

# Comprehensive Vision Care in Urban Community: the Pediatric Outreach Program by SSTP in City Areas of Bangladesh

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## Abstract

**Purpose:** Undetected and uncorrected refractive error in children leads to visual impairment and creating a significant public health issue day by day in school going pediatric group in many developing countries. With these rationales this study has been undertaken by using SSTP in schools of some city areas of Bangladesh to assess the magnitude of refractive status of school going children and treat them.

**Method:** It was a prospective study conducted in the selected schools by the authority of Ispahani Islamia Eye Institute & Hospital since in March 2019 to July 2019. Total study population was 32,748. Students from class three to class ten in the selected school by the hospital authority were included in the study. The students having other eye pathology like squint, cataract, leucoma, ptosis, chalazion were excluded from study. All the students underwent history taking like family history of refractive error, spectacle use, visual acuity measurement and dry refraction, anterior segment evaluation by portable slit lamp and fundus evaluation. The students who showed accommodative spasm referred for cycloplegic refraction and those had non refractive eye condition like ptosis, chalazion, blepharitis were referred in base eye hospital for consultation.

**Results:** Total 32,748 students (6401 students from Dhaka, 8462 from Barisal, 8074 from Jamalpur and 9811 from Naogaon) were screened out nationally by Students sight testing program (SSTP). Among the entire student's 2733 (8.3%) children were referred to base eye hospital in Dhaka, Barisal, Jamalpur and Naogaon. In Dhaka 1739 out of 6401 children, Barisal 759 out of 8462 children, Jamalpur 123 out of 8074 and Naogaon 112 out of 9811 children were underwent cycloplegic refraction. Prevalence of overall refractive error was 62.05%. Among them myopia was 54.01%, astigmatism 32.42% followed by hypermetropia 13.56%. Majority of myopic child complaint of difficulty in reading blackboard from back benches (46.35%) followed by headache (39.36%) and eye strain (11.70%) LogMAR Acuity (0.20-0.50) were in 888 children, logMAR Acuity (0.50-1) were 298 children, less than logMAR Acuity 1 were 73 children was discovered in capital city of Dhaka. Total old cases of refractive error were 37% where's newly detected case was 63%.

**Conclusion:** In order to fulfill the target of comprehensive vision care in school going urban child, SSTP is a useful, easy and simple way for screening out of the children and can play an important role in reducing the visual morbidity by provision of spectacle.

**Keywords:** Refractive error, visual acuity, SSPT, Myopia

## Introduction

Comprehensive vision care is an utmost demand of modern civilization especially in pediatric group. To serve this purpose we need to plan a pediatric outreach program which is easy to reach the pediatric community. School sight test

program (SSPT) was a acceptable and effective method to materialize the plan. As refractive status is the main measure of good vision; so far detection of refractive status was considered as the main target to make successful of this mission. Uncorrected refractive error is one of the most common causes of blindness around the world

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especially in pediatric group which is treatable or preventable. Globally, the major causes of blindness are cataract, uncorrected refractive errors and glaucoma and their prevalence are 33%, 43% and 2% respectively.<sup>1</sup> An estimated 19 million children are visually impaired worldwide of which 12 million are due to refractive errors which could be easily corrected by provision of SSTP method in school going pediatric community. SSPT is an easy and simple way to screen out the refractive status of school going children.<sup>1</sup> Epidemiological study indicates that among the refractive errors, prevalence of myopia is increasing worldwide in economically developed societies.<sup>4</sup> It may be due to excessive use of mobile phone, tab, computer which adversely causing myopic shift. This is mainly in East-Asian populations like China, Japan and Singapore.<sup>5</sup> Different study reveals that refractive errors are usually present in the childhood and continue to the adult life.<sup>6</sup> Undetected and uncorrected refractive errors are particularly a significant problem in school children. Children generally never complain of defective vision. Generally they are not aware of their problem or they may adjust to their poor vision. Even some time they used to avoid work which needs visual concentration. Uncorrected refractive error can cause adverse impact on learning process and educational capacity.<sup>7</sup> Blindness due to refractive error can also have dramatic effect in personality development and career opportunities, along with causing an economic burden to the society.<sup>2</sup> Most of the children with such diseases are apparent and hence, screening helps in early detection and correction with spectacles.<sup>8</sup> Refractive error has been given high priority under the National Programmed for Control of Blindness. It took central part in the global initiative for the elimination of avoidable blindness.<sup>8</sup> With these rationales this study was done to assess the magnitude of refractive error and to assess the degree of myopia among school-going children in some city areas of Bangladesh.

### Purpose

Due to fast urbanization and COVID pandemic most of the urban children are addicted to device

like mobile phone, laptop, tab, television which positively increase the tendency to myopic shift of children due to excessive near work. Detection of this myopic shift is time demanding public health issue otherwise our future nation will be suffering from visual morbidity and its consequence in long run will be very alarming. In that sense this pediatric Outreach program by use of SSPT is time demanding for provision of comprehensive vision care in urban community.

### Planning a vision testing program for children:

There are several questions which need to be addressed and answered when planning a vision testing program for children. The most important is to decide the aim of the program which includes:

- At what age will children be tested?
- What method of visual acuity measurement will be used?
- What level of visual acuity will be used to identify children who need further examination/refraction?
- Who will measure the vision?
- Where will the follow-up examinations and refraction are performed?
- How will the program be monitored and evaluated?



**Fig: Students are waiting for refraction**

### Method

The current prospective case series study was conducted in March 2019 to July 2019 in selected schools of some city areas of Bangladesh under Ispahani Islamia Eye Institute & Hospital (IIEI&H). IIEI&H has 3 branch hospitals (Naogaon, Barisal and Jamalpur). The pediatric

outreach program was planned to arrange in this three city areas with the main branch of Dhaka city. Total screened out student's number was 32,748 in all four city areas. The study includes all the students in the age group of 6 to 16 years (from class three to class ten) in the selected schools by authority that were present on the day of the screening. Exclusion of that children having defective vision because of other reasons like squint, cataract, leucoma, ptosis. In this study schools were selected by hospital authority taken at random by lottery method. The list of schools was taken from the office of District Educational Office. Prior starting the study; this information was provided to the Principals of the selected schools and permission was sought from them to conduct the study in their schools. Refractive status was tested using the following instruments: 1. Snellen's chart 2. Opaque disc perforated by small central hole 3. Occluder 4. A trial box, a trial frame, self-illuminated vision box, streak retinoscope. All the students underwent history taking like family history of refractive error, spectacle use, visual acuity measurement, dry refraction, anterior segment evaluation by portable slit lamp, and fundus evaluation. Study subjects were also looked for obvious eye problems like squint, cataract, leucoma, ptosis, Bitot's spots and for symptoms suggestive of underlying ocular conditions like watering of the eyes, redness and headache by trained ophthalmic assistants. The students who showed accommodative spasm referred to base eye hospital for cycloplegic refraction and the students with non-refractive eye condition like ptosis, chalazion, blepharitis, squint, cataract were referred for consultation and taking treatment from specialist doctor in base eye hospital. The students were categorized after examination as "having good vision and NO OBVIOUS EYE PROBLEM and need no further referral" and "need further referral".



**Fig: Ophthalmic assistant check the vision of students**

Attending doctors subsequently screened the children identified as "need further referral" for final referral to base eye hospital. The ophthalmic assistants examined children at the school itself which included assessment of presenting and best corrected visual acuity, refraction. The attending doctors examine the anterior segment and fundus of the eye as well as testing for ocular motility and alignment. Then referred some children to base eye hospital for further management as per needed.



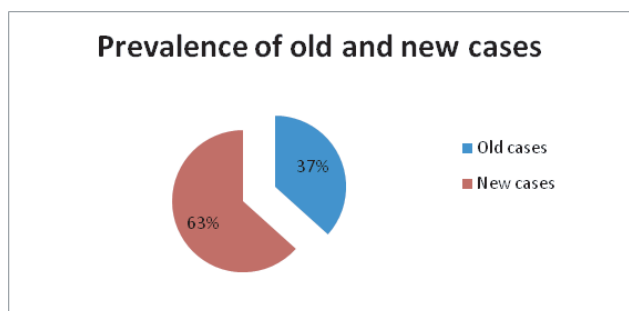
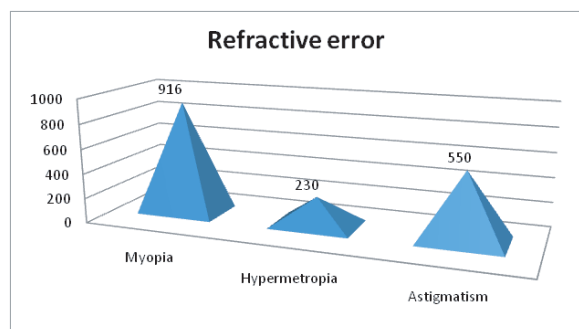
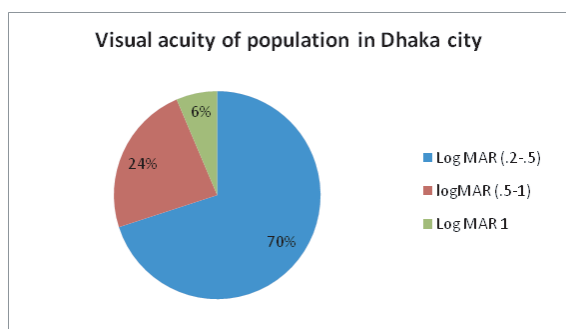
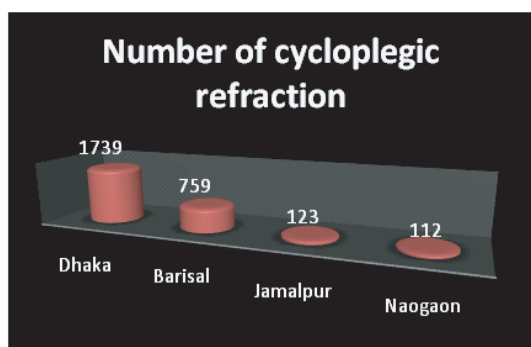
**Fig: Team attending in selected school for SSTP**

## Results

Total screened out student's number was 32,748 in all four city areas. Out of them 6401 students from Dhaka, 8462 from Barisal, 8074 from Jamalpur and 9811 from Naogaon) were screened out nationally by SSPT. Among the entire student's 2733 children were referred to base eye hospital in Dhaka, Barisal, Jamalpur and Naogaon. In Dhaka 1739 out of 6401 children, Barisal 759 out of 8462 children, Jamalpur 123 out of 8074 and Naogaon 112 out of 9811 children were underwent cycloplegic refraction. Prevalence of overall refractive error was 62.05%. Among the refractive error myopia was 54.01%, astigmatism 32.42% followed by hypermetropia 13.56%. Majority of myopic child complaint of difficulty in reading blackboard from back benches (46.35%) followed by headache (39.36%) and eye strain (11.70%). In Dhaka logMAR Acuity (0.20-0.50) were 888 children, logMAR Acuity (0.50-1) were 298 children, less than logMAR Acuity 1 were 73 children was discovered. Total old cases of refractive error were 37% where's newly detected case was 63%.

**Table: Total number of sample size**

Divisional city	Number	Percentage
Dhaka	6401	19.54
Barisal	8462	25.84
Jamalpur	8074	24.65
Naogaon	9811	29.96



**Discussion**

It was observed that Prevalence of overall refractive error was 62.05%. Myopia was the major refractive error (54.01%) among total refractive errors, followed by astigmatism (32.42%) and hypermetropia (13.56 %). Among myopia detected cases majority complaint of difficulty in reading blackboard from back benches (46.35%) followed by headache (39.36%) and eye strain (11.70%).



**Fig: Ophthalmic assistant doing refraction**

This study shows that the prevalence of refractive errors were 62.05% among the school children which was more than the studies conducted by Rahman M, Devi B, Kuli JJ, Gogoi.9 Pavithra MB, et al.10 But study by Prema N found the prevalence similar to our study. These variations in prevalence could have been due to differences in demographic factors. Our study showed that myopia was the most common refractive error (54.01%) followed by astigmatism (32.42%) and hypermetropia (13.42%). Similar observations were found in the study done by Rahman M, Devi B, Kuli JJ, Gogoi G.9 Study by Nisha Dulani and Harish Dulani on Prevalence of Refractive Errors among School Children in Jaipur, Rajasthan also found similar observation where Myopia was 63.4%, Astigmatism was 25.8% and followed by Hypermetropia of 11.35%. It was evident from

this current study that among refractive error detected cases majority complaint of difficulty in reading blackboard from back benches (46.35%). EL-Bayoumy BM, Saad A, Choudhury AH. Reported a similar finding where the prevalence of refractive error was higher among those who had problem in seeing distant objects.<sup>11</sup> Similar finding were found in the study done by Kumar KS, Akoijam BS.<sup>10</sup> It was observed from the study that 36.64% were already wearing spectacles (old cases) whereas rest 63.36 % was detected during the study. Prema. N in the study done in Kancheepuram Dist., Tamil Nadu, India found that Only 7% of students with poor vision who wore eyeglasses but 93% of student having poor vision did not have glasses.<sup>13</sup> Study done by Rahman M, Devi B, Kuli JJ, Gogoi G in Dibrugarh, Assam<sup>9</sup> and Kumar KS, Akoijam BS in Imphal, Manipur<sup>16</sup> also found the high prevalence of uncorrected refractive errors. The possible reasons for students for not wearing glasses may be lack of awareness about refractive errors. These finding comply with the present study.



**Fig: Final check by attending doctor**

The project covered nearly 90% of enrolled children and achieved a target. This coverage is an indicator of the good organization of the entire program. The study suggested that referral rate to base eye hospital was 5-10% and spectacle

prescription rates more than 60% may indicate the need of more screening program. The number of children referred to base eye hospital was 8.3% and the number of children prescribed spectacles (63.36%) compare favorably with the monitoring and evaluation benchmarks proposed by Limburg et al.<sup>17</sup> The number of children examined by the ophthalmic assistant is an indicator of well-organized refractive services. Referral systems need to be finally checked by attending doctor. The number of children examined by the ophthalmic assistant (77.32%) in our program compares favorably with the benchmark proposed by Limburg et al. (60-90%).<sup>17</sup>

A major lacuna in the program is the ability to reach out to children not attending schools, however; this may be addressed by strategies that aim to improve universal education. Studies that provide evidence on strategies of the frequency of school screening (annual or at specific time periods) will help improve the effectiveness of the screening program.

### Conclusion

Good refractive status is a standard parameter of comprehensive vision in pediatric community. Due to fast urbanization and COVID pandemic the urban child are suffering more from excessive myopic shift due to use of modern technology like mobile, computer ; therefore a national plan should be implemented to more screening program of school going urban children in detecting refractive errors and provision of refractive correction to fulfill the target. Otherwise our future nation will be suffering from visual morbidity and its consequence in long run will be very alarming .Considering this; pediatric Outreach program by use of SSPT is time demanding for provision of comprehensive vision care in urban community. SSPT is a good and simple way to identify and correct refractive error of children by provision of spectacle which will reduce the visual morbidity. As prevalence of uncorrected refractive error was also found to be high, therefore students, parents, and teachers must be educated about signs and symptoms of refractive errors, so that they can get early

detection and correction with spectacles to prevent progression of visual impairment. The existing health services should be strengthened and implemented effectively so that it would be helpful to attain the global initiative for elimination of avoidable blindness by more provision of SSTEP.

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The authors declare that they have no competing interests.

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