

Parental perception on screen time and psychological distress among young children

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ABSTRACT

Objective: We aimed to assess the parent-reported screen time of children, identify the perceived risk factors for increased screen time and its relationship to psychological distress in children. **Materials and Method:** A cross sectional study was conducted at a teaching hospital in Karachi, Pakistan. A total of 230 employees from medical and non-medical departments were included. Participants were employees with child/children ages 4-12 year who consented to participate in the study, we included 135 fathers and 91 mothers. The questionnaire included (i) demographic data (ii) Media history exam form and (iii) parent reported strength and difficult questionnaire (SDQ). **Result:** The average daily screen time reported was 2.5 (1.5-5) hour for boys and 2 (1-4) hour for girls. Preschoolers had greater screen time as compared to school-aged children (Median (IQR): 3 (1.5-5.6) vs 2 (1-4), $P = 0.46$). The children owned devices with approximately equal distribution of preschoolers and school-aged children (19 (27.1%) and 48 (30%), $P = 0.661$ respectively). Emotional score was found higher in school-aged group in comparison to preschoolers ($p = 0.036$). Moreover, mother screen time and number of devices owned by a child were found to be positively associated with child's screen time. **Conclusion:** We conclude that as we are embracing the digital age providing a tech free zone to children is virtually impossible. Children screen time related activities in our part of the world exceeds the limitation. Parental awareness and co-viewing screen with their children are essential to avoid media related behavior problems.

Keywords: Children, leisure screen time, parental perception, psychological distress

Background

We are living in an era where digital life begins at a very early age with children being exposed to various forms of screens (mobile phones, TV screens, tablets, and computers). In recent years, great emphasis has been put upon suggesting an appropriate screen time and type of media exposure for children. Screen time is considered as the time spent in front of media devices, its benefits as well as the harmful risks is much debated.^[1] On one hand, screen time has been associated with detrimental health risks like obesity, sleep disturbances, and behavior problems and

on the other, digital literacy is promoted as it improves child's educational development.^[2]

Due to confusion regarding appropriate amount of screen time for children,^[3] American Academy of Pediatrics (AAP) has been regularly updating its recommendations. AAP initially suggested restricting screen time to no more than 2 hours/day for children ≥ 2 years and no screen time for children < 2 years of age.^[4] In 2013, they advised pediatricians to inquire about screen time in every child with two basic questions (i) whether the child has TV in his room and (ii) amount of time child spent in front of screens. The newer guidelines focus on motivating parents to interact, co-view, and engage with their child when in front of screens, limiting media hours and having tech-free zones.^[5] World Health Organization (WHO) urges no screen time for children under 5, and stresses upon daily physical activity of > 60 minutes to reduce sedentary behavior, vitalize

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sleep hygiene, and parental awareness of their child's screen time.^[6]

Compulsive use of internet has shown association of screen time with emotional, hyperactivity, and conduct problems,^[7] along with a negative impact on academic performance.^[8] Dr. Dimitri's "over stimulation hypothesis" proves that prolonged exposure to rapid screen changes during critical period of brain development (2-6 years) preconditions the mind to expect high level of stimulations, which leads to inattention, hyperactivity, language and cognitive problems in later life during real life situations or human-human interactions.^[9] Jean M twenge *et al.* reported psychological well-being to be progressively lower from 1 hour a day of screen time to ≥ 7 hours a day of screen time.^[10] A Singaporean study reported maternal television viewing for >3 hours/day was strongly associated with increased child screen viewing time indicating the influence of parental screen time on children.^[11] This provides substantial need to study parental screen time, family leisure screen time and its influence on child behavioral development.

According to a study in USA, 21% of 6- to 11-year olds exceeded the <2 hour daily time limit on viewing TV, videos and playing video games. While in the UK, the proportion of young people playing computer games exceeding 2 hours has increased from 42% to 55% in boys and 14% to 20% in girls from 2006 to 2010.^[12] According to the 2020 Google Consumer data report on device use, 75.6% of entire Pakistani population use smart phones with approximately 7% of the total social media users being adolescents.^[13]

In South Asian culture, children have unrestricted access to television, with iPad and tablets being used at dinner table to keep the child engaged. According to a local research conducted at Wah Cantt Medical College, factors associated with excessive TV viewing included male gender, presence of TV in the room, nuclear family and eating meals while watching TV.

Due to exposure to social media through different screens, it's important to recognize the type of media child is exposed to and how that affects the child physically and emotionally.^[14] The recent shift from television to portable gadgets has affected lower-middle income countries too as media gadgets are readily available, easily accessible and difficult to monitor. The screen time for children and families as a response to this Covid-19 global pandemic has likely increased. Since the implementation of standard precautions and social distancing as a strategy to flatten the curve of infection, the children and families have become increasingly dependent on screens through online learning, entertainment, and interaction. The effect of social media and use of different screens remain debatable, thus it's important for parents to acknowledge what their toddler understands from the screens and recognize any health issues caused by exceeding daily screen limits.^[15]

This study was conducted to determine parent reported average screen time in children ages 4-12 years, identify perceived risk

factors for increase in screen time among these children, and assess the relationship between high screen time and psychological distress through Strength and Difficulty Questionnaire.

Materials and Method

This cross-sectional study was conducted at a teaching hospital of Karachi from May 2017 to January 2019. The participants were hospital's employees having children between 4 and 12 years. The sample size of 230 participants was calculated using web-based survey sample size calculator, "Research Advisor" (<https://www.research-advisors.com/tools/SampleSize.htm>). Institute Review Board reviewed the protocol for human subjects and issued approval to the study.

This was an interview-based survey, which were conducted by Family Medicine residents and medical students doing elective training at The Indus Hospital Research Center (IHRC), after receiving necessary training to conduct the interviews. Departmental heads were contacted through e-mail to seek permission to interview participants on scheduled dates to ensure their work was not affected, nevertheless confidentiality of the participants and data were maintained. The interview took approximately 20-25 minutes. Few employees filled the form on their own, however the data provided was revisited by the principal investigator.

Children previously diagnosed with behavior problems, learning disability or congenital abnormality leading to behavioral issues i.e., Down syndrome, autism, cerebral palsy, blindness, hearing, and speech impairment were excluded.

Data was collected through a structured questionnaire, which comprised of three parts:

i) **Demographic data** including employees education, spouse education, number of children, employees leisure screen time, spouse leisure screen time, number of devices at home, family average daily screen time and particulars regarding child—age, devices owned if any, amount of leisure screen time. The time spent by child in front of screen for educational purpose, school projects or homework was excluded. The duration of time mother and father actively spent with the child daily was also included.

ii) **American Academy of Pediatrician's media exam questions** to assess the different types of screens used (television, mobile screen, video game, music, internet access etc.). This included parental awareness of child's screen use as well as parental style. It assessed child's habit of book reading and addressed parental concerns if any regarding child's self-body image, indulgent in tobacco or illicit drugs and use of inappropriate or foul language.

iii) **Strength and Difficulty Questionnaire (SDQ)**, which is a validated tool to assess psychosocial health and behavioral

screening of 4- to 17-year olds. It comprised of 25-items assessing five domains: conduct problems; hyperactivity; emotional problems; peer problems; and pro-social behavior. The total is added to determine child's psychosocial distress with > 17 score being considered high difficulty score.^[9] This questionnaire includes parent perception of recent trouble in child's behavior which might indicate a mental health problem. When assessed in Pakistani population, the reliability of this tool was greater when the scales were merged into three-factor subscales, as internalizing factors (emotional and conduct problems), externalizing factors (hyperactivity and peer problems) and prosocial scale.^[16]

Data was analyzed using SPSS version 26.0. Mean ± SD or Median (IQR) were reported for all the quantitative variables like child's age, employee's education, employee's year of education, difficulty score, screen time, daily child- mother time, daily child-father time, number of devices at home, number of devices owned by the child etc., Frequency and percentage were computed for all the categorical variables like child's gender, employee's parental concerns and parenting styles etc., Independent sample T-test/Mann-Whitney U test were applied as appropriate to assess difference in child screen time, time mother spend with child, time father spend with child, difficulty score, emotional score, conduct problem, hyperactivity problem, prosocial behavior, peer problems between various preschoolers, and school-aged children. Chi-square test was applied to assess association between device owned and preschoolers and school-aged children.

Quantile (median) regression analysis was performed to assess factors associated with difficulty score, screen time, externalizing problems, internalizing problems, and prosocial scale. All the variables that were found to have *P* value <0.25 in univariate analysis and of clinical and biological significance were included in the final multivariable model. Step-wise method was used to build the final models. *P* value < 0.05 was considered statistically significant.

Result

Parents of 230 children (125 boys and 105 girls) participated in the study, of which 60.4% (n = 139) were fathers. Median years of schooling was 14 years (IQR: 10-16) for fathers and 16 years (IQR: 12-18) for mothers [Table 1].

The average screen time was reported 2.5 hours (1.5-5) for boys and 2 hours (1-4) for girls. The average psychosocial difficulty score as calculated from SDQ questionnaire was 11 (8-14) in boys and 10 (7-12) in girls. Of the 125 boys, 68.8% (n = 86) and 82.8% (n = 87 out of 105) girls were reported to have SDQ scores within normal range.

Two-third of the children were school-aged (n = 0.160, 69.6%) with no significant difference in age between both the genders [Table 2]. Preschoolers were observed to have greater screen time as compared to school-aged children {Median (IQR):

3 hours (1.5-5.6) vs 2 hours (1-4), *P* = 0.46} [Table 3]. Moreover, 67 children (29.1%) owned devices with approximately equal distribution of preschoolers (n = 19, 27.1%) and school-aged children (n = 48, 30%), respectively (p = 0.661). Approximately half of these 67 children had television in their room (n = 36, 53.7%), followed by tablet (n = 28, 41.8%) and mobile phone (n = 15, 22.4%) regardless of age group.

No significant difference was observed in screen time, parents' average daily time spent with child, difficulty score, conduct problem, hyperactivity problem, prosocial behavior, and peer problems between both the preschoolers and school-aged children. Whereas emotional score was higher in school-aged group in comparison to preschoolers (p = 0.036).

Factors associated with screen time

Preschoolers were found to have 0.5 times greater screen time as compared to school-aged children adjusting for other variables, but the results were not statistically significant. Moreover, mother's screen time and number of devices owned by a child were found to be positively associated with child's screen time. It was observed that higher the mother's screen time and more the no of devices a child owned, the greater the child's screen time. It was also noticed that parents who were unaware of what their child was watching reported lesser child's screen time. Whereas, parents who expressed concerns that their child might display

Table 1: Employees Demographic

	Male	Female
Employees (n %)	139 (60.4%)	91 (39.6%)
Employees years of education	14 (10-16)	16 (12-18)
Employee's screen time (H)	3.5 (1.5-7)	4 (2-7)
Employee's daily time with child (H)	3 (2-5)	3 (2-5)
Employee's number of children		
1 child	16 (12.8%)	15 (14.2%)
2 children	53 (42.4%)	33 (31.4%)
3 children	34 (27.2%)	37 (35.2%)
≥4 children	22 (17.6%)	20 (19%)
Family's Daily - Average screen time (H)	1 (0-2)	1 (0-2)
Number of electronic devices at home	4 (3-7)	5 (4-8)

Table 2: Child's Demographic

	Male	Female
Child's screen time was reported	125 (54.3%)	105 (45.6%)
Child's age group		
4-6 years	55 (44%)	53 (50.4%)
7-9 years	33 (26%)	29 (27.6%)
10-12 years	37 (29.6%)	23 (21.9%)
Child's daily screen time (H)	2.5 (1.5-5)	2 (1-4)
Child owned devices		
Mobile phone	7 (5.6%)	12 (11.4%)
Tablet/IPAD	16 (12.8%)	14 (13.3%)
Laptop	1 (0.8%)	3 (2.8%)
Television in child's room	23 (18.4%)	13 (12.4%)
Father's Daily time with child (H)	3 (1-5)	3 (2-5)
Mother's daily time with child (H)	3.6 (2-7)	3 (1.5-6)

Table 3: Differences in characteristics between preschoolers and school-aged children

	Preschoolers		School-aged		P
	Mean±SD/Median (IQR)	Min-Max	Mean±SD/Median (IQR)	Min-Max	
Child screen time	3 (1.5-5.625)	0-10.25	2 (1-4)	0-10	0.615 [†]
Time mother spend with child	7 (4-10)	1-16	6.7±3.7	0.5-13	0.337 [†]
Time father spend with child	3 (2-5)	0-8	3 (1-5)	0-14	0.540 [†]
Difficulty score	10.8±4.3	3-20	10.5±4.5	1-28	0.665 [†]
Emotional score	1 (1-3)	0-7	2 (1-3)	0-9	0.036* [‡]
Conduct problem	2 (1-4)	0-7	2 (1-3)	0-7	0.647 [†]
Hyperactivity problem	4.1±1.9	0-9	3.7±2.1	0-9	0.192 [†]
Prosocial behaviour	8 (6-9)	2-10	8 (7-10)	1-10	0.167 [†]
Peer problem	2 (2-4)	0-7	2 (1-3)	0-8	0.560 [†]
	n	%	n	%	P
Devices owned					
Yes	19	27.1	48	30	0.661 ^c
No	51	72.9	112	70	
Total	70	100	160	100	
Type of devices owned					
Laptop	2	10.5	2	4.2	0.136 ^{MC}
Tablet	5	26.3	23	47.9	
Mobile phone	6	31.6	9	18.8	
TV in their room	12	63.2	24	50	
Ipad	1	5.3	0	0	

*P<0.05, †Independent Sample t-test, ‡Mann-Whitney U test, c: Chi-square test, MC: multiple response Chi-square test

aggressive behavior or uses foul language, their child had greater screen time as compared to the other children [Table 4].

Factors associated with hyperactivity

Results showed that higher emotional scores, greater screen time, and father spending more time with child were significantly positively associated with hyperactivity. Also, it was noticed that children of parents reporting that their child have a sense of his/her body image or sexuality had 0.61 times greater hyperactivity adjusting for other variables, though the result was not statistically significant. Whereas higher number of siblings, greater father's screen time and female gender were significantly negatively associated with hyperactivity [Table 5].

Factors associated with internalizing problems

It was observed that children in whom parents perceived difficulty in their child, mother's screen time, children in whom parents had fear that their child will start using tobacco, alcohol, or illicit drugs and children who had high externalizing scores were significantly positively associated with internalizing problem. However, mothers reported less internalizing problems in their child as compared to fathers adjusting for other variables. Furthermore, it was observed that higher the father's education lesser the child's internalizing problems [Table 6].

Factors associated with externalizing problems

Preschoolers had significantly greater externalizing problems than the school-aged children adjusting for other variables. Also, it was noticed that externalizing problems were significantly positively associated with internalizing problems, child screen

Table 4: Factors associated with screen time

	Coefficient	Std. Err.	P	LCL	UCL
Child screen time					
Child age					
Preschoolers	0.50	0.35	0.15	-0.18	1.18
School-aged					Ref
Mother screen time	0.19	0.04	0.00	0.10	0.28
No of devices owned by a child	0.57	0.25	0.02	0.08	1.07
Parent awareness					
Not aware	-1.24	0.32	0.00	-1.88	-0.60
Aware					Ref
Perceived aggression or use of foul language in child by parent					
Perceived aggression	0.95	0.37	0.01	0.22	1.69
Did not perceive aggression					Ref
Constant	1.95	0.30	0.00	1.35	2.55

*P<0.05, **P<0.0001, LCL: lower 95% confidence interval, UCL: upper 95% confidence interval

time, parents who perceived difficulty in their child adjusting for other variables. Moreover, girls and children with higher level of pro-social behavior had 0.97 and 0.39 times lesser externalizing problems respectively adjusting for other variables [Table 7].

Discussion

The overuse of screen and media indulgence has raised concerns regarding its intricate relation with psychological impact and health outcomes in children. This study was conducted to estimate an average child screen time in our population, identify the perceived risk factors for increased screen time and its relationship to psychological distress in children. A local study

Table 5: Factors associated with hyperactivity

	Coefficient	Std. Err.	P	LCL	UCL
Hyperactivity					
Emotional score	0.21	0.10	2.15	0.03*	0.02
Child screen time	0.32	0.07	4.44	0.000**	0.18
Sibling total	-0.56	0.18	-3.16	0.000**	-0.91
Father screen time	-0.14	0.04	-3.30	0.000**	-0.22
Child's gender					
Female	-0.85	0.33	-2.58	0.01*	-1.50
Male			Ref		
Father average daily time spent with child	0.12	0.06	1.89	0.06	-0.01
Child's own sense of body image or sexuality					
Yes	0.61	0.35	1.74	0.08	-0.08
No			Ref		
Constant	3.83	0.94	4.09	0.000**	1.99

*P<0.05, **P<0.0001, LCL: lower 95% confidence interval, UCL: upper 95% confidence interval

Table 6: Factors associated with internalizing problems

	Coefficient	Std. Err.	P	LCL	UCL
Internalizing problem					
Externalizing problem	0.23	0.07	0.00	0.10	0.36
Child screen time	-0.17	0.09	0.06	-0.34	0.00
Participant					
Mother	-0.75	0.38	0.05	-1.50	0.00
Father			Ref		
Perceived difficulty in children by parents					
Yes	1.60	0.38	0.00	0.85	2.34
No			Ref		
Father education in years	-0.11	0.05	0.02	-0.20	-0.02
Mother screen time	0.09	0.05	0.10	-0.02	0.19
Parents' perception regarding their child's use of tobacco, alcohol, or illicit drugs?					
Fear of using tobacco, alcohol or illicit drugs	1.19	0.55	0.03	0.10	2.28
No fear of using tobacco, alcohol or illicit drugs			Ref		
Constant	2.94	1.37	0.03	0.24	5.64

Table 7: Factors associated with externalizing problems

	Coefficient	Std. Err.	P	LCL	UCL
Externalizing problems					
Internalizing problems	0.17	0.09	0.06	-0.01	0.35
Prosocial behavior	-0.39	0.12	0.00	-0.62	-0.17
Child screen time	0.30	0.09	0.00	0.12	0.48
Child age					
Preschoolers	1.00	0.48	0.04	0.06	1.95
School-aged					
Perceived difficulty in children by parents					
Yes	0.83	0.45	0.07	-0.05	1.72
No			Ref		
Father education in years	-0.10	0.05	0.05	-0.21	0.00
Sibling total	-0.33	0.24	0.18	-0.81	0.15
Father's screen time	-0.09	0.05	0.07	-0.20	0.01
Child's gender					
Female	-0.97	0.42	0.02	-1.79	-0.15
Male			Ref		
Father average daily time spent with child	0.14	0.08	0.09	-0.02	0.31
Constant	9.82	1.62	0.00	6.63	13.01

was required to compare results with western data as well as understand the parental practices and concerns regarding child screen time. This would help family physicians to confidently educate parents regarding healthy ways to monitor child's screen time and family media use in general to provide their child with the best experience of screen media, especially in time of global pandemic where screen times for both adults and children have increased significantly.

Child's screen time in our population exceeded the AAP recommendation for children like reported in other countries.^[17,18] This study observed poor linear correlation between child age and screen time suggesting preschoolers have a greater screen time than school-aged children. We found more difficulty score on SDQ in children with high screen time, mothers having high screen time and in children who owned a media devices as reported in previous studies.^[19,20]

Mothers are primarily responsible for their child's upbringing. If the mother is educated, she is likely to be better at parenting and adopt ways to moderate child's screen time and comprehend what they understand from it.^[21,22] Like other studies, our results showed that mothers who spent more time with their children reported that their child had less behavioral difficulty and were more prosocial.^[11,23]

In our study, children with two or more siblings had less difficulty score, which could be related to more physical activity and human-human interaction such as outdoor plays and board games that was not captured in this study. Nevertheless, a recent Chinese study reported single-child household to have a negative association between screen time, social as well as cognitive development.^[24] Further research is recommended in this area.

As in already published literature, this study also observed that children surrounded by numerous media devices were reported to have greater screen time.^[25,26] The higher number of media devices in household could primarily be due to joint family system which is common in South Asian culture. It's been observed that grandparents are usually lenient toward children and allow the use of media gadgets and the screen time is not actively monitored.^[27]

When externalizing problems were assessed, the results were similar to previous reports; boys were reported to be more hyperactive than girls,^[28] and younger children were found to have higher externalizing factor scores than older children. Hyperactivity has been associated with higher screen time; however, an interesting finding of this study was that fathers reported more emotional problems in their child than mothers^[29] and fathers spending more time with children was positively associated with child's hyperactivity. This could be because mothers are protective of their children and seldom take a tantrum as a sign of impending behavioral problems.^[30]

AAP has raised concerns about TV in child's room resulting in sedentary lifestyle and unsupervised screen time. We noticed a

similar trend in our population: 36 (15.6%) children in this study had TV in their bedroom, which is quite concerning. Family Physicians must counsel the parents about discouraging the placement of media devices in a child's room, especially at night to prevent them from being at risk for developing behavioral issues.

Portable devices are linked to greater prosocial skills, fewer behavior challenges, and improved academic performance compared to TV viewing and its association with behavior problems are said to be minimal. Data from UK and USA over last few years indicates a fivefold increase in tablet uptake by 0- to 8-year-old children; 51% of infants 6- to 11-month-old use a touch screen daily.^[31] Our results showed similar trend and children tablets ownership was found to be 13% (n = 30) that might be contributory to higher screen time. Further studies are recommended to assess the effect of use of portable devices on prosocial behavior and academic performance in our population.

This study highlighted the common factors associated with child screen time and behavioral changes. The media history exam question included parental awareness and parenting style regarding all types of media devices that has ever been used. As adverse behavior problems have been previously reported in adolescent, this study focused on parental perceived behavior changes related to screen time during childhood and early adolescence, when parent's influence and control over their child's media use can be effectively amended [32]. Moreover, the regression model analysis showed the correlation of child screen time and difficulty scores individually.

Data were collected from employees of a single institution and captured only one parent's perception. Factors like physical activity and child's sleep were not included in this study which could be linked with higher screen time and difficulty scores. Due to the questionnaire being lengthy, difficulty in data collection was faced. Nevertheless, parents who consented to participate in the study were content as they felt screen time awareness is important and will help them in healthy parenting.

We recommend having a larger sample size for further researches on parental role in child's media use in South Asian population^[32]; we also suggest interviewing children and both the parents simultaneously. Longitudinal studies that includes family media plan adherence as suggested by WHO and AAP in South Asian population is also suggested.

As we are embracing the digital age, providing a tech free zone to children is virtually impossible. Parents are encouraged to create their family's media plan and set parameter for use of screen time as a first step to prevent their children from developing behavioral issues. As children screen time is a global issue, family physicians must address the use of screen and assess any behavior changes related to it in their routine practice, especially in the time of pandemic.

Disclosure

Ethical statement: Interactive Research Development- Institute Review Board (IRD-IRB) reviewed the protocol for human subjects and issued approval to the study, ID # IRD_IRB_2017_02_006.

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Authors contributions

AI: study concept and design, data acquisition, analysis and data interpretation and manuscript drafting **HA:** study concept and design, manuscript drafting and critical revision **SI:** Analysis and data interpretation, manuscript drafting & statistical analysis **NBA:** study concept and design, analysis and data interpretation and final approval

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Conflicts of interest

There are no conflicts of interest.

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