



Research Paper

Post COVID scenario of visual disorders among rural school children of tribal area of Tripura

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Abstract

Purpose: Tripura is a beautiful North – Eastern state in India. Maximum tribal people live in autonomous area named TTAADC. The study was conducted among the school children in different rural tribal area of Tripura, within 15th September 2021 to 30th November 2021. Children who have normal vision both in distance & near and had no asthenopic problem are not included in this study. The purpose of this study is, to demonstrate the prevalence of visual disorders and the frequency of associated ocular risk factors of online study after pandemic period among rural school children of tribal area of Tripura.

Methods: The Questionnaire-based study was done, including Visual acuity measurement both distance and near, by Snellen's Visual acuity chart, anterior segment examination by torch light with binocular loupe, tear secretion evaluation by Schirmer Tear Test Strips, convergence measurement by RAF rule.

Results: 259 children were randomly examined in that period in different primary school campus of TTAADC of Tripura, where 97(37.45%) were girls and 162(62.55%) were boys. 99(38.22%) children were myopic, 47(18.15%) children were hypermetropic, 70(27.03%) were astigmatic, 43(16.60%) children were suffering convergence anomalies and 91(35.13%) children were suffering dry eye symptoms, 52(20.08%) children were suffering severe dry eye symptoms after pandemic period.

Conclusion: The boys had a higher frequency of a presenting visual impairment than girls. Many students were unaware of visual impairments and their risk factors. Refractive error was the main cause of visual impairment in children after pandemic period in rural tribal area. There was a benefit of spectacles in 80% of those who had visual acuity less than 6/6. To overcome post pandemic dryness can be manage by taking sufficient citrus fruits and drinking water, restriction of uses of digital devices. Hence this survey emphasized the need for similar survey at regular interval.

Keywords: primary school children; rural tribal area; visual impairment; post COVID dryness.

Introduction

The deadly coronavirus originated from Wuhan city of China. The coronaviruses are transmitted directly or indirectly human contact, or viral droplets. So, the prevention of the spreading of the

COVID-19 by maintaining social distancing and hygiene maintain. COVID infected patient are found both symptomatic and asymptomatic. Symptoms starting from sore throat, cough, with fever, subsequently it led to renal failure,

respiratory failure, and multiple organ failure. The World Health Organization (WHO) declared COVID-19 as a pandemic. As a result, the education system was challenged all over the world and forced educators to shift to an online mode of teaching for not to break up the academic session.

All educational institutions have been closed since 16th March 2020 to stop the spreading of the COVID. The traditional face to face teaching method converted into online digital classes. All the students attending their classes through a smartphone. Long time using of smartphone or any digital devices for online classes facing major ocular problems in school students. Most common ocular problems from digital devices are eyestrain, dry eyes, itching, blurring vision, eye ache, headache, watering, blurring vision.

Uncorrected refractive errors are one of the major causes of visual impairment in children and adolescents worldwide.¹ In recent years, under the influence of external environmental alterations such as the decrease in outdoor activities, overuse of electronic products, and intensive education, myopia has the trend of a younger onset and faster progression.¹

Ametropia, especially myopia, is closely related to long-term eye use in short distances. It is widely accepted that the progression of myopia accelerated during the epidemic, especially in young children.²

In some studies, it was observed that daily more two hours regular and continuous smart phone user were more sufferer in digital eye strains. Few studies also found about ocular complications due to abuses of digital device among young adults. There was no proper studies and reports were found related to post pandemic ocular complications due to excessive uses of digital devices during online classes in Tribal area of Tripura.

Aims & Objectives of the Study

- 1) The aim of this study is to demonstrate the scenario of visual disorders after pandemic

period among rural school children of tribal area of Tripura.

- 2) To know the frequency of associated ocular risk factors of online study among the school children who used digital devices to attend online classes during the pandemic in tribal area of Tripura.

Back Ground & Profile of the Study Area

Tripura is a small and beautiful state in North-East India. Total area of Tripura is 10,491 km², in which 7,132.56 km² under the Tripura Tribal Areas Autonomous District Council (TTAADC). According to 2011 census total population of TTAADC 12,16,465, in which 10,21,560 people are schedule tribe. There are 19 different tribal community people are residing in TTAADC, like Tripuri, Riang, Jamatia, Noatia, Uchai, Chakma, Mog, Lushai, Kuki, Halam, Munda, Kaur, Orang, Santal, Bhil, Bhutia, Chaimal, Garo, Khasia, and Lepcha. Each community has their own unique culture. Currently, TTAADC has 1622 primary schools and one residential English medium high school. Every year around eighty thousand children are admitted in different primary schools of TTAADC. Primary level schools consist with class I to Class V. It was restricted of online classes for I to III standard children by the central government in pandemic period. Only classes IV to V standard children were attend their online classes digitally.

Materials and Methods

Questionnaire-based study was done among primary level students of TTAADC, those who were attending online classes during the pandemic period by digital devices. The questionnaires of survey comprised of digital device information, visual performance, and clinical observation of the students after pandemic situation. The whole study was conducted in the month of 15th September 2021 to 30th November 2021. Visual acuity measurement both distance and near, by Snellen's Visual acuity chart, anterior segment examination by torch light with binocular loupe,

tear secretion evaluation by Schirmer Tear Test Strips, convergence measurement by RAF rule. Every primary standard Student was attending minimum four hours online classes during pandemic period.

In this study, digital eye strain related symptoms and their severity and frequency were recorded. Eye strain-related symptoms like burning sensation, itching, foreign body sensation, watering, excessive blinking, redness, eye-ache and headache, dryness, blurring vision, difficulty to see near object, photophobia sufferer were observed. Children those who were facing post pandemic any ocular symptoms, they were included in this study. Children those who were not attend online classes and had no vision related ocular problem were excluded from this study.

Results

Children those who had attending online classes and suffering visual abnormalities after pandemic period were examined in this study. Total 259

children were randomly examined in that period in different primary school campus of TTAADC of Tripura, where a questionnaires sheet was provided to every class IV and V standard children, where 97(37.45%) were girls and 162(62.55%) were boys [Table No. 1].

Table No. 1 Gender wise school children distribution

Boys	Girls
162(62.55%)	97(37.45%)

Out of total school children, 99(38.22%) children were myopic, where 62(23.94%) boy child and 37(14.29%) girl child; 47(18.15%) children were hypermetropic, where 33(12.74%) boy child and 14(05.41%) girl child; 70(27.03%) were astigmatic, where 41(15.83%) boy child and 29(11.20%) girl child; and 43(16.60%) children were suffering convergence anomalies, where 26(10.04%) boy child and 17(06.56%) girl child. [Table No. 2].

Table No. 2 Post pandemic ocular abnormalities distribution among tribal school children

Suffering with	Boys	%	Girls	%	Total	%
Myopia	62	23.94	37	14.29	99	38.22
Hypermetropia	33	12.74	14	05.41	47	18.15
Astigmatism	41	15.83	29	11.20	70	27.03
Convergence anomalies	26	10.04	17	06.56	43	16.60
Total	162	62.55	97	37.45	259	100.00

Out of 99(38.22%) myopic school children, 59(22.78%) children were corrected less than equal to -0.50Dsph ; 21(08.11%) children were corrected less than equal to -1.00Dsph ;

11(04.25%) children were corrected less than equal to -2.00Dsph ; 08(03.09%) children were corrected above -2.00Dsph [Table No – 3].

Table No. – 3 Gender wise myopia distributions among tribal school children

Myopia	Boys	%	Girls	%	Total	%
Less than equal to -0.50Dsph	36	13.90%	23	08.88%	59	22.78%
Less than equal to -1.00Dsph	14	05.41%	07	02.70%	21	08.11%
Less than equal to -2.00Dsph	07	02.70%	04	01.54%	11	04.25%
Above -2.00Dsph	05	01.93%	03	01.16%	08	03.09%
Total	62	23.94%	37	14.28%	99	38.22%

Out of 47(18.15%) hypermetropic school children, 29(11.20%) children were corrected Less than

equal to $+0.50\text{Dsph}$; and 18(06.95%) children were corrected above $+0.50\text{Dsph}$ [Table No – 4].

Table No – 4 Gender wise hypermetropia distributions among tribal school children

Hypermetropic	Boys	%	Girls	%	Total	%
Less than equal to + 0.50Dsph	21	08.11	08	03.09	29	11.20
Above + 0.50Dsph	12	04.63	06	02.32	18	06.95
Total	33	12.74	14	05.41	47	18.15

Out of 70(27.03%) astigmatic school children, 44(16.99%) children were suffering by simple astigmatism; 20(07.72%) children were suffering

by compound astigmatism; again 06(02.32%) children were suffering by mixed astigmatism [Table No – 5].

Table No – 5: Gender wise astigmatism distributions among tribal school children

Astigmatic	Boys	%	Girls	%	Total	%
Simple	26	10.04	18	06.95	44	16.99
Compound	11	04.25	09	03.47	20	07.72
Mixed	04	01.54	02	00.78	06	02.32
Total	41	15.83	29	11.20	70	27.03

Out of total school children, 43(16.60%) children were suffering with different types of convergence anomalies like convergence excess or convergence insufficiency, which was measured

by RAF rule. Out of 43 children, 25(09.65%) children were suffering convergence excess and 18(06.95%) children were suffering convergence insufficiency [Table No. 6].

Table No. 6 Gender wise Convergence anomalies distributions among tribal school children

Convergence anomalies	Boys	%	Girls	%	Total	%
Convergence excess	16	06.18	09	03.47	25	09.65
Convergence insufficiency	10	03.86	08	03.09	18	06.95
Total	26	10.04	17	06.56	43	16.60

Children those who were suffering asthenopia, even both the near and distance visual acuity was normal in both eyes, had found convergence anomalies. They were advised for push up and push down eye exercise to convergence insufficiency and convergence excess respectively. They had no need for refractive error corrections.

In this study, it was found that 91(35.13%) children were suffering dry eye symptoms after pandemic period, 52(20.08%) children were suffering severe dry eye symptoms after pandemic period [Table No. 7].

Table No. 7 Tear secretion test after pandemic period among tribal school children

Schirmer's test	Boys	%	Girls	%	Total	%
More than 10mm	73	28.19	43	16.60	116	44.79
Less than 10mm	55	21.23	36	13.90	91	35.13
Less than 5mm	34	13.13	18	06.95	52	20.08
Total	162	62.55	97	37.45	259	100.00

Out of total children, only 67 (25.87%) children had no ocular symptoms developed after pandemic period. Otherwise, rest 182 children had found one or more ocular symptoms like redness 08.11%, Itching 12.36%, blurring vision 25.48%,

dryness 39.77%, foreign body sensation 29.73%, burning sensation 35.91%, headache and eye-ache 14.67%, photophobia 07.34%, watering 16.60% [Table No. 8].

Table No. 8 Students suffering different types of Ocular symptoms after pandemic period

Ocular symptoms	No.'s of children	%
Redness	21	08.11%
Itching	32	12.36%
Blurring vision	66	25.48%
Dryness	103	39.77%
Foreign body sensation	77	29.73%
Burning sensation	93	35.91%
Headache & eye-ache	38	14.67%
Photophobia	19	07.34%
Watering	43	16.60%

Discussion

In this study, there is a clear scenario of the prevalence of post pandemic visual abnormalities among the school children of TTAADC of Tripura. It is also clear that participation of girl children was very low. Myopia was the most prevalent type of refractive error than other types of refractive errors. Convergence anomalies related asthenopia also developed among tribal school children, due to long time uses of digital devices. Simple myopia was more than other types of refractive errors in tribal school children. School children less than +0.50Dsph hypermetropia was found than over correction. In this study it was found that simple astigmatism is much more than compound and mixed astigmatism.

The long and extensive study regimen of a medical school involves extensive near-work such as reading and writing.³ Another study suggested that an increased amount of near-work could cause an early defective vision and its progression in adulthood.⁴ The possible association between near work activity and the prevalence of refractive error can be explained on the basis that increasing the amount of near-work done can consequently increase accommodation, which in turn could potentially cause defective vision, particularly myopia.⁵

Continuous smartphone use leads to a decrease in the blink rate, causing dry eye-related problems. Smartphones are also used with a short viewing distance because of their small screens, thus causing more asthenopia symptoms.⁶

The purpose of the study was to collect data on visual disorders among rural school children of tribal area of Tripura after pandemic period. In the study it was also collect data on dryness after post pandemic period. 91(35.13%) children were suffering dry eye symptoms and 52(20.08%) children were suffering severe dry eye symptoms after pandemic period in rural area tribal school children in Tripura.

In the study it is clear that the online study developed ocular abnormalities even in tribal school children of Tripura. Which developed the asthenopic symptoms related ocular abnormalities. More than 70% students were developed low corrected myopia, hypermetropia, and astigmatism after long time digital study in pandemic period. Which could be due to improper uses of digital devices, low illumination in study area, unconsciousness.

Conclusion

The boys had a higher frequency of a presenting visual impairment than girls. Many students were unaware of visual impairments and their risk factors. Refractive error was the main cause of visual impairment in children after pandemic period in rural tribal area. There was a benefit of spectacles in 80% of those who had visual acuity less than 6/6. Such refractive errors can be easily diagnosed, measured and corrected with spectacles. If, however, they are not corrected or the correction is inadequate, gradually refractive errors become a major cause of low vision and development of amblyopia even blindness. To overcome post pandemic dryness can be manage

by taking sufficient citrus fruits and drinking water, restriction of uses of digital devices. Hence this survey emphasized the need for similar survey at regular interval. Healthy vitamin-A related diet or vitamin- A supplement can relief the prevalence, sufficient taking of drinking water, adequate sleep is necessary can relief from post pandemic visual disorders. In severe conditions instillation of artificial tear to protect cornea. Regular eye check-ups are strongly recommended for rural school children of tribal area of Tripura. Correction of refractive error is a dynamic process. Hence this survey emphasized the need for similar survey at regular interval.

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