The Professional Medical Journal
www.theprofesional.com

ORIGINAL PROF-0-4006

DOI: 10.29309/TPMJ/2020.27.1.4006

PREVALENCE OF REFRACTIVE ERRORS AND THE FACTORS RELATED TO IT AMONG MADRASSA STUDENTS IN DISTRICT SIALKOT.

Taskeen Zahra[1], Intzar Hussain[2], Shahmun Munawar[3], Shahbaz Baig[4], Noreen Maqbool Bokhari[5]

1. MBBS, FCPS
Assistant Professor
Department of Community Medicine
SIMS, Lahore.
2. MBBS, DOMS, FCPS, FRCS
Associate Professor
Department of Ophthalmology
SIMS, Lahore.
3. Final Year MBBS Student
KMSMC, Sialkot.
4. MBBS, MPH
Associate Professor
Independent Medical College,
Faisalabad.
5. MBBS, FCPS
Assistant Professor
KMSMC, Sialkot.

Correspondence Address:
Dr. Taskeen Zahra
Department of Community Medicine
SIMS, Lahore.
dr.taskeenzahra@yahoo.com

Article received on:
02/08/2019
Accepted for publication:
25/11/2019

ABSTRACT… Objectives: Refractive errors (RE) comprise visual impairment arising from the decreased ability of eye to focus light on retina that has become one of the most common problems among school going children and is the second leading cause of treatable blindness among them.[1] RE remains unquantified in Pakistan, especially among madrassa students who are further neglected due to lack of school health services. Keeping this in mind the following study was conducted to find the prevalence of RE among Madrassa students aged 5 to 15 years in Sialkot and the factors related to it. **Study Design:** A cross-sectional study. **Setting:** Out of three registered madrassas in Sialkot city, only one allowed access to the team. The team consisted of an ophthalmology professor, two opticians, four interviewers and the researchers. **Period:** Six months from February 2018 till July 2018. **Material & Methods:** This cross-sectional study was designed by randomly selecting 168 students out of a total of 520 madrassa students who were all tested for RE, the selected students were then interviewed on a semi structured, pre-tested closed ended questionnaire after seeking permission from the parents and madrassa heads. Factors like illumination, distance while reading and watching screen were recorded on a checklist. The data was analyzed in SPSS 21 and P value $\leq$0.05 was taken significant. **Results:** 31.5% of students had errors of refraction. 81.1% were myopic, 7.6% were hyperopic and 11.3% were astigmatic. Near distance reading/screen, positive family history, longer time studying in madrassa and insufficient illumination were the significant factors related to RE. **Conclusion:** This study showed a dire need of awareness in screening the potential cause for blindness among madrassa students.

Key words: Madrassa, Prevalence, Refractive Errors.

Article Citation: Zahra T, Hussain I, Munawar S, Baig S, Bokhari NM. Prevalence of refractive errors and the factors related to it among madrassa students in district Sialkot. Professional Med J 2020; 27(1):143-151.
DOI: 10.29309/TPMJ/2020.27.1.4006

INTRODUCTION

Visual impairment is a degree of vision loss that requires an aid and sometimes cannot be corrected by any means whereas blindness is a complete or near complete vision loss. According to WHO uncorrected refractive errors (43%), cataracts (33%), and glaucoma (2%) are the most common causes of visual impairment. It is estimated that 80% of vision loss is either preventable or treatable. RE broadly includes myopia, hyperopia, astigmatism and presbyopia. The estimated pool prevalence of myopia, hyperopia and astigmatism in children globally is 11.7%, 4.6%and 14.9% respectively. In children <15 years an estimated 19 million are visually impaired, of these 12 million are due to RE. Childhood blindness affects the quality of the entire family and can thus limit their ability to perform daily tasks and their interaction with the world. This has drawn the attention of World Health Organization's Vision 2020 program, which has included "Childhood Blindness" as one of its targets.[2]

The vision loss expert group (VLEG) provides the latest estimation of prevalence of visual impairment and blindness worldwide by analysing data from 1990-2015. This research showed that 253 million people were visually impaired in 2015 with 89% of visually impaired people belonging to low- or middle-income countries. A study by Harrington S conducted in Ireland from 2016-2018 showed that the prevalence of myopia, hyperopia and astigmatism among ages 6–7 years old was 3.3%,

25% and 19.2%, respectively, and among ages 12–13 years old was 19.9%, 8.9% and 15.9%, respectively.[3] A study by Dhanesha U conducted in Ethiopia among children with mean age of 13 years showed that refractive error was the leading cause of visual impairment among them by (89%)[4], a study conducted by Durga Kumar C in India among 12-13 year age group estimated the prevalence of RE to be 34% with 29% having positive family history and mostly detected by their mothers.[5] Similar results were found by Sumbal Inam in Pakistan showing a strong relation of RE with family history and screen time exposure.[6]

RE has been a neglected problem in Pakistan and is still not being given due attention, in spite of the fact that RE prevalence is 17.5% in this 5-15-year age group. No national survey has yet been conducted in this regard. Very few literature is available on current situation in school children let alone madrassa students who are not included in the main stream education system.
Term Madrassa is used for schools that embark religious education among students as young as 4 years in an orthodox manner. These students are often subjected to near work of rote learning with extensive reading and reciting with unconventional methods.[7]

Thus, in this scenario the following study was taken up in District Sialkot located in the north-east of Punjab with a population of 3,893,672[8]. It has three registered madrassas, countless schools and colleges. The objectives of this study were to find the prevalence of RE among Madrassa students aged 5 to 15 years in Sialkot and to study the factors related to it. RE in this study included myopia, hyperopia and astigmatism, myopia (near-sightedness) was taken as difficulty in seeing far objects clearly, hyperopia (farsightedness) was defined as difficulty in seeing near objects clearly, astigmatism defined as distorted vision due to an irregularly curved cornea.[9] Factors such as age, years of madrassa schooling, parents education status, parents occupation, family history, sleeping hours, time spent studying, time spent in recreational activities, screen time, illumination, distance while reading and using screen were taken into account.

MATERIAL AND METHODS

A cross-sectional study conducted on students of Madrassa in district Sialkot. Out of three registered madrassa implementing religious educations in Sialkot city, only one allowed access. After receiving permission from the college authorities, the madrassa was visited in May 2018, the procedure was explained, and consent was taken from the madrassa heads after which they provided a list of 520 students along with their parents' contact. All the students were tested for RE after which 168 students between ages 5-15 years were selected randomly by lottery method with the prevalence of RE taken as 13.7%.[10] The parents were contacted telephonically, consent was taken after explaining the procedure. All students with eye diseases other than RE, absentees, were excluded at the spot. The team consisted of the professor of ophthalmology department KMSMC, 2 opticians and the required equipment for full eye examination along with four interviewers and researchers from department of community medicine KMSMC. The interview was conducted by trained interviewers in same tone and duration on a pre-tested questionnaire. Factors like illumination and distance while reading were observed and recorded. Data was entered, cleaned and analysed on SPSS 21. The qualitative variables like gender and type of refractive error were expressed in frequency and percentage while quantitative variables like and age was expressed in mean, median and standard deviation. Chi square test was used and P value < 0.05 was taken as significant. The confidentiality and anonymity of data were fully ensured.

RESULTS

Figure-1 showed that out of 168 students 53(31.5%) had RE out of which 43(81.1%) had myopia, 4(7.6%) had Hyperopia and 6(11.3%) had astigmatism. Mean age of students was 12.3274, 90(53.7%) of the students were < 12 years of age. Table-I showed that more than half of the students had been studying for >1 year at the madrassa. 98(58.3%) of the fathers of these students had some education and only 83 (49.8%) mothers were educated to some extent. Most mothers were housewives. About half of the

students (53.6%) had family history of refractive errors. Table-II showed that slightly more than one third of the students studied with sufficient illumination. 114(67.9%) read with distance < 25cm and 45(26.8%) used screen with distance < 25cm. Table-III describes that students who spent more than 1 year in the madrassa had more chances of getting RE (chi square= 11.179) and literate home staying mothers had a protective effect against RE(chi square= 25.425 and 5.736 respectively). Table-IV describes that insufficient illumination while studying and during indoor activities has more chances of causing RE (chi square= 6.226 and 11.147 respectively) and distance less than 25 cm while reading also has a negative impact on eyesight causing RE (chi square= 17.144).

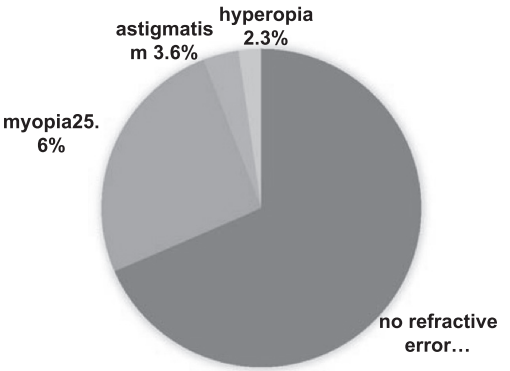

Figure-1. Prevalence of refractive errors among Madrassa students n=168

DISCUSSION

RE is the problem with focusing light onto the retina. RE includes myopia, hyperopia and astigmatism, that are the most common cause of reduced visual acuity. Both environmental and genetic factors are involved in the development of RE. Mostly RE are more likely to be inherited as complex traits. An uncorrected RE is related to limitations in vision-related tasks and decreased the quality of life. Due to uncorrected RE children usually suffer a critical setback in development as learning in this age is often visual based. The present research aimed to study the prevalence of RE and factors related to it in madrassa school which is marginalized parallel teaching system in Pakistan.

Characteristics	Frequency	Percentage (%)
Age(Years)		
5-10	21	12.6%
11-15	147	87.5%
Total	168	100%
Mean Age: 12.3274	Median: 12.0000	SD ± 1.83935
Years of Schooling		
<5	83	49.4%
≥5	85	50.6%
Total	168	100%
Type of Dewelling		
Day Scholar	39	23.2%
Hostellite	129	76.8%
Total	168	100%
Years In Madrassa School		
<1	59	35.1%
≥1	109	64.9%
Total	168	100%
Father's Education Status		
Illiterate	70	41.7%
Under Metric	61	36.3%
Undergraduate	35	20.8%
Graduate	2	1.2%
Total	168	100%
Mother's Education Status		
Illiterate	85	50.6%
Under Metric	68	40.5%
Undergraduate	14	8.3%
Graduate	1	0.6%
Total	168	100%
Father's Occupation Status		
Unemployed	20	11.9%
Self Employed	74	44%
Unskilled Work	48	28.6%
Govt/Private Job	25	14.9%
Professional	1	0.6%
Total	168	100%
Mother's Occupation Status		
Housewife	108	64.3%
Works Inside The House	50	29.8%
Works Outside The House	10	6.0%
Total	168	100%
Type of Family		
Nuclear	72	42.9%
Extended	96	57.1%
Total	168	100%
Family Income		
≥10000 PKR/ Month	143	85.1%
<10000 PKR/Month	25	14.9%
Total	168	100%
Place of Residence		
Rural	96	57.1%
Semi Urban	34	20.2%
Urban	38	22.6%
Total	168	100%
Family History		
Yes	90	53.6%
No	78	46.4%
Total	168	100%

Table-I. Frequency distribution of Madrassa students according to their Sociodemographic profile (n=168)

Characteristics	Frequency	Percentage (%)
Sleeping Hours		
≥8hours	95	56.5%
<8hours	73	43.5%
Total	168	100%
Time Spent Studying		
≥9hours	138	82.1%
<9hours	30	17.9%
Total	168	100%
Total Time Spent In Outdoor Recreational Activities		
≥1hour	149	88.7%
<1hour	19	11.3%
Total	168	100%
Total Screen Time		
≥0.5 hour	93	55.4%
<0.5 hour	75	44.6%
Total	168	100%
Illumination While Studying		
Sufficient	66	39.3%
Insufficient	102	60.7%
Total	168	100%
Illumination In Indoor Activities		
Sufficient	51	30.4%
Insufficient	117	69.6%
Total	168	100%
Distance While Reading		
≥25cm	54	32.1%
<25cm	114	67.9%
Total	168	100%
Distance While Screen Using		
≥25cm	123	73.2%
<25cm	45	26.8%
Total	168	100%

Table-II. Frequency distribution according to personal proclivity related to refractive errors n=168

In the present study, out of 168 students 53(31.5%) had RE with myopia being the most prevalent 43/53 (81.1%), followed by astigmatism 6/53 (11.3%) and hyperopia 4/53 (7.6%). A similar study was conducted among madrassa students of Haripur district in 2015[10] showed that myopia 52.6% was the most prevalent RE among the students followed by hyperopia 28.4% and astigmatism 19%.[5] Both studies showed myopia as the most prevalent RE.

A significant relation of increasing age was found with RE in this study with (P=0.045). Similar results were found by Hassan Hashemi in Western Iran depicting that the prevalence of myopia significantly increased with age (odds ratio=1.30) (P=0.003).[11]

It was also found that the total time spent by the students at the madrassa in years was significantly related to RE (P=0.001). This clearly showed that increased study demand and RE had a strong relation. Similar results were shown by Lian Hong Pi in China where myopia ($P<0.001$) and astigmatism ($P=0.04$) were more prevalent in academically challenging school systems.[12]

Maternal education had a significant impact on the visual acuity of the children. It is obvious that if a mother is literate, she has more knowledge of the factors that may cause decreased visual acuity in her child. Education level is considered a surrogate of factors related to RE. Around half of the children whose mothers were illiterate had RE (49.4%), hence it was shown that mothers' education and occupation had a protective effect on RE. Similar results were found in a study conducted in India.[13]

It is important to mention here that out of 90 students with positive family history of RE 37 (41.1%) were diagnosed with RE with p= 0.005 showing the significant relation. A similar study was conducted by L Guo in Guangzhou in 2016[14], that showed that children born to myopic parents tend to have myopia following a dose-dependent pattern.

Characteristic	Refractive Error		Total	P-Value* Chi Square**
	Yes Frequency (%)	No Frequency (%)		
Age (Years)				
≤12	22(24.4%)	68(75.6%)	90(100%)	0.045*** 4.529**
>12	31(39.7%)	47(60.3%)	78(100%)	
Total	53(31.5%)	115(68.5%)	168(100%)	
Years of Schooling				
<5	28 (33.7%)	55 (66.3%)	83 (100%)	0.363* 0.619**
≥5	25 (29.4%)	60 (70.6%)	85 (100%)	
Total	53(31.5%)	115(68.5%)	168(100%)	
Years of Madrassa Schooling				
<1	9 (15.3%)	50 (84.7%)	59 (100%)	0. 001*** 11.179**
≥1	44 (40.4%)	65 (59.6%)	109(100%)	
Total	53(31.5%)	115(68.5%)	168(100%)	
Type of Dwelling				
Day Scholar	9 (23.1%)	30 (76.9%)	39 (100%)	0.240* 1.688**
Hostellite	44 (34.1%)	85 (65.9%)	129(100%)	
Total	53(31.5%)	115(68.5%)	168(100%)	
Fathers Educational Status				
Illiterate	28 (40.0%)	42 (60.0%)	70 (100%)	0.064* 3.970**
Literate	25 (25.5%)	73 (74.5%)	98 (100%)	
Total	53(31.5%)	115(68.5%)	168(100%)	
Mothers Educational Status				
Illiterate	42 (49.4%)	43 (50.6%)	85 (100%)	0.000*** 25.425**
Literate	11 (13.3%)	72 (86.7%)	83 (100%)	
Total	53(31.5%)	115(68.5%)	168(100%)	
Fathers Occupational Status				
Unemployed	6 (30.0%)	14 (70.0%)	20 (100%)	1.000* 0.025**
Employed	47 (31.8%)	101 (68.2%)	148(100%)	
Total	53(31.5%)	115(68.5%)	168(100%)	
Mothers Occupational Status				
Housewife	41 (38.0%)	67 (62.0%)	108 (100%)	0.024*** 5.763**
Employed	12 (20.0%)	48 (80.0%)	60 (100%)	
Total	53(31.5%)	115(68.5%)	168(100%)	
Type of Family				
Nuclear	19 (26.4%)	53 (73.6%)	72 (100%)	0.243* 1.553**
Extended	34 (35.4%)	62 (64.6%)	96 (100%)	
Total	53(31.5%)	115(68.5%)	168(100%)	
Family Income				
≥10000 PKR/month	46 (32.2%)	97 (67.8%)	143 (100%)	0.817* 0.171**
<10000 PKR/month	7 (28.0%)	18 (72.0%)	25 (100%)	
Total	53(31.5%)	115(68.5%)	168(100%)	
Place of Residence				
Rural	29 (30.2%)	67 (69.8%)	96 (100%)	0.738* 0.186**
Semi-Urban/Urban	24 (33.3%)	48 (66.7%)	72 (100%)	
Total	53 (100%)	115 (100%)	168 (100%)	
Family History				
Yes	37 (41.1%)	53 (58.9%)	90 (100%)	0.005*** 8.210**
No	16 (20.5%)	62 (79.5%)	78 (100%)	
Total	53(31.5%)	115(68.5%)	168(100%)	

Table-III. Relationship of sociodemographic profile of madrassa students with refractive errors (n=168)
***(P Value ≤0.05 Is Significant)**

Characteristic	Refractive Error		Total	P-Value* Chi Square**
	Yes Frequency (%)	No Frequency (%)		
Total Sleeping Hours				
≥8 Hour	28 (29.5%)	67 (70.5%)	95 (100%)	0.616* 0.435**
<8 Hour	25 (34.2%)	48 (65.8%)	73 (100%)	
Total	53(31.5%)	115(68.5%)	168(100%)	
Total Time Spent Studying				
≥9 Hours	46 (33.3%)	92 (66.7%)	138 (100%)	0.387* 1.141**
<9 Hours	7 (23.3%)	23 (76.7%)	30 (100%)	
Total	53(31.5%)	115(68.5%)	168(100%)	
Total Time Spent In Outdoor Recreational Activities				
≥1 Hour	45 (30.2%)	104 (69.8%)	149 (100%)	0.304* 1.106**
<1 Hour	8 (42.1%)	11 (57.9%)	19 (100%)	
Total	53(31.5%)	115(68.5%)	168(100%)	
Total Screen Time				
≥0.5 Hours	31 (33.3%)	62 (66.7%)	93 (100%)	0.619* 0.308**
<0.5 Hours	22 (29.3%)	53 (70.7%)	75 (100%)	
Total	53(31.5%)	115(68.5%)	168(100%)	
Illumination In Indoor Activities				
Sufficient	23(45.1%)	28 (54.9%)	51 (100%)	0.018*** 6.226**
Insufficient	30 (25.6%)	87 (74.4%)	117 (100%)	
Total	53(31.5%)	115(68.5%)	168(100%)	
Illumination While Studying				
Sufficient	11(16.7%)	55(83.3%)	66(100%)	0.001*** 11.147**
Insufficient	42(41.2%)	60(58.8%)	102(100%)	
Total	53(31.5%)	115(68.5%)	168(100%)	
Distance While Reading				
≥25 Cm	7 (12.9%)	47 (87.0%)	54 (100%)	0.000*** 17.144**
<25 Cm	52 (45.6%)	62 (54.4%)	114 (100%)	
Total	53 (31.5%)	115 (68.5%)	168 (100%)	
Distance While Using Screen				
≥25 Cm	22 (17.9%)	101 (82.2%)	123 (100%)	0.000*** 39.686**
<25 Cm	31 (68.9%)	14 (31.1%)	45 (100%)	
Total	53(31.5%)	115(68.5%)	168(100%)	

Table-IV. Relationship of personal proclivity of madrassa students with refractive errors (n=168)
*****(P value <0.05 is significant)**

On the other hand, total time spent studying and family income had no relation with RE whereas a study conducted by QS You in greater Beijing showed positive relation with the factors having significant p values P<0.001 and P<0.001 respectively.[15] (Table-III)

Among personal proclivity factors like total sleep time showed no relation in the study but was opposed by a study conducted by Y Gong in china that showed positive relation of RE among children with the total sleeping hours of 8 hours or less having P < 0.001.[16]

The current study showed no relation of RE with outdoor activities that was contraindicated by a study conducted in Beijing by Z Lin showing a positive relation of RE with total outdoor activity and outdoor leisure time in hours in primary school children having P=0.03 and P=0.04 respectively.[17]

In the present study there was no significant relation of total screen time among the children which was contrasted by a study conducted in Pakistan by Sumbal Inam in 2017 showing a strong relation of RE with watching television at

close distance and playing digital screen games.[6] The reason for our contrasting results might be madrassa students have fewer chances for outdoor activities and limited access to digital devices, androids and other luxuries.

Indoor Illumination during routine activities and while studying had a strong relation in this study showing p values (0.018 and 0.001) respectively. Similar results were found in a study conducted by QS You in China among children suggesting the significant relation with the dim reading illumination and less rest during studying.[15] The significant relation is also supported by a study conducted in India by N Joseph.[18] The worldwide stress on reading and diligent study habits among children requires a strong encouragement to read books at a distance and take regular breaks.

This study showed that, 52(45.6%) students reading books at < 25cm and 31(68.9%) students using screen devices at distance <25 cm from eyes had the RE with p= 0.000 and p= 0.000 respectively showing a significant relation. A study by TP Quek in Singapore showed similar significance of RE with distance while reading and using digital devices.[19] (Table-IV)

The study was not without limitations, the RE and RE factors requiring sophisticated devices were not explored and it was unfortunate for the team that they couldn't access the female section of the madrassa as they were not permitted. Moreover, the study involved only single madrassa, thus the generalization of findings to other madrassas can be limited. Despite these and certain resource constraints, this study has provided much-needed information regarding the prevalence of RE among madrassa students. These results are limited to a single madrassa so further exploration of the risk factors among school going children especially those attending madrassas is recommended, as madrassas are ignored by the governments even in the provision of school health services.

CONCLUSION

Uncorrected RE are the commonest cause of visual impairment in all groups of society. The study showed that the total prevalence of RE among madrassa students was 53/168 (31.5%). Among RE myopia was the most prevalent 43/53(81.1%) followed by hyperopia 4/53(7.6%) and astigmatism 6/53(11.3%). The students age >12 years, positive family history and years of madrassa schooling (> 1 year) were found to be significantly related to prevalence of RE. Maternal education had a protective effect against prevalence of RE. Similar role was found for working mothers. Among personal proclivity, insufficient illumination during indoor activities and reading distance < 25cm were also found to be significantly related. No relation was found with screen time. A high prevalence of RE among madrassa student is in indicative of the tip of the ice berg which would unearth the appalling scenario. There is dire need to spread awareness among all communities of the world to help prevent the avoidable visual impairments with a better approach. With 2020 around the corner improvements are needed to be made to meet the goals as soon as possible to improve visual and optical health among all age groups and communities equally. The study shows lack of screening and poor health services in madrassas, hence, quantifying the need to increase awareness and proper screening among the students who are studying in a marginalized parallel school system and already belong to the lower social strata of the society.

REFERENCES

1. Bourne R, Flaxman S, Braithwaite T, Cicinelli M, Das A, Jonas J et al. **Magnitude, temporal trends, and projections of the global prevalence of blindness and distance and near vision impairment: A systematic review and meta-analysis.** The Lancet Global Health. 2017; 5(9):e888-e897.

2. **What is VISION 2020? - IAPB [Internet].** IAPB. 2019 [cited 10 January 2019]. Available from: https://www.iapb.org/global-initiatives/vision-2020/what-is-vision-2020.

3. Harrington S, Stack J, Saunders K, O'Dwyer V. **Refractive error and visual impairment in Ireland schoolchildren.** British Journal of Ophthalmology. 2018; bjophthalmol-2018-312573.

4. Dhanesha U, Polack S, Bastawrous A, Banks L. **Prevalence and causes of visual impairment among schoolchildren in Mekelle, Ethiopia.** Cogent Medicine. 2018; 5(1).

5. Durga Kumar C, Anga V. **A cross sectional study on defective vision among secondary school going children in Vijayawada city, Andhra Pradesh.** 2019.

6. Inam S, Asghar F, Naeem T, Unum A, Ahsan U, Latif A. **Prevalence and comparison of undetected refractive errors among children of age b/w 5-10 years in public & private sector schools.** Pakistan journal of medical & health sciences. 2018 Jan 1; 12(1):157-60.

7. Atta Z, Arif AS, Ahmed I, Farooq U. **Prevalence of refractive errors in Madrassa students of Haripur district.** Journal of Ayub Medical College Abbottabad. 2015 Dec 15; 27(4):850-2.

8. Sialkot District [Internet]. **En.wikipedia.org.** 2019. Available from: https://en.wikipedia.org/wiki/Sialkot_District.

9. Sewunet SA, Aredo KK, Gedefew M. **Uncorrected refractive error and associated factors among primary school children in Debre Markos District, Northwest Ethiopia.** BMC ophthalmology. 2014 Dec; 14(1):95.

10. Al Wadaani FA, Amin TT, Ali A, Khan AR. **Prevalence and pattern of refractive errors among primary school children in Al Hassa, Saudi Arabia.** Global journal of health science. 2013 Jan; 5(1):125.

11. Hashemi H, Rezvan F, Beiranvand A, Papi OA, Yazdi HH, Ostadimoghaddam H, Yekta AA, Norouzirad R, Khabazkhoob M. **Prevalence of refractive errors among high school students in Western Iran.** Journal of ophthalmic & vision research. 2014 Apr; 9(2):232.

12. Pi LH, Chen L, Liu Q, Ke N, Fang J, Zhang S, Xiao J, Ye WJ, Xiong Y, Shi H, Yin ZQ. **Refractive status and prevalence of refractive errors in suburban school-age children.** International journal of medical sciences. 2010; 7(6):342.

13. Murthy GV, Gupta SK, Ellwein LB, Munoz SR, Pokharel GP, Sanga L, Bachani D. **Refractive error in children in an urban population in New Delhi. Investigative ophthalmology & visual science.** 2002 Mar 1; 43(3):623-31.

14. Guo L, Yang J, Mai J, Du X, Guo Y, Li P, Yue Y, Tang D, Lu C, Zhang WH. **Prevalence and associated factors of myopia among primary and middle school-aged students: A school-based study in Guangzhou.** Eye. 2016 Jun; 30(6):796.

15. You QS, Wu LJ, Duan JL, Luo YX, Liu LJ, Li X, Gao Q, Wang W, Xu L, Jonas JB, Guo XH. **Factors associated with myopia in school children in China: The Beijing childhood eye study.** PLoS One. 2012 Dec 27; 7(12):e52668.

16. Gong Y, Zhang X, Tian D, Wang D, Xiao G. **Parental myopia, near work, hours of sleep and myopia in Chinese children.** Health. 2014 Jan 7; 6(01):64.

17. Lin Z, Vasudevan B, Jhanji V, Mao GY, Gao TY, Wang FH, Rong SS, Ciuffreda KJ, Liang YB. **Near work, outdoor activity, and their association with refractive error. Optometry and Vision Science.** 2014 Apr 1; 91(4):376-82.

18. Joseph N, Nelliyanil M, Rekha TP, Majgi SM, Rai S, Kotian SM. **Proportion of refractive error and its associated factors among high school students in South India.** British Journal of Medicine and Medical Research. 2016 Jan 1; 11(11):1.

19. Quek TP, Chua CG, Chong CS, Chong JH, Hey HW, Lee J, Lim YF, Saw SM. **Prevalence of refractive errors in teenage high school students in Singapore.** Ophthalmic and Physiological Optics. 2004 Jan; 24(1):47-55.

20. Awan HR, Ihsan T. **Prevalence of visual impairment and eye diseases in Afghan refugees in Pakistan.** [Internet]. Apps.who.int. 2018.Available from: http://apps.who.int/iris/handle/10665/118474.

AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Taskeen Zahra	Conceptuation, Methodology and questionaire development, Analysis plan and formulation.	
2	Intzar Hussain	Perceiving of idea, data collection team head.	
3	Shahmun Munawar	Data collection, content writing.	
4	Shahbaz Baig	Content writing, article review, references writing.	
5	Noreen Maqbool Bokhari	Content writing, article review, references writing.