmed Khan¹, Saba Haider Tarar¹, Kanwal Abbasi¹, Muhammad Usman Sadiq², Sara Najeeb²

Abstract

Objective: To assess the prevalence of astigmatism, and most common type of astigmatism among school going children in AJK.

Study Design: Cross sectional observational study.

Place and Duration of Study: The study was conducted in school going children in District Mirpur and District Bhimber AJK, Pakistan over a period of 6 months.

Materials and Methods: An informed written consent was taken before the study. After that data was recorded at a self-designed proforma from both public sector as well as private schools of District Mirpur and Bhimber from 500 students. Each eye was considered as a separate individual data. Total 1000 eyes were taken for the study with the age ranging from 5 – 16 years. First visual acuity was measured monocularly by using Snellen's visual acuity chart. In case of substandard vision, pinhole test was done to assess the maximum improvement after correction. The type and amount of astigmatism was calculated by using cycloplegic refraction.

Results: We examined 1000 eyes of the 500 students of 5-16 years of age, with mean age of 10.12 ± 3.116 years including 328 (32.8%) male students and 672 (67.2%) female students. Astigmatism was seen maximum in 9-12 years age group. Astigmatism was seen in 308 eyes (30.8%), 212(68.83%) were females and 96(31.16%) were male. Out of which 162 (52.59%) had myopic astigmatism. 0.5 – 1.00 diopter cylinder (DC) was the most common amount and was present in 236 eyes (23.6%). Predominantly, With the rule myopic astigmatism was seen in 135eyes (43.83%).

Conclusion: Myopic astigmatism and compound myopic astigmatism were more common among males and females and maximum in the age group of 09-12 years of age. With the rule (WTR) astigmatism was more prevalent. *Al-Shifa Journal of Ophthalmology 2018; 14(2): 86-91.* © Al-Shifa Trust Eye Hospital, Rawalpindi, Pakistan.

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Introduction:

In school going children, visual impairment due to uncorrected refractive errors, is one of the most commonly encountered problems and has become the second major reason of treatable blindness.¹

Vision 2020, The Right to Sight, a global initiative launched by a coalition of non-government organizations and the World Health Organization (WHO), aims at eliminating treatable visual impairment and blindness on a global level.² At present, 12.8 million children in the age group of 5 -15yrs are visually handicapped from uncorrected or inadequately corrected

errors, depicting a global prevalence of 0.96%.³ Astigmatism is a very significant ocular problem and is responsible for about 13% of the total refractive .⁴

Astigmatism is defined as a condition in which the parallel rays of light coming from 6 meters distance entering the eye through the refractive medium do not focus on a single sharp point on the retina.⁵ In astigmatism, light rays do not refract equally in all meridians and do not focus equally in all meridians. Due to unequal focusing, light comes to focus along a line instead of focusing at a point (astigma meaning no Point).⁶ Based on the focal point with reference to the retina, astigmatism is further subdivided into simple astigmatism (simple myopic or simple hypermetropic), compound astigmatism (compound myopic or compound hypermetropic) and mixed astigmatism. There is another classification based on the relationship between the two principal meridians as regular (when two principal meridians are perpendicular to each other) and irregular (when the two principal meridians are not perpendicular to each other). Regular astigmatism can be with-the-rule (WTR) (>0 to <30 axis or >150 - <180 axis), against-the-rule (ATR) (>60 to <120 axis) or oblique (>30 - 60 axis or >120 to <150 axis) astigmatism.⁷

Astigmatism is due to multifactorial etiological factors. Past research has demonstrated that it is inherited as an autosomal dominant manner having high concordance among the twins and it has a high risk of recurrence in children having parents with astigmatism.⁸ Furthermore, the role of environmental factors is also well known.⁹ Astigmatism also varies with age of the patient, gender and ethnical origin leading to abnormal retinal electrophysiology, asthenopia, meridional amblyopia, migraine, myopia, eye-strain and blindness.¹⁰

Subjects and Methods:

The study is Descriptive cross sectional and consists of all school going children in age group 5-16 years at district Mirpur and district Bhimber including both public and private sector schools. The study duration was six months. The ethical consideration was permitted from the Research Ethical committee Divisional HQ, teaching Hospital, Affiliated with Mohtarma Benazir Bhutto Shaheed Medical College, Mirpur. A written permission was taken from the Education department as well.

A team consisting of two ophthalmologists and three qualified optometrists was involved in the ocular examination and refraction of students. After taking consent, data was collected through a Pre-designed proforma from 500 students. Sample size was calculated by using WHO sample size calculator.

First visual acuity was assessed by using Snellen's visual acuity chart with patient seated at distance of 6 meters. If visual acuity was less than 6/6, then pinhole test was done. If vision improved to 6/6 in this test, then the patients were considered to be having refractive error. Total refractive error was calculated using a retinoscope. For retinoscopy, patient's pupil was dilated with cycloplegic drug i.e. 1% cycloplegic three times with the interval of 10 minutes and retinoscopic reflex was noted after 90 minutes of instillation of first drop. By this method, type and amount of refractive error was calculated. Patients whose eyes had amblyopia, strabismus or other ocular pathologies were excluded from this study. Statistical analysis was done on using SPSS 18 software.

Results:

We examined 1000 eyes of the 500 students, with mean age of 10.12 ± 3.116 years including 328 (32.8%) male students and 672 (67.2%) female students. Astigmatism was seen in 308 eyes (30.8%), out of which 212 were females while 96

were male. Two hundred and twelve females represent 68.83% of total Astigmatism while 31.54% of the female population screened. Similarly, 96 male children represent 31.16% of total Astigmatism while 29.26% of the male population screened.

Age wise distribution of Refractive errors revealed 9-12 years aged children to be affected in maximum number i-e 412 (41.2%), children followed by 13-16 years i-e 310 (31.00%) children (Table I).

Myopic Astigmatism was seen in Maximum children in 162 children (52.59%) followed by compound Myopic Astigmatism 112 (36.36%). Myopic Astigmatism was most prevalent in 76

children of 9-12 years comprising 46.91% of total defect (p-value 0.003) using the chi square test. However compound Myopic Astigmatism was most prevalent in 5-8 years old children comprising of 38.39% of total defect.

With the rule Astigmatism is found in 135 eyes which is 48.83% followed by against the rule Astigmatism 29.54% followed by oblique Astigmatism 26.62% (Table II).

As far as the amount of astigmatism is concerned, 692 eyes (69.20%) eyes had no Astigmatism. 0.5 – 1.00 diopter cylinder (DC) was the most common defect and was present in 236 eyes (23.6%) followed by 1.25-2.00 DC found in 54 (5.49%) eyes (Table III).

Table 1: Age of Patient Vs Type of Astigmatism

		Age of Patient				
Type of Astigmatism according to power Meridian (p-value 0.003)		5-8 Years	9-12 Years	13-16 Years	Total	P-Value
	No Astigmatism	192	280	220	692	0.031
	Myopic Astigmatism	36	76	50	162	0.003
	Hypermetropic Astigmatism	1	9	4	14	0.025
	Mixed Astigmatism	4	8	2	14	0.023
	Compound Myopic Astigmatism	43	39	30	112	0.019
	Compound Hypermetropic Astigmatism	2	-	4	06	0.013
	Total	278	412	310	1,000	0.024

Table II: Type of Astigmatism according to Axis Meridian

TYPE OF ASTIGMATISM ACCORDING TO AXIS MERIDIAN				
Age of patient	5-8 YEARS	9-12YEARS	13-16YEARS	TOTAL
No Astigmatism	192	280	220	692
With the rule astigmatism	43	58	34	135
Against the rule astigmatism	15	49	27	91
Oblique astigmatism	25	30	27	82
Total	275	417	308	1,000

Table III: Amount of Astigmatism.

Amount of Astigmatism	0.0	0.50-1.00DC	1.25-2.00DC	2.25-3.00DC	3.25-4.00DC	>4.00DC
No of eyes	692 eyes 69.2%	236 eyes 23.6%	54 eyes 5.4%	8 eyes 0.8%	6 eyes 0.6%	4 eyes 0.4%

Discussion

Astigmatism can occur in any age group, children and adults. Studies have suggested that uncorrected astigmatism is associated with increased risk of myopia or amblyopia. Early detection of astigmatism in pediatric populations is particularly important because of its potential influence on restoration of normal visual development.^{11,12}

We examined 1000 eyes of the 500 students, with mean age of 10.12 ± 3.116 years including 328 (32.8%) male students and 672 (67.2%) female students. Astigmatism was seen in 308 eyes (30.8%). This result is comparable with a study done in Lahore where Latif et al¹³ and Ali et al¹⁴ demonstrated 20.07% and 19.8% refractive error in school going children. However, this contrasts with another study done in Rawalpindi which had a very high refractive error of 74.5%.⁵

Among the children having refractive errors, 212 were females while 96 were male. 212 females represent 68.83% of total Astigmatism while 31.54% of the female population screened. Similarly, 96 male

children represent 31.16% of total Astigmatism while 29.26% of the male population screened. So, there is a slight predominance (1.90%) in female children. These results are comparable with a study done in Saudi Arabia where Al wadaani et al showed females having more refractive errors than males.¹⁵

Age wise distribution of Refractive errors revealed 9-12 years aged children to be affected in maximum number i.e 412 (41.2%) children followed by 13-16 years i.e 310 (31.00%) children (p-value 0.003). This result is comparable with another study done in India in which 11-13 years age group was severely affected followed by 8-10 years.¹⁶

Myopic Astigmatism was seen in Maximum children in 162 children (52.59%) followed by compound Myopic Astigmatism 112 (36.36%). Myopic Astigmatism was most prevalent in 76 children of 9-12 years comprising 46.91% of total defect (p-value 0.002). However, Ijaz R et al showed Compound myopic astigmatism 355 (32.3%) was more commonly present in students in both male and female eyes⁵. Similarly compound

Myopic Astigmatism was most prevalent in 5-8 years old children comprising of 38.39% of total defect. These results are comparable with other studies done by Ali et al.¹⁴

As far as the amount of astigmatism is concerned, 692 eyes (69.20%) eyes had no Astigmatism. 0.5 – 1.00 diopter cylinder was the most common defect and was present in 236 eyes (23.6%) followed by 1.25-2.00 DC found in 54 (5.49%) eyes. these results are comparable with Ijaz R et al who showed 0.5 – 1.00 diopter cylinder was the most common defect and was present in 454 eyes (41.3%)⁵. While in a study conducted in Taiwan, 42.5% of school children had astigmatism. Most of them (80%) had -1.0 D while 60% of them had myopic astigmatism.¹⁶

With the rule Astigmatism is found in 135 eyes which is 48.83% followed by against the rule Astigmatism 29.54% followed by oblique Astigmatism 26.62%. Gupta M et al also demonstrated that the WTR astigmatism is more than the ATR astigmatism. In that study, With the Rule astigmatism was present in 188 (84.69%), Against the Rule astigmatism was present in 34 (15.32%) of cases.¹ There are studies in which prevalence of ATR astigmatism was high as compared to WTR Astigmatism.¹⁷ Astigmatism can be treated by anyone of the following options; eye glasses, contact lenses and refractive surgery.¹⁸ In refractive surgery corneal curvature is altered to change the focusing of the light rays on retina. Radial keratotomy and photorefractive surgery are examples of refractive surgeries.¹⁹

Conclusion:

Refractive errors are the major cause of visual impairment worldwide and have immediate and long-term consequences. The result of this study shows a significantly high prevalence of refractive errors among the school going children of

District Mirpur and Bhimber, AJK, Pakistan.

This study was done to generate local statistics which were lacking in this part of the country to demonstrate the magnitude of Astigmatism in this area. Further research and regular screening of school children for refractive errors is required on mass level.

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Strabismus in Patients with Low Vision Visiting a Tertiary Eye Care Setting in Rawalpindi

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ABSTRACT

Objectives: To estimate the frequency of strabismus in patients with low vision in a tertiary eye care setting

Study Design: It was a descriptive cross-sectional study.

Subjects and Methods: One hundred and seventy patients with decreased vision from the Low vision department from June 2016 to December 2016 were included through convenient sampling who fit the inclusion criteria. Patients were referred to low vision department by ophthalmologists. They were checked for their visual acuity at 4 meters using Early Treatment Diabetic Retinopathy Study (ETDRS) chart. Then cover test was performed at both short and long distance to assess strabismus. At long distance, fixation target was Snellen chart at 6 meters and fixation target was set at 33cm for the short distance.

Results: Out of 170 patients, strabismus was found to be in 114 patients (67%), Out of 114, 64 patients (56%) diagnosed with acquired strabismus while 50 patients (44%) had congenital strabismus. Retinitis pigmentosa was found in 34% of the patients while 12% had myopic degeneration.

Conclusion: This study found 67% strabismus in patients presenting in low vision department. Out of patients with strabismus, 56% had acquired deviations and 44 % had congenital strabismus. *Al-Shifa Journal of Ophthalmology 2018; 14(2): 92-98. © Al-Shifa Trust Eye Hospital, Rawalpindi, Pakistan.*

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Introduction:

Strabismus is a condition with misalignment of eyes and having one eye either constantly or intermittently turned inward (Esotropia) or outward (Exotropia). This ocular misalignment may cause double vision, decreased vision, ocular discomfort, headaches, or abnormal head posture. Strabismus is usually attributable to refractive, sensory or organic, anatomic or motor, or interventional causes. Strabismus can result in permanent vision loss in some conditions.¹

Low vision is defined by WHO as visual acuity of less than 6/18 to no perception of light. It is also defined as a visual field of 10 degrees from center of fixation or 20 degrees in largest diameter in better eye even after best available medical, surgical

and optical treatment with the potential to do activities of daily life.²

In 2010, globally the estimated number of people visually impaired in the world was 285 million, 39 million blind and 246 million had low vision; 65 % of people visually impaired and 82% of all blind were 50 years and older.³

In Pakistan total blindness was estimated as 2.7% (95% CI, 2.4%-2.9%) among adults age 30 years or above and 0.9% (95% CI, 0.8%–1.0%) among individuals of all age groups. Punjab had estimated high prevalence of blindness and visual impairment. Rural areas had a higher prevalence of blindness than did urban areas (3.8% vs. 2.5%, $P < 0.001$).⁴

Globally the major causes of visual impairments are uncorrected refractive errors (43%) and cataracts (33%) followed by glaucoma, age related macular degeneration (AMD), diabetic retinopathy (DR), trachoma and corneal opacities. These diseases cause functional problems of eye position with pathological complications, such as retinal detachment, macular degeneration and optic disc abnormalities.⁵

High prevalence of horizontal and vertical strabismus with pathological myopia was confirmed by the study conducted in Japan.⁶ The risk of strabismus is high in patients having congenital nystagmus and can be predicted from the nature of underlying visual disorder.⁷ Cycloexotropia is an unusual association with retinitis pigmentosa.⁸

Normal binocular vision is mandatory for many vocational and occupational tasks and for many daily life activities. Hence, early diagnosis and prompt management of strabismus are important. Comparison between binocular with monocular performance on a variety of tasks for a group of normal individuals in various studies indicate that strabismus frequently

leads to incompetent performance on various, occupational, educational and vocational tasks. Individuals with unilateral constant strabismus experience suppression, fatigue when reading and unstable vision with loss of depth perception that creates difficulty in orientation and mobility for them.⁹ In this study, the presence of strabismus is determined among individuals with different diseases presenting in low vision department.

Subjects and Methods:

It was a descriptive cross-sectional study carried out from June 2016 to December 2016 in Low vision department of a tertiary eye care setting in Rawalpindi. There are three types of outpatient departments (OPD) in the setting, zakat, general and private. The patients from these OPD, s who have low vision or functional disability due to their decreased vision referred to Low vision department. Sample size was calculated by open epi that became 170. Non-probability convenient sampling technique was used. Both genders of ages 5 to 55 years with low vision disease presented in Low vision department having visual acuity 6/18 (0.47 Log MAR) to 6/60(1.0 Log MAR) were included. Mentally retarded and nonresponsive patients were excluded. Data was collected using pretested structured proforma including history and clinical findings after seeking written consent. Proformas were typed in English. All data was recorded by principal author. Proformas were validated for content and face validity by circulating them to subject expert. Patients were evaluated under the supervision of senior optometrist. Tools used for examination were ETDRS, chart to access visual acuity, occluder and Snellen chart for distance target and light for near target to perform cover test. Snellen equivalent visual acuity was incorporated. Clinical findings and history were recorded on structured Proforma. Data was coded and entered SPSS version 17. Data analysis was done

by using SPSS. Descriptive analysis is done, and frequencies and percentages are shown in tables.

Results:

Out of total 170 patients, 102 were males (60%) and remaining 68 (40%) were females and most of the participants belonged to the age group of 5-25 years (105, 68%).

Majority of the patients presented with history of decreased vision since birth (71.2%). The patients who visited low vision department were mostly having retinal diseases. The most common disease seen was Retinitis Pigmentosa (34%) followed by myopic degenerations (12%) [Table: I].

Of the total, 43.5% of the patients had a visual acuity 6/18-6/24 in their right eye

and 37.6% patients had same visual acuity in their left eye [Table II].

Total percentage of presence of strabismus in patients visiting the low vision department of tertiary eye care setting was very high, that was 67% [Table III]

On cover test with best corrected vision most of the patients were found to be phoric in distance for horizontal deviation and 59 patients with vertical deviation was found to be the same for distance and near [Table IV]. On cover test with uncorrected vision most of the patients were found to be phoric in distance for horizontal deviation and 59 patients with heterotropia showed the same for distance and near cover test. Ocular misalignment exotropia was mostly present in retinitis pigmentosa followed by Stargardt disease and esotropia was found to be most prevalent in myopic degeneration and congenital cataract patients [Table V].

Table:1 Ocular History of Patients (N=170)

Onset of decrease in vision	N=170	100%
Nil	1	0.60
Since Birth	121	71.20
Acquired	48	28.20
Diagnosis of Patients	N=170	100%
Retinitis pigmentosa	57	34
Cone rod dystrophy	9	5
Myopic degeneration	20	12
AMD	7	4
Macular dystrophy	12	8
Stargardt disease	12	8
Albinism	12	7
Congenital cataract	16	10
Diabetic retinopathy	3	2
Retinal detachment	5	3
Trauma	5	3
Retinal dystrophy	2	1
Glaucoma	10	6

Table: II Best Corrected Visual Profile of Patients (N=170)

Visual Acuity	Right Eye		Left Eye	
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
6/18-6/24	74	43.5	64	37.6
<6/24-6/30	10	5.9	12	7.1
<6/30-6/38	16	9.4	22	12.9
<6/38-6/48	13	7.6	12	7.1
<6/48-6/60	10	5.9	6	3.5
<6/60	47	27.6	54	31.8
Total	170	100	170	100

Table: III Frequency of strabismus among study participants (N=170)

Strabismus	N=170	100%
Yes	114	67
No	56	33
Onset of Strabismus	N=114	100%
Congenital	50	44
Acquired	64	56

Table: IV Cover test with Glasses in Distance and Near for Horizontal and Vertical Deviation (N=170)

Diagnosis	Horizontal Deviation			Vertical Deviation	
	Phoria	Exotropia	Esotropia	Distance	Near
				Heterotropia	Heterotropia
Retinitis pigmentosa	18	31	5	20	20
Cone rod dystrophy	7	1	1	0	0
Myopic degeneration	2	1	17	13	13
AMD	4	0	0	0	0
Macular dystrophy	8	3	1	0	0
Stargardt disease	3	4	4	3	3
Albinism	2	2	7	5	5
Congenital cataract	2	1	14	12	12
Diabetic retinopathy	3	0	0	0	0
Retinal detachment	4	0	1	2	2
Trauma	4	1	0	3	3
Retinal dystrophy	1	1	0	0	0
Glaucoma	4	2	2	1	1
Total	62	47	52	59	59

Table V: Cover test without Glasses in Distance and Near for Horizontal and Vertical Deviation (n=170)

Diagnosis	Horizontal Deviation			Vertical Deviation	
	Phoria	Exotropia	Esotropia	Distance	Near
				Heterotropia	Heterotropia
Retinitis pigmentosa	19	30	5	20	20
Cone rod dystrophy	7	1	1	0	0
Myopic degeneration	3	1	16	13	13
AMD	4	0	0	0	0
Macular dystrophy	8	3	1	0	0
Stargardt disease	3	4	4	3	3
Albinism	1	2	8	5	5
Congenital cataract	2	0	15	12	12
Diabetic retinopathy	3	0	0	0	0
Retinal detachment	4	0	1	2	2
Trauma	4	1	0	3	3
Retinal dystrophy	1	1	0	0	0
Glaucoma	5	2	2	1	1
Total	68	45	53	59	59

Discussion:

The low vision patients suffer from severe visual impairment and this decreased in vision causes different problems, strabismus is one of them. In this study high prevalence of strabismus (67%) was seen in patients presenting in low vision department. Strabismus is a common problem with low vision patients despite of the underlying pathology or congenital condition. Strabismus is an early problem in pathologies like retinitis pigmentosa that causes functional impacts as stereopsis, double vision, headache, abnormal head posture and affects the patient cosmetics apparently.

In our study, of the 57 patients with RP, 54.3% had exodeviation, 31.57% had phoria and 8.7% had esodeviation. The study conducted by Mayata M et al reported 82% exodeviation, 8 % orthophoria, and 13 % esodeviation at near distance while at distance 79%, 14%, and 7% in RP patients respectively.¹⁰ Of the 16 congenital cataract patients, most of them had esodeviation (93.75%). The study conducted by P Merino et al reported 72.4

% prevalence of strabismus with congenital cataract and esodeviation was found twice of exodeviation.¹¹

In this study among the patients with strabismus 56% had acquired deviation and 44 % had strabismus since birth. Out of the total 170 patients, 52 patients (30.6%) had esotropia with glasses in distance and 47 patients (27.6%) had exotropia while without glasses in distance 53 patients (31.2%) had esotropia and 45 patients (26.5%) had exotropia. Nakao et al concluded that the prevalence of horizontal strabismus 18.3% at near distance and 13.5% at long distance.⁶

In present study, high prevalence of vertical strabismus (65%) in patients with pathologic myopia was found with cover test which has been rarely studied in the epidemiological studies. Of the 20 patients with myopic degeneration, most of them (17, 85%) had esotropia, only one patient had exotropia and 2 patients had phoria. Tanaka A et al reported in his study 16.2% vertical strabismus in patients with pathologic myopia.¹²

Out of the total, 59 patients (34.7%) were presented with vertical deviations with glasses in near and long distance. Results were similar for vertical deviations without glasses in near and long distance.

Eleven patients with Albinism participated in study and 7 patients had esotropia, 2 patients had exotropia and 2 patients had phoria. Study conducted by Yokota et al proved the association between congenital nystagmus and strabismus.¹³ Association between strabismus and Down syndrome was reported in a study conducted by Creavin A et al.¹⁴

All diseases of low vision were considered, and the results were different in different pathologies. The limitations in this study were that the sample size was less due to limited time duration. The sample size was not selected randomly, and the study was conducted in single clinical setup.

Conclusion:

This study found 67% strabismus in patients presenting in low vision department. Out of patients with strabismus, 56% had acquired deviations and 44% had congenital strabismus.

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Frequency of Diabetic Retinopathy Among the Known Diabetic Patients at a Tertiary Care Eye Hospital

Mahmood Ali¹, Sarah Zafar¹, Muhammad Sadiq¹, Farah Akhtar¹, Wajid Ali Khan¹

ABSTRACT

Objectives: To report the frequency of diabetic retinopathy (DR) among the known diabetics presenting for the first time at Al-Shifa Trust Eye Hospital (ASTEH) Rawalpindi.

Subjects and Methods: A cross sectional observational study conducted at out-patient department of ASTEH Rawalpindi from 01st April 2015 to 30th September 2015. After an informed verbal consent and history taking of all the patients, a detailed ocular examination was conducted including visual acuity, slit lamp examination and dilated fundus assessment. DR was graded according to International Clinical Diabetic Retinopathy and Diabetic Macular Edema Disease Severity Scale. All this information was recorded on a proforma and data analysis was done using SPSS version 18.0.

Results: Out of 200 total participants, 85 (42.5%) were male and 115 (57.5%) were female. Mean age of the participants was 56.0 (\pm 9.740) years while mean duration of diabetes was 8.468 (\pm 6.034) years. DR was detected in 105 (52.5%) patients among which 44 (22%) patients had Proliferative DR and 57 (28.5%) patients had diabetic macular edema. Severity of DR was significantly associated with age ($p=0.004$), duration of DM ($p>0.001$) and blood sugar status ($p=0.001$).

Conclusion: Frequency of DR is high in our diabetic patients. More attention should be paid towards measures like improving awareness among diabetics and training of general physicians in diagnosing the condition. *Al-Shifa Journal of Ophthalmology* 2018; 14(2): 99-106. © Al-Shifa Trust Eye Hospital, Rawalpindi, Pakistan.

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Introduction:

Diabetes Mellitus (DM) is a common disorder characterized by sustained hyperglycemia of variable severity, secondary to lack, diminished efficacy or both of endogenous insulin. Diabetes may be categorized as insulin dependent (Type 1) or non-insulin dependent (Type 2)¹. World Health Organization (WHO) and International Diabetes Federation have predicted that the number of adult onset DM worldwide would be more than double by 2030 from the present level of 171 million to 366 million. In the developed world, the estimated increase is approximately 46%, from 55 million in 2000 to 83 million in 2030; whereas, among developing nations, the estimated increase is approximately 150%, from 30 million in 2000, to 80 million in 2030².

Diabetic retinopathy (DR) is a microangiopathy primarily affecting the pre-capillary arterioles, capillaries and post capillary venules, although large vessels may also be involved. Clinically DR may be Non-proliferative Diabetic Retinopathy (NPDR) in which pathology remains intraretinal and Proliferative Diabetic Retinopathy (PDR) in which pathology extends onto or beyond the retinal surface³. Macular edema may be present at any stage of DR⁴.

The planning of eye care programs requires data on the prevalence of diseases but unfortunately planning is often hampered by the lack of the data due to improper documentation in the past. This study was an effort to report the burden of morbidity related to DR at a tertiary care hospital of Pakistan. Data from such studies will be helpful to plan strategies for early detection and timely management of DR in our population as well as proper utilization of services. The calculation of frequency of DR among the diabetics will also help us to target the health education at the highest risk groups. The objective of this study was to report the frequency of DR among the known diabetic patients presenting for the first time at ASTEH Rawalpindi.

Subjects and Methods:

It was a hospital based cross sectional observational study conducted at the outpatient department of ASTEH Rawalpindi, a tertiary care teaching hospital. From 1st April 2015 to 30th Sep 2015. The study was conducted on 200 known diabetic patients selected by non-probability convenience sampling. Patients in whom fundus examination was not possible due to bilateral opaque media like bilateral dense corneal opacities, corneal dystrophies or mature cataracts were excluded.

Demographic profile of all the patients was noted including name, age, gender, address and socio-economic status. After the history taking, a detailed ocular examination was done including assessment of unaided and best-corrected visual acuity, pupil reactions, rubeosis iridies, cataract and diabetic retinopathy. Anterior segment assessment was done with (Takagi) slit lamp biomicroscope. Goldman applanation tonometer was used to record intra ocular pressure. After this examination tropicamide eye drops were instilled in both eyes for the dilatation of pupils. Dilated fundus assessment was done on slit lamp biomicroscope with non-contact (Volk Superfield) and contact (Volk Centralis) lenses. All these examinations were performed by a same doctor. If required Optical Coherence Tomography (OCT) or Fundus Fluorescein Angiography (FFA) were advised to establish the diagnosis. DR was graded according to International Clinical Diabetic Retinopathy and Diabetic Macular Edema Disease Severity Scale⁵. Those requiring further management for diabetic retinopathy were referred to the retina clinic of the hospital.

All this information was maintained through a specially designed proformas and analyzed using SPSS version 18.0. Numerical variables like age of patient and duration of diabetes were described in terms of mean and standard deviations. Other categorical variables like gender and type of diabetes and stages of DR were expressed in terms of frequencies and percentages. Bivariate analysis was carried out to assess the correlation between various variables. Correlations were also calculated after controlling for confounding variables. Significance was defined as $p < 0.05$.

Table I. International clinical diabetic retinopathy and diabetic macular edema disease severity scales: 5 Levels for Diabetic Retinopathy ⁽⁵⁾

Proposed Disease Severity Level	Findings Observable upon dilated Ophthalmoscopy
No Apparent Retinopathy	No abnormalities
Mild Non-Proliferative Diabetic Retinopathy	Microaneurysms only
Moderate Non-Proliferative Diabetic Retinopathy	More than just microaneurysms but less than Severe NPDR
Severe Non-Proliferative Diabetic Retinopathy	Any of the following: <ul style="list-style-type: none"> • More than 20 intraretinal hges in each of 4 quadrants • Definite venous beading in 2+ quadrants • Prominent IRMA in 1+ quadrant And no signs of proliferative retinopathy
Proliferative Diabetic Retinopathy	One or more of the following: <ul style="list-style-type: none"> • Neovascularization • Vitreous/preretinal hemorrhage

Table II. International clinical diabetic retinopathy and diabetic macular edema disease severity scales: Levels for Diabetic Macular edema ⁽⁵⁾

Proposed Disease Severity Level	Findings Observable upon dilated Ophthalmoscopy
Mild Diabetic Macular Edema	Some retinal thickening or hard exudates in posterior pole but distant from the macula.
Moderate Diabetic Macular Edema	Retinal thickening or hard exudates approaching the center of the macula but not involving the center
Severe Diabetic Macular Edema	Retinal thickening or hard exudates involving the center of the macula

Results:

A total number of 200 participants (n=200) fulfilling the inclusion criteria were enrolled in the study. There were 85 (42.5%) males and 115 (57.5%) females with a M:F ratio of 1:1.35. The mean age of the participants was 56.0 (SD 9.740) years with a median of 55 years. Mean duration of diabetes in these patients was 8.468 (SD 6.034) years with a range of 26.5 years. Non-insulin dependent diabetes mellitus (NIDDM) was more frequent than insulin dependent diabetes mellitus (IDDM) present in 172 (86%) and 28 (14%) patients respectively.

On examination, retinopathy was detected in 105 (52.5%) patients. Proliferative DR was the most frequent stage detected in 44 (22%) patients followed by mild NPDR in 29 (14.5%) patients, moderate NPDR in 24 (12%) patients and severe NPDR in 8 (4%) patients. Table III shows distribution of

patients with various grades of DR according to gender. DME was diagnosed in 57 (28.5%) patients and was graded as mild, moderate and severe in 22 (11%), 22 (11%) and 13 (6.5%) patients respectively. Table IV shows gender wise distribution of patients with various grades of macular edema.

The data regarding main outcome measures was ordinal so Kendall's tau-b test was used for analysis. Presence of DR was associated with age ($p=0.042$), type of diabetes ($p=0.001$), duration of diabetes ($p=0.000$) and blood sugar status ($p=0.028$) however after controlling for confounding variables, type of diabetes did not show significant correlation with DR ($p=0.477$). Severity of DR was significantly associated with age ($p=.004$), address ($p=0.046$), type of DM ($p=.000$), duration of DM ($p=.000$), blood sugar status ($p=.001$) and level of awareness ($p=0.002$).

Table No. III: Distribution of patients with various grades of DR

Grading of DR	Gender Frequency (Percentage)		Total Frequency (Percentage)
	Male	Female	
No DR	36 18.0%	59 29.5%	95 47.5%
Mild NPDR	10 5.0%	19 9.5%	29 14.5%
Moderate NPDR	12 6.0%	12 6.0%	24 12.0%
Severe NPDR	4 2.0%	4 2.0%	8 4.0%
PDR	23 11.5%	21 10.5%	44 22.0%
Total	85 42.5%	115 57.5%	200 100.0%

Table IV: Gender wise distribution of patients with various grades of macular edema

Macular Edema	Gender		Total
	Male	Female	
Absent	60 30.0%	83 41.5%	143 71.5%
Mild	10 5.0%	12 6.0%	22 11.0%
Moderate	9 4.5%	13 6.5%	22 11.0%
Severe	6 3.0%	7 3.5%	13 6.5%
Total	85 42.5%	115 57.5%	200 100.0%

Discussion:

Due to the expected increase in the incidence of DM, several studies have recently been conducted worldwide to report the prevalence of DM and its complications. Frequency of DR was 52.5% in current study which is quite high. Different studies have reported variable frequency (15% to 58%) of DR among the diabetics in Pakistan^{6,7,8}. The reported frequency depends on the set up in which the study was conducted. A study conducted in an Ophthalmology set up at Peshawar has reported higher frequency of DR (58%) as compared to those conducted in an endocrinology / diabetic clinic in Karachi (15%) and population based surveys (15.3%)^{8,9}. Most of the patients presenting to ophthalmology department have some associated ocular complaint, so it is quite understandable that frequency of DR is more in these setups as compared to general medical wards or diabetic / endocrinology clinics. Even among various ophthalmology setups the frequency of DR can vary depending upon the available diagnostic and therapeutic facilities.

A previous study done in our hospital has reported frequency of DR among diabetics as 24.39% (in free patients) and 23.80% (in paying patients)¹⁰. This was much lower than the reported frequency in the same setup in current study. The study design of these two studies is different. In the study by Afghani et al initially a screening for DM was done and then DR was evaluated in all patients screened positive for DM. So, the study sample consisted of both new and known diabetics.

In a population-based study in India, the frequency of DR in the known diabetics was 20.8%, while in new diabetics it was only 5.1%. This explains that the overall frequency of DR will depend on the proportion of new and known diabetic patients in a study. As the current study only considered known diabetics, frequency of DR was found much higher. These results closely match with the reported DR frequency of 58% by Aamir et al⁸.

Two noticeable findings of current study were that PDR was the most frequent stage of retinopathy detected in 22% of patients while the frequency of macular edema was 28.5%. Other Pakistani studies have reported a frequency of 4 to 11.7% and 5 to 33.3% for PDR and macular edema respectively^{11,12,13,14}.

A study done on 189 patients with DR at Larkana reported that 43% eyes had PDR and 33% eyes had maculopathy¹⁵. High frequency of these vision threatening findings in our set up may be explained by two reasons. First reason might be lack of awareness among patients to seek timely advice. Secondly the availability of many new diagnostic and therapeutic facilities at the hospital might have attracted many referred cases with advanced disease. Currently anti VEGF drugs like bevacizumab are being utilized for the management of PDR and macular edema¹⁶. However, this facility is available in only few centres of Pakistan, ASTEH being one of them. Many patients are also being referred from other centres for FFA, ocular coherence tomography, photocoagulation and vitrectomy.

Presence of DR was associated with age, duration of diabetes and blood sugar status while severity of DR was significantly associated with age, duration of DM and blood sugar status. These findings are consistent with the results of Zghal-Mokni I et al, McClean MT et al, Khandekar R et al and Jenchitr W et al^{17,18,19,20}.

Some studies have also found association between DR and gender, type of diabetes and urbanization but current study did not support any of these factors on multivariate analysis. The association of these factors with incidence of DR is controversial. Kayani H and Khandekar R have reported association of DR with male gender while Jamal-u-Din has reported association with female gender^{11,19}.

Jamal-u-Din et al reported higher incidence of DR in individuals with type I diabetes while Kayani H have reported equal incidence in both types^{11,21}. Similarly regarding urbanization, Shaikh et al and Xie XW et al have contradictory results in favour of urban and rural population respectively^{6,22}.

The current study has some biases and strengths. The study was conducted in a tertiary care eye hospital, so results regarding frequency of DR can be compared with the studies done in other tertiary eye care centers. Patients with bilateral media opacities could not be evaluated for diabetic changes which might have affected the results. The strengths of this study were that this is also the first study in Pakistan that has graded the DR according to new classification approved by American academy of Ophthalmology.

Conclusion:

Frequency of DR is high in our diabetic patients. More attention should be paid towards measures like improving awareness among diabetics and training of general physicians in diagnosing the condition. Necessary facilities should be provided at hospitals for the diagnosis and management of DR.

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