EXCESS SCREEN BASED MEDIA USE, A PREDICTOR OF AUTISM SPECTRUM DISORDER AND ITS SEVERITY?

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ABSTRACT

Objective: To analyze association of excess screen media use and autism spectrum disorder.
Study Design: Analytical study.
Place and Duration of Study: The Children Hospital & Institute of Child Health, Lahore, from Jan 2016 to Jun 2016 (total 6 months).
Methodology: Total 100 children aged ≥3 years were included. Informed written consent was taken. Institutional Review Board approval was taken. Data regarding age, gender, socioeconomic status, autism severity and total time spent in hours per day in static screen media (television, mobiles, I-pads, computers, laptops etc.) with excess defined as ≥2 hours/day was recorded on a questionnaire proforma. Childhood Autism Rating Scale II (CARS II) was administrated in addition to clinical diagnosis of autism based on Diagnostic & Statistical Manual V (DSM V) criteria (APA 2013). Statistical analysis was performed using latest SPSS. Chi square test and logistic regression was used to analyze significance (p<0.05).
Results: There were 84 males (84%) and 16 females (16%). Sixteen (16%) patients had mild form, 38 (38%) had mild to moderate form, 33 (33%) had moderate to severe and 13 (13%) had severe autism category. The severity of autism spectrum disorder was associated with longer the time spent in static screen media and association was statistically significant (p=0.01).
Conclusion: Excess screen media use may be considered a risk factor for Autism Spectrum Disorder and its severity.

Keywords: Autism spectrum disorder, Static screen media, Socioeconomic status.

INTRODUCTION

Autism spectrum disorder is a developmental disorder with deficit in social communication social interaction with repetitive behaviors, attitudes and interests. It includes difficulties in spoken language, interaction with peers, verbal and nonverbal and reciprocal interaction. It is now an umbrella term including disorders which were previously considered as separate like Autism, Asperger syndrome, pervasive development disorder not otherwise specified.

Childhood disintegrative disorder and Rett's syndrome are no longer included in the spectrum[1].

The diagnosis of autism spectrum disorder is based on diagnostic & statistical manual V diagnostic criteria which includes[2].

a. Persistent deficits in social communication and social interaction currently or by history:
   - Impairment in social-emotional reciprocity
   - Impairment in nonverbal aspect of communication like body movements, eye contact and jextures used for social interaction
   - Deficits in developing, maintaining, and understanding relationships

b. Restricted, repetitive patterns of behavior, interests, or activities, as manifested by at least two of the following, currently or by history:

Stereotypic or repetitive motor movements, use of objects, or speech like echolalia

Persistence to sameness like sameness of routines, or ritualized patterns of verbal or nonverbal behavior

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Highly restricted, fixated interests that are abnormal in intensity or focus that are difficult to change

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Hyper or hyposensitivity to sensory stimuli or unusual interest in sensory aspects of the environment and objects.

The severity of Autism Spectrum Disorder is based on degree of impairment in these two key areas as level 1 (needing support), Level II (needing substantial support), Level III (needing very substantial support).

c. Symptoms must be present in early development period
d. Symptoms cause clinically significant impairment in social, occupational or other areas of current functioning
e. These impairments are not better explained by Intellectual disability or Global development delay[3].

The worldwide prevalence of autism has been on steady increase. In early 1970s, prevalence estimates from European studies were 1/2,500 children[3] and by the end of 20th century the prevalence estimates from large surveys were 1-2% of all children[4]. Current estimates in United States population show prevalence rate of Autism Spectrum Disorder to be 20.6/ 10,000. Studies suggest that this increase in prevalence may be attributable to improved awareness and recognition and changes in diagnostic practice and criteria[5].

Nazish *et al* diagnosed autism in 3.2% of all children referred to a tertiary care hospital in Pakistan with developmental delay[6].

The etiology and pathogenesis of autism spectrum disorder is complex and multifactorial. Male preponderance, genetic and familial factors with increased risk in unaffected siblings (19%)[7], closer pregnancy space, advanced maternal and paternal ages[8], extreme prematurity (3 times more common in <27 weeks)[9], in utero exposure to drugs like valproate[10] and anti depressants[11] and toxins and metabolic disorders[12] have been implicated in etiology and pathogenesis of autism spectrum disorder.

Although not extensively studied, but literature shows that excess television watching in early childhood development period is not only deleterious for development but is an important trigger of autism.

The purpose of this study is to determine and analyze association of excess exposure to static screen media with Autism Spectrum Disorder as autism is being frequently diagnosed in children presenting with speech delay and social communication impairment and the use of screen media in early development period is on the rise in our population. The results of our study may help educate the parents/caregivers about potential hazards of screen media in early critical developmental period of language that is verbal and nonverbal and communication skills. So that by reducing the time spent is static screen media in this critical period may thereby reduce the risk of this disorder or its intensity in our children.

So the objective of this study was to analyze and determine any association of excess screen based media use with Autism Spectrum Disorder and its severit

METHODOLOGY

This analytical study was conducted in development & behavior pediatrics outpatient department, at Children's Hospital & Institute of Child Health, Lahore from Jan 2016 to Jun 2016.

Institutional Review Board approval was taken. Informed consent was taken from parents or guardians.

Total of 100 children of either gender with age ≥36 months visiting Out Patient Department of Developmental & Behavior Pediatrics the Children's Hospital & Institute of Child Health, Lahore with suspicion of Autism Spectrum Disorder were enrolled. Detailed history including birth history, pre natal, natal and post natal history was taken. Developmental history in all areas of development was taken. Past medical

and family history was also recoded and physical examination was carried out along with detailed parents' questionnaire by Developmental & Behavior Paediatrician. Children which were excluded from study included:

Children having autism like features but with diagnosis other than Autism Spectrum Disorder, like Attention Deficit Hyperactivity Disorder, Global Development Delay or Intellectual disability (Intellectual developmental delay) or overlapping features, other underlying medical or neurodevelopmental disorders like fragile X syndrome, Tuberous Sclerosis, those having incomplete recall of the exposure to screen media time.

Data regarding age, gender, socioeconomic status, autism severity and total time spent in hours per day in static screen media (television, mobiles, I-pads, computers, laptops etc.) with excess defined as ≥2 hours/day was recorded on a questionnaire Proforma. Childhood Autism Rating Scale II (CARS II) was administrated by a clinical psychologist trained in dealing children with Autism Spectrum Disorder in addition to clinical diagnosis based on Diagnostic & Statistical Manual V (DSM V) criteria (APA 2013) by a Developmental Paediatrician. Patients were categorized according to severity as mild, mild to moderate, moderate to severe and severe depending on Childhood Autism Rating scale II score.

Statistical analysis was performed using SPSS latest version to look for association between amount of time spent in screen media and degree of autism severity. Chi-square test and logistic regression tests were used to calculate significance (p<0.05).

RESULTS

A total of 106 children of Autism Spectrum Disorder were included while 6 children were excluded due to overlapping features. Data of these 100 children was used for analysis. There were 84 males (84%) and 16 females (16%) with M: F ratio of ≈ 5:1.

Mean age of the patients were 54.92 months with Standard deviation of 22.749 months. Minimum age was 36 months and maximum was 132 months with range of 96 months. The age distribution of cases is shown in fig-1.

Out of 100 cases, 2 (2%) belonged to low socioeconomic status, 31 (31%) belonged to middle socioeconomic status and 67 (67%) belonged to high socioeconomic status as shown in fig-2.

Out of 100 children, distribution as per severity was 16 (16%) in mild severity, 38 (38%) in mild to moderate severity, 33 (33%) in moderate

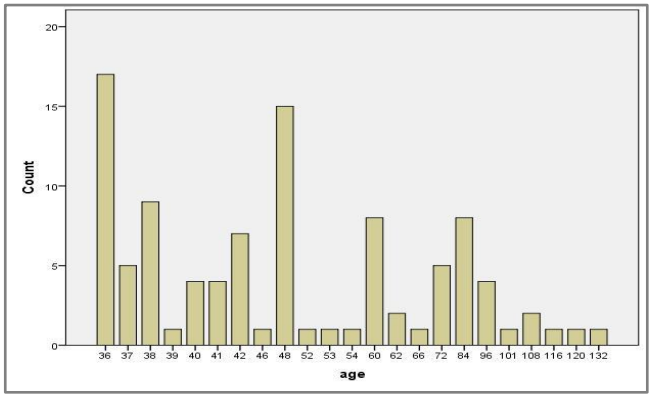

Figure-1: Age distribution among 100 patients.

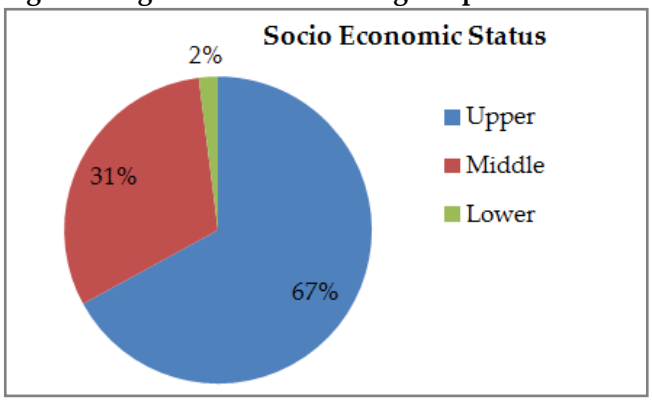

Figure-2: Socio-economic distribution among patients.

to severe category and 13 (13%) in severe autism category as shown in fig-3.

Out of 16 cases of mild category of Autism Spectrum Disorder, n=2 belonged to lower and n=2 to middle socioeconomic status while n=12 to upper socioeconomic status. Out of 38 cases of mild to moderate severity Autism Spectrum Disorder, n=10 were from middle and n=28 from

upper socioeconomic status while no case belonged to low socioeconomic status. Out of 33 cases of moderate to severe cases of Autism Spectrum Disorder, n=17 belonged to middle and n=16 belonged to upper socioeconomic status, while no

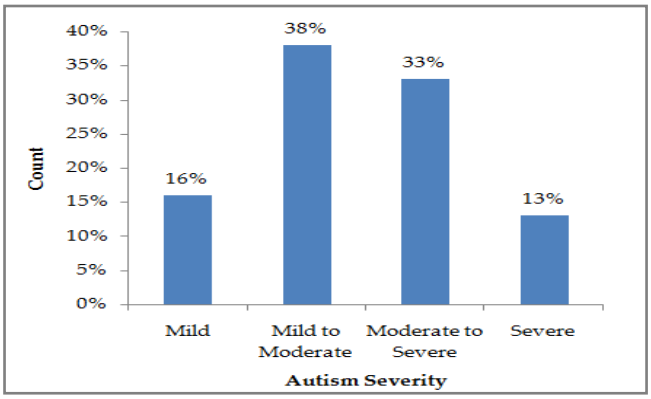

Figure-3: Distribution of autism severity among patients.

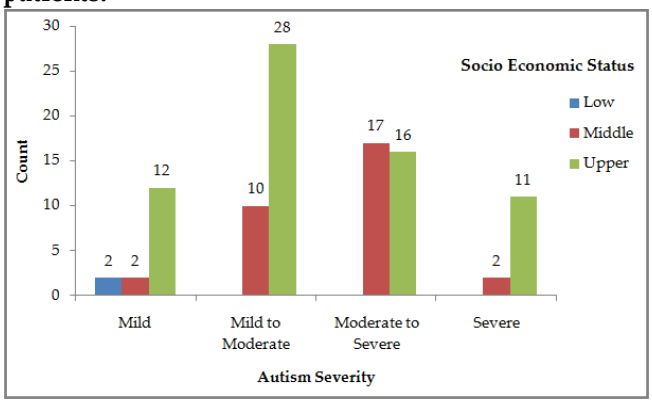

Figure-4: Distribution of autism severity with socioeconomic status.

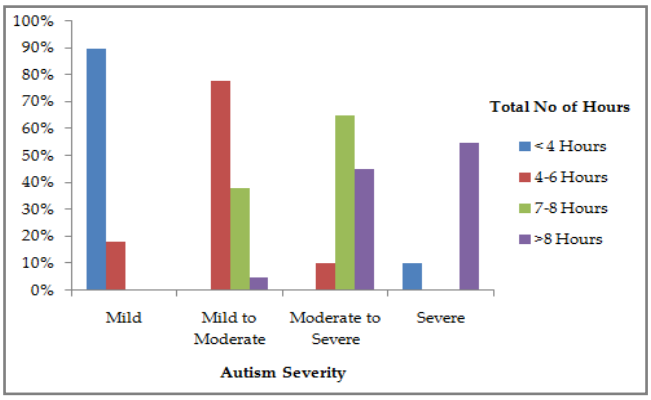

Figure-5: Association of Autism Spectrum Disorder severity with total time spent is screen media.

case belonged from low socioeconomic status. Out of 13 cases of severe Autism Spectrum Disorder, n=2 were from middle and n=11 from upper socioeconomic status while no case belonged to low socioeconomic status (fig-4). The association between socioeconomic status and Autism Spectrum Disorder severity was statistically significant (p=0.001).

The severity of Autism Spectrum Disorder was associated with greater the time spent in screen media i.e. more the time spent in static media, more severe degree of Autism Spectrum Disorder was noticed (fig-5) and association between Autism Spectrum Disorder severity and total time spent in screen media was statistically significant (p=0.01).

DISCUSSION

Autism Spectrum Disorder is a disorder with complex etiology and pathogenesis. The possible causes are genetic, environmental, infectious, drugs and vaccines like post Measles/ Mumps/Varicella vaccine. There is lot of research showing increased prevalence of screen based media use including television, computers and video games in children with Autism Spectrum Disorder[13], but there are few studies linking excessive use of screen media in etiology and severity of Autism Spectrum Disorder. This study was aimed to determine any association between excessive time spent in screen media with Autism Spect-rum Disorder and its severity.

Male predilection was noticed with Male: Female ratio of 5:1 in our study, which is similar to what is found in previous studies. Chakrabarti S showed that male: Female ratio for Autism Spectrum Disorder is 4:1 close to our study[14]. Higher male prevalence is extensively studied in literature but the factors responsible remain unclear. The possible explanations may be gender discrimination, inability of diagnostic tests like to differentiate among gender or biological reasons such as imprinted X linked genes[15].

Our study showed that overall Autism Spectrum Disorder is more prevalent in middle and upper socioeconomic class, 98% belonging to middle and upper socioeconomic class while only 2% from low socioeconomic class. A similar

pattern was observed in severity of Autism Spectrum Disorder i.e. more severe disease seen in middle to higher socioeconomic class while the severity of Autism Spectrum Disorder did not progress beyond mild Autism Spectrum Disorder in low socioeconomic class. These results coincide with the studies done by Thomas[16], explaining high prevalence of Autism Spectrum Disorder in high socioeconomic class. This may be due to easy access of children to screen media belonging to high socioeconomic class but it needs further epidemiological research. A study by Rai[17] shows Autism Spectrum Disorder more prevalent in lower socioeconomic status which is in contrast to our results that may be due to the fact that children belonging to lower socioeconomic status may have less access to the diagnostic services and less awareness among parents and caregivers about the disease.

Literature does show that the use of screen media is high in children with Autism Spectrum Disorder than with other disorders or typically developing children. A study performed by Mazurek *et al*[18] in youth population of Autism Spectrum Disorder revealed 64.2% spend most of their free time in nonsocial media including television and video games while 13.2% used social media. This was a case control study using children with other disabilities like speech/ language impairment as comparison group. Our study also showed increased use of screen media in Autism Spectrum Disorder children but our study population ranged from 3 years to 12 years of age. Regarding severity of symptoms of Autism Spectrum Disorder, literature shows that the excess use of screen media is associated with other problems in Autism Spectrum Disorder children which may include sleep problems[19], problem behaviors especially oppositional behaviors in youth as shown in a study by Mazurek *et al*[20], and more inattentive symptoms with excess use of screen media especially video games. Our study also highlighted that severity of symptoms of Autism Spectrum Disorder was directly proportional to time spent in screen media.

Studies in younger children regarding effects of television show that amount and quality of parent child interaction decreases with background television[21] and this also results in decreases meaningful play and attention span in young children, having impact on subsequent overall and cognitive development.

Mistry[22] did a prospective study analyzing television exposure (defined as >2 hour) at an age of 30 months and 5 years, Child Behavior Checklist and Social skills Rating System at 5.5 years, the study showed that excessive screen media use was associated with behavior problems and poor social skills. This is in conformity with our study which may be to the fact that our study population also included the similar study population and operational definitions.

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RECOMMENDATION

Comparison may be done with children with typical development having exposure to screen media. Also trials may be conducted showing reduction in exposure to screen media leads to improvement in clinical features of Autism Spectrum disorder.

CONCLUSION

Based on the findings noted in our study that, Excess screen media use may be considered a risk factor for Autism Spectrum Disorder and its severity but for better understanding of the association case control study or trial may be done.

CONFLICT OF INTEREST

This study has no conflict of interest to be declared by any author.

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