

# Impact of Screentime on quality of life in children with Autism and Social communication disorder – A Comparative study

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## Abstract

### Background:

Autism is a neurodevelopmental disorder with impairment in social emotional and communication domains and presence of repetitive behaviours and restrictive interest. Social communication disorder is closely related to Autism and is characterized by a persistent difficulty in using verbal and nonverbal communication in a socially appropriate manner with absence of stereotypical behaviour present in autism. Excessive screen time has significant impact on the quality of life of children especially those with neurodevelopmental disorders like autism, SCD. Quality of life evaluation has a significant influence on the treatment and intervention options of ASD children. Hence, this study was conducted to compare the effect of screentime in quality of life of children with autism and SCD.

### Methods:

60 children in the age group of 2-10 years diagnosed with ASD/SCD along with 60 age and sex matched normal children as controls were included in the study. After applying exclusion criteria, informed consent, detailed history including complete details of screen exposure was obtained and evaluation was done. Pediatric

Quality of life inventory (PedsQL) was used to assess the quality of life of these children. Data were analysed and comparison was done using SPSS-23 statistical software.

### Results:

In the study, 8 girls and 20 boys were diagnosed with SCD and 10 girls and 22 boys were diagnosed with ASD. 65% of children were in 2-5 years of age and 35 % were in 5-10 year age group. Children with ASD with screen time <2hrs was 59.3% and >2hrs was 40.7% and in SCD, screen time < 2 hours was 82.1% and >2 hours was 17.8%. 8(72.7%) children with severe ASD had screen time >2 hours while only 1 child with severe SCD had screen time >2 hours. The quality of life was significantly different between the control and the ASD/SCD groups with ASD group more significantly affected. Further, the difference in quality of life was statistically significant with ASD and SCD having higher screen exposure, with ASD children more affected (p value < 0.01%)

### Conclusion:

Quality of life is affected in children with ASD and SCD, but more so in ASD children with screen exposure. Hence parents must strictly adhere to the screen time guidelines of Indian Academy of Pediatrics to improve the overall prognosis

and quality of life in children with autism and SCD, which in turn may have significant effect on effectiveness of therapy. While giving therapy with electronic tools in children with communication disorders, specific caution on quality of program should be considered for the ASD subgroups than in SCD.

**Keywords :**Autism , SCD , screen -time , quality of life , neurodevelopmental disorder .

### **Introduction :**

Autism Spectrum Disorder (ASD) is a neuro developmental condition distinguished by difficulties with social communication and adaptive skills. The core features of ASD include deficits in the quality of communicative interactions, like difficulties with initiating, misinterpreting information and impairment in nonverbal communication and responding and maintaining conversations, impairments in sharing pleasure or joint attention, limitations in making inferences, and difficulties with developing and maintaining age-related social relationships<sup>[1,2]</sup> Most parents worry that their children will not be able to live normally and independently. In addition, lack of public awareness about autism and the increasing numbers will bring a heavy burden on society and health systems. Since the prevalence of ASD in India is increasing (1:65) in age group of 2 -9 years,<sup>[3]</sup>the parents of autistic children need to be empowered to make their children self-reliant in life.

Autism Spectrum Disorders (ASD) and Social Communication Disorder (SCD) are closely related entities. SCD is characterized by a persistent difficulty in using verbal and nonverbal communication in a socially appropriate manner, which is not otherwise explained by other diseases such as global developmental delay, autism spectrum disorders, intellectual disability, or hearing impairment. DSM-5 defines this as a separate disorder. Initially, it was not thought to be a separate entity from ASD, while ASD does comprise of social communication issues, but it also includes restricted, repetitive stereotypical behaviour. ASD must be ruled out to diagnose

SCD. So, a separate diagnosis of SCD had to be coined to warrant that the distinctive requirements of these children were fulfilled.<sup>[4]</sup>

Digital technology and screen time have become an inevitable part of childhood, with the shift of learning and socialization to virtual environments.<sup>[5]</sup>According to IAP consensus 2021, Children below 2 years age should not be exposed to any type of screen; in children 2 -5 years of age screen time should be limited to less than 1 hour per day which includes recreational screen time, and time spent on screen at home to complete educational and extra-curricular assignments. In the age group of 5 -10yrs the screen time should be limited to less than 2 hours per day. Screen exposure should be used for the purpose of social interaction, education, and learning, with recreational screen time kept to a minimal.<sup>[6]</sup>

Quality of life evaluation has a significant influence on the treatment and intervention options of ASD children. PedsQL-4 Generic Core Scales, which has 23 items, measure the core dimensions of health as delineated by the World Health Organization and the role (school) functioning. There are four multidimensional scores and three summary scores, which include physiological function (8 items), emotional function (5 items), social function (5 items), and role function (5 items).<sup>[7]</sup>Lack of awareness, lack of acceptance by parents in early stages and resource constraints prevent early interventions making it more complicated, affecting the QoL of these children later in life.

Television watching for greater than 2 hours per day causes obesity among preschool children.<sup>[8]</sup>Food advertisement is an important link connecting media time with unhealthy food consumption and subsequent obesity.<sup>[9]</sup>There are various proposed mechanisms of screen exposure and obesity which include decreased physical activity, increased intake of high-calorie, low-energy food, and decreased sleep. Violent daytime media exposure has also been associated with sleep problems, nightmares and night awakenings, again affecting the quality of sleep

adversely.<sup>[10]</sup> Reduced blink rate and amplitude have been consistently reported with screen use, which leads to headaches.<sup>[11]</sup>

Excessive screen time has significant impact on the quality of life of children especially in those with neurodevelopmental disorders like autism, SCD.<sup>[12]</sup> This study was conducted to study the impact of screen time on the quality of life of children with ASD and SCD and to know significant difference if any, between the quality of life of both the groups. This will in turn help us to improve the quality of life of these children, which will in turn improve their therapy outcomes.

### **Materials and Methods:**

Sixty children enrolled in Saveetha Child development centre in the age group of 2-10 years, diagnosed with either autism spectrum disorder or social communication disorder by DSM -V criteria, were included by consecutive sampling for this prospective study conducted over a 2 year period from August 2020 to July 2022 after getting IEC approval (002/08/2020/IEC/SMCH). 60 normal age and sex matched children were also recruited and their screen time exposure was also assessed.

*Inclusion criteria:* Children in 2-10 years with documented diagnosis of autism / social communication disorder by a developmental paediatrician and a clinical psychologist according to DSM-5 criteria were included in the study.

*Exclusion criteria:* All children with other comorbidities like other system disorders like heart disease, autistic symptoms as part of other disorders, including neurodegenerative disorders, other psychiatric disorders like schizophrenia, depression, etc. were excluded. Children with screen time < 1 hour /day were also excluded.

Informed consent was obtained. Detailed history with emphasis on screen time was obtained. Diagnosis of ASD was done with DSM-5 and severity of ASD assessed by ISAA and Clinical Global Impressions scale (CGI), whereas severity of SCD was assessed by CGI alone. CGI was chosen as SCD as such had no severity rating scale. Pediatric Quality of life inventory (PedsQL) was used to assess the quality of life of these children. PedsQL has two scales- one for children and the other one for their parents. We used the parent-report version in this study. PedsQL-4 Generic Core Scales, which has 23 items, measure the core dimensions of health as delineated by the World Health Organization and the role (school) functioning. There are four multidimensional scores and three summary scores, which include physiological function (8 items), emotional function (5 items), social function (5 items), and role function (5 items).

AAP guidelines were used initially, followed by ratified guidelines by IAP on screen time. It was introduced to parents, focussed group discussions were held to help them understand, followed up with checking their understanding and reinforcement of following the directions at home at every encounter with parents. PedsQoL data was collected before this counselling sessions and Data were analysed using SPSS-23 and effect of screen time on quality of life of children with ASD and SCD was compared.

### **Results :**

In the present study we had 8 girls and 20 boys with SCD and 10 girls and 22 boys with ASD in the study sample. Children in the age group of 2-10 yrs were enrolled where, a majority of 65% were in 2-5 years of age and 35 % were in 5-10 years.

**Table 1. Screen time in ASD ,SCD and Control:**

Condition/ Hour of exposure	N	Percentage
ASD<2hr	19	59.3%
ASD>2 hr	13	40.7%
SCD<2 hr	23	82.1%
SCD >2 hr	5	17.8%
Control <2hrs	27	45%
Control >2hrs	33	55%

Table 1 shows screen time in ASD <2hrs as 59.3% and more than 2hrs as 40.7% and less than 2hrs in SCD as 82.1% and more than 17.8%.

**Table 2. Screen time vs age group**

Age group/ screen time	<2 hours	>2hours
ASD 2-5 years	19(48%)	9(23%)
ASD 5-10 years	0	4(19%)
SCD 2-5 years	8(20.5%)	3(8%)
SCD 5-10 years	15(71.4%)	2(9.5%)

19 children(48%) with ASD within age group of 2-5 years had screen time of < 2 hours, 9 children with ASD in the age group of 2-5 years had screen time more than 2 hours.

**Table 3. Compare ISAA and CGI of ASD**

Severity	ISAA	CGI	Significance
Mild	14	13	0.8459 (not significant)
Moderate	7	9	
Severe	11	10	

10 children had severe ASD while 9 children had moderate ASD and 13 children had mild ASD using CGI.

**Table 4. Severity of ASD vs SCD using CGI scale**

Type (N)	Mildly ill	Moderately ill	Severely ill
ASD	13	9	10
SCD	19	7	2

10 children had severe ASD while 9 children had moderate ASD and 13 children had mild ASD using CGI. In SCD group only 2 children had severe illness while 19 were mildly ill.

**Table 5: ASD and severity vs screen time**

ASD severity*/ Screen time	<2 hours	>2 hours	Significance
Severe ASD	2(6.25%)	8(25%)	0.0405*
Moderate ASD	7(21.8%)	2(6.25%)	
Mild ASD	10(31.2%)	3(9.3%)	
Severe SCD	1(3.5%)	1(3.5%)	
Moderate SCD	6(21.4%)	1(3.5%)	
Mild SCD	16(57.1%)	3(10.7%)	

8 children with severe ASD had screen time more than 2 hours while 2 children with moderate ASD had screen time >2 hours.

**Table 6. PedQol of ASD vs SCD vs control in children**

Type (N)	Physiological function	Emotional function	Social function	Psychological function	Overall function
ASD(32)	61.8+/-26.01	52.97 ± 26.62	45.03 ±26.92	36.69 ± 31.60	49.27 ± 24.3
SCD(28)	80.01 ± 10.07	69.89 ± 10.15	78.89 ± 19.26	71.05 ± 10.03	73.14 ± 13.1
Control(60)	90.17 ± 12.98	78.89 ± 19.26	84.89 ± 16.41	81.75 ± 17.03	83.23 ± 15.2
t	t=12.988	t=9.951	t=17.131	t=16.786	t=16.872
p	p<0.01	p<0.01	p<0.01	p<0.01	p<0.01

There is statistical significance between the quality of life in children with ASD and SCD when compared with controls.

**Table 7. Disease severity vs PedQol of life in ASD & SCD**

Groups	Physiological function	Emotional function	Social function	Psychological function	Overall function
1. Severe ASD(n=10)	51/02 ± 21.79	41.75 ± 23.50	31.73 ± 21.04	23.15 ± 21.58	36.59 ± 14.89
2.Moderate ASD (n=9)	73.867 ± 10.61	62.53 ± 19.90	51.19 ± 17.29	47.54 ± 32.70	62.61 ± 39.45
3.Mild- ASD (n=13)	83.767 ± 14.94	75.81 ± 16.70	70.13 ± 19.89	68.68 ± 22.25	74.49 ± 15.05
4.severe SCD (n =2)	71.542 ± 19.53	61.52 ± 17.81	52.24 ± 14.21	49.52 ± 13.72	65.73 ± 29.43
5.Moderate SCD(n=7)	86.965 ± 13.71	70.84 ± 16.50	62.10 ± 29.70	69.78 ± 82.21	78.72± 18.42
6.Mild SCD(n=19)	90.14 ± 13.42	79.17 ± 19.47	85.29 ± 16.42	82.55 ± 16.33	85.63 ± 13.89

The quality of life in children with ASD was significantly impaired when compared to children with SCD,especially those children with severe ASD.

**Discussion :**

Excessive media exposure is fraught with many ill-effects,mainlycausing delay in language development. This early exposure and continuing exposure will not only result in speech & language disorders but also retard the progress of already established disorders. In our study we

had 8 girls and 20 boys with SCD and 10 girls and 22 boys with ASD.Children in the age group of 2-10yrs (n-60) were enrolled out of which, a majority of 65% were in 2-5 yrs of age and 35 % were in 5-10yrs.19 Children(59.3% ) with ASD had <2hrs screen time and 13(40.7% ) had more than 2hrs screen time and in SCD ,23(82.1%)

children had screen time <2 hours and 5(17.8%) children had > 2 hours of screen time[table -1].

Out of 32 children with ASD, according to ISAA severity scale, 11 children (34.3%) had severe ASD while 21 children (65.6%) had mild/moderate ASD. Among 11 children with severe ASD, 8 children (72.7%) had screen time more than 2 hours, while only 5 children (23.8%) with severe ASD had screen time less than 2 hours. All children enrolled in the study had screen time >1 hour.

According to a study conducted in Thailand, it was found that children with autism watched TV earlier and more frequently than normally developing children.<sup>[12]</sup> This is supported by our study where out of 28 children in the age group of 2-5 years of age with ASD, 19 (67.8%) children and 9(32.1%) children had screen time of less than 2 hours and more than 2 hours respectively [Table 2]. According to American Academy of Paediatrics (AAP) guidelines children less than 2 years of age should not be exposed to any kind of media, in ages 2-4 years, it should be limited to less than 1 hour per day and beyond 5 years it can be up to a maximum of 2 hours.<sup>[13]</sup>

In a study conducted by Healy et al. it was found that children with ASD had a longer screen time and less physical activity than normally developing children.<sup>[14]</sup> In addition, because of their lower activity rate and longer screen time, children with ASD were more commonly overweight or obese than typically developing children.<sup>[15]</sup>

Christina et al tested the Clinical Global Impression (CGI), a clinician rating scale, with a group of children with ASD with limited language who received intervention to improve social interactions and communication. Children's CGI ratings were comparable to other assessments in measuring social communication.<sup>[16]</sup> The Clinical Global Impression-Severity (CGI-S) scales are widely accepted tools that measure overall disease severity, synthesizing the clinician's impression of the global state of an individual.

CGI scales are quite often employed in clinical trials of neuropsychiatric disorders along with disease-specific rating scales. CGI scales can be adapted to reflect specific symptom domains relevant to the disorder when no disease-specific rating scales are available. In a study conducted by Kolevzon et al, CGI was used to assess the disease severity of children with Angelman syndrome.<sup>[17]</sup> In our study we compared the ISAA severity scores of ASD with CGI scores, and there was no statistically significant difference [Table 3] (p value-.0.845). Hence in our study we used CGI to grade the severity in SCD [Table 4].

The increasing accessibility to smart phones and other gadgets has augmented their usage among the parents and in turn, the children are being exposed to media like mobile, iPads, tablets T.V, computer directly and indirectly at a very early age. This usage is happening not only at home but also at the day care centres, which is affecting the neurocognitive development and social communication of these children among many other ill effects.<sup>[18]</sup> It is proven that good communication skills, including both receptive and language skills at an early stage is important for good adult mental health later on and psychosocial adjustment; hence, children should be protected from exposure to media at early age to prevent communication delay.<sup>[19]</sup> According to a recent study conducted in 101 children with ASD, the longer the screen time, more severe was the symptoms of ASD (especially sensory symptoms), and more obvious was the developmental delay in ASD children with a longer screen time and younger age, especially in the language domain.<sup>[20]</sup> Parental concerns over learning issues, bullying, coping with stress and achievement were significant in both groups ASD and SCD.<sup>[21]</sup>

Not only the language domain, but also the other domains are affected by screen time. A longer screen time restricts the development of physical activities and gross motor ability and limits the development of toy operation ability, which is related to fine motor ability, adaptive

behaviors and cognitive levels. According to a study conducted by Dadson et al, the screen time affected fine motor ability and visual-motor integration in children. Playing with toys and using object substitution in play can offset these effects to some degree.<sup>[22]</sup> The recommendation by Canadian Society for Exercise Physiology is that for the normal development of motor skills and cognitive skills, young infants and toddlers should minimize the time spent sitting and watching screen for a long time.<sup>[23]</sup> A study done previously also shows that screen time was negatively associated with social skills throughout early childhood.<sup>[24]</sup>

In both ASD and SCD groups, screen time was found to be affecting severity of the condition, especially in children with ASD. 8 children with severe ASD had screen time >2 hours while 2 children with moderate ASD had screen time >2 hours. In case of SCD children, only 1 child who was classified as severely ill by CGI had screen time more than 2 hours where as 3 children with mild illness had screen time of more than 2 hours. [table 6] It is statistically significant with a p value <0.05.

Quality of life between the groups was analysed, which showed that the QoL of autistic children was significantly lower than that of social communication disorder in both the individual and overall domains. All domains were significantly impacted, though the effect in the physiological domain was lesser; psychological function is the most affected, bringing the overall score significantly lower. [table.7]

When compared with SCD children, ASD children, especially of severe autism, showed considerable difficulty in having a good quality of life (QoL). In mild, moderate and severe grade, QoL showed statistically significant problems. The physiological functions of body movement showed not much difference in mild-moderate

variety. In all other domains, there was a significant difference in both when compared to SCD as depicted in [Table 8].

Hence it is evident that screen-time affects the quality of life in children even when effective interventions were going on in both ASD and SCD. However, its negative implications in SCD were less than in ASD and hence parents have to be more cautious with use of media especially in ASD children during education and even with therapy. Even in SCD children, the screen time should be selected, monitored and quality of program should be checked by parents to enable children get quality program at optimal time and not over exposure. Parental concerns over learning issues, bullying, coping with stress and achievement were significant in both ASD and SCD groups.

Hence it is clear that screen time significantly affects the developmental domains of children which in turn negatively impact on the quality of life. Thus screen time has to be minimised in children especially those with NDDs like ASD, SCD which will in turn improve the quality of life of these children hence improving their therapeutic outcome.

### **Conclusion:**

Quality of life is significantly impaired in children with autism due to screen time. Hence parents must strictly adhere to the screen time guidelines to improve the overall prognosis and quality of life in children with both autism and SCD.

The interventions which we consider to correct the core features in Autism should also address the core concerns of QoL. The significant impact in social, emotional and psychological domains has to be considered in all ASD children, even in high functioning, as it will affect the scholastic and overall performance.

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