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ORIGINAL ARTICLE

Excessive screen time is associated with maternal rejection behaviours in pre-school children

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Aim: Early childhood screen exposure leads to multiple adverse health events and parents have a major influence on their children's screen time. Our aim was to determine the association between maternal acceptance–rejection/control behaviours and excessive screen exposure in pre-school children.

Methods: In this cross-sectional descriptive study, children aged 2–5 years who had daily screen time <1 h (n = 76) and >4 h (n = 62) were enrolled. A structured survey form and Parental Acceptance–Rejection/Control Questionnaire were completed by mothers.

Results: Total rejection scores were found to be lower in those with screen time <1 h than cases with >4 h (82.7 ± 13.2, 89.3 ± 17.2; P = 0.015). In addition, higher hostility, neglect and reverse-affection scores were detected in excessive screen-exposed group (P = 0.033, P = 0.003, P = 0.047, respectively). Multivariate logistic regression analyses revealed that mothers' low acceptance of their children and high neglect score were associated with excessive screen exposure after adjusting possible confounding factors. The undifferentiated rejection and control behaviours of the mothers had no association with excessive screen exposure.

Conclusion: Children with excessive screen time may have a problematic relationship with their mothers. The relationship between parent and child should be examined and corrective actions should be taken.

Key words: parental acceptance–rejection; pre-school children; screen time.

What is already known on this topic

1 Excessive screen exposure leads to multiple adverse health events in pre-school children.
2 Parents have a major influence on their children's screen time.
3 The acceptance, rejection and control behaviours of parents affect the emotional, behavioural, social and cognitive development of children.

What this paper adds

1 This study, which investigated the relationship between maternal acceptance–rejection/control behaviours and children's screen time, focuses on the main reason for excessive screen exposure.
2 We found that excessive screen time was associated with the mothers' low acceptance of their children and high neglect scores.
3 Children with excessive screen time may have a problematic relationship with their mother. The relationship between parent and child should be examined and corrective actions should be taken.

Increasing use of screen media by society and the growing marketing of cable TV channels, digital devices and applications to young children, even to those from disadvantaged households, leads to excessive screen exposure of children starting from the early years of brain development.[1,2] Excessive screen exposure in early childhood leads to obesity, sleep disorders and cognitive, language, social and emotional delays.[1,3] Therefore, the American Academy of Pediatrics (AAP) recommends parents limit screen use for pre-school children aged 2–5 years to only 1 h a day of high-quality programming, co-viewing with children, helping them to understand what they see.[2] In spite of all known harmful effects and the recommendations of the AAP, many children are exposed to screens at very early ages and for a very long time.[4–6] Thompson *et al*. reported that infants aged as young as 3 months were exposed to a screen for an average of 2.6 h daily, and nearly 40% of infants were exposed to screens for 3 h daily by 12 months of age.[4] Yalçın *et al*., showed that pre-school children watched TV for an average of 2.2 h a day and 10.7% of them

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watched television for >4 h daily.[5] Another study including 3254 children stated that 50% of children viewed TV by 2 months of age, 75% by 4 months of age and 90% by 2 years of age.[6]

In previous studies, longer screen time was associated with lower levels of maternal education and employment, single motherhood, maternal obesity, maternal depression[3,7] and also parenting style and attitudes.[8,9] A neglectful parenting style is a risk factor for long screen time, and an authoritative parenting style reduces screen time.[10] Another important factor affecting the emotional, behavioural, social and cognitive development of children is their level of acceptance or rejection by their parents and parental control behaviours.[11] Parenting behaviour has two dimensions: warmth and control. Rejection and acceptance constitute the warmth dimension of parental behaviour, and permissiveness and strictness constitute the control dimension of parental behaviour.[12] Parental acceptance means the love, affection, care, comfort, support or nurturance that parents feel and show towards their children. Parental rejection means the absence or withdrawal of warmth, love or affection by parents towards their children,[13] and parental control means the attempts made by parents to regulate, manipulate or manage their children's behaviour.[14] Perceived parental rejection behaviours in childhood are associated with many mental health problems, especially in adolescent and adult periods. There is also a correlation between parental acceptance–rejection and mental health problems such as depression and behaviour problems, including conduct disorder, externalising behaviours, delinquency and substance abuse.[11] Evaluating the interaction between parental acceptance–rejection behaviours and pre-school children's excessive screen time would help physicians in family counselling. However, there is no published study on the interaction between parental acceptance–rejection behaviours and children's screen time. In this present study, we aimed to investigate the differences in the maternal acceptance–rejection/control behaviours in pre-school children with excessive screen exposure compared to children with recommended use.

Methods

Study design

A cross-sectional descriptive study was conducted in Yıldırım Beyazıt University Yenimahalle Training and Research Hospital between 1 May 2018 and 10 October 2018.

In the region, most of the children aged 2–5 years are cared for by their mothers and brought to our hospital by their mothers. Therefore, this pre-school age group and their mothers were enrolled in the study. Information about the study was given to the mothers of children aged 2–5 years who were admitted to the paediatric outpatient clinics for any reason; 'There are some forms investigating the screen times of children and the child-parent relationship, if you complete them while waiting for a routine check-up of your child, we can examine them and give comments during your examination. Completing the forms is voluntary'. However, no information about the ideal screen time or parental behaviour was given in the waiting room. Then, we obtained written informed consent and gave the participants the structured survey form and the Parental Acceptance–Rejection/Control Questionnaire (PARQ/C) at the same time. We collected completed forms during the physical examination and then anticipatory guidance was given according to the detected problems. Mother–child pairs with known or reported any mental retardation or psychiatric problems and acute serious problems (pneumonia, high fever, trauma) according to hospital records were not accepted in the study. After examining the forms, healthy children who were admitted for well-child care or upper respiratory tract infections, whose daily screen time was over 4 h or <1 h were included in the study.

The structured survey form

A structured survey form was created including the characteristics of mother–child pairs and the screen use characteristics of the children. The structured survey form collected data on the demographic characteristics of children (age, gender, birth order, etc.) and parents (age, educational status, occupation, family type, number of children, number of people living at home), children's screen viewing characteristics (starting age, when they viewed etc.). The starting age of screen use was asked as at what month.

The preferred conditions to put the child in front of the screen (mothers were busy doing housework, watching television or silencing their crying children, feeding their children) were questioned. Daily average usage of screens (TV, smartphone, computer, tablet, touch screen and game console) including home care and nursery care were asked to mothers as: 'How long does your child watch screens (television, tablet, computer, smartphone, etc) generally? Please reply for the last month and give overall daily screen time; a.<60 min; b.1-4 hr; c. >4 hr'. Children with a daily screen time of >4 h were defined as having high screen exposure (HSE) and those with a daily screen time of <1 h as the AAP suggested, were as having low screen exposure (LSE).

The Parental Acceptance–Rejection/Control Questionnaire

The PARQ/C was used to determine the levels of parental acceptance and parental rejection and control behaviours. The Turkish reliability and validity of the scale was performed by Anjel in 1993.[15] The scale, consists of four subscales: 20-item affection, 15-item hostility, 15-item neglect and 10-item undifferentiated rejection. After the addition of the 13-item Control subscale by Rohner,[16] the reliability and validation of PARQ/C was re-established by Erkman and Varan.[17] PARQ/C use a 4-point Likert type scale ranging from almost always true to (4) almost never true (1). All items of the affection subscale and some items of the negligence and control subscales are reverse coded. Neglect subscale scores range from 15 to 60, hostility from 15 to 60, affection from 20 to 80 and undifferentiated rejection ranges from 10 to 40. Higher subscale scores indicate greater parental neglect, hostility, undifferentiated rejection and less affection. The total scores of the four subscales, except the control, range from 60 to 240 and higher score indicates a greater parental rejection. Scores on the control subscale range from 13 to 52; scores of 13–26 indicate permissive control, 27–39 moderate control, 40–45 firm control and 46–52 indicate strict control.

Ethics of the study

Ethical approval for the study was obtained from the Hacettepe University Ethics Committee, written informed consent was obtained from all participants before the enrolment in the study.

Statistical analysis

The data were analysed using the SPSS 23.0 package programme (SPSS Inc., Chicago, IL). The Kolmogorov–Smirnov test was used to determine the normality of data distribution. Descriptive statistics are presented as mean ± standard deviation for normally distributed data, and as numbers and percentages for categorical data. The χ^2 test was used to compare the frequencies of categorical variables. Odds ratios (ORs) were evaluated with a confidence interval (CI) of 95%.

Student's t-test for independent samples was used to compare the means of scores. $P < 0.05$ was considered statistically significant. PARQ scores were skewed and given as median, mean ± standard deviation and the Mann–Whitney U test was used to detect differences between HSE and LSE. The total PARQ score, subscale scores and control score were divided into four categories as the 1st quartile, 2nd quartile, 3rd quartile, and the 4th quartile. Multivariate logistic regression analysis was performed to determine the effect of the total PARQ and subscale quartiles on HSE after adjusting for the child's age, gender (male vs. female), maternal age, maternal education (>12 vs. ≤12 years) and occupation (housewife vs. working), birth order (1 vs. ≥2), daytime care giver (home vs. day-care centre). Adjusted ORs were calculated at 95% confidence intervals.

Results

Characteristic features of the parent–child pairs and its relation with excessive screen time

During study period, 270 questionnaires were filled; 88 cases with recommended screen time, 69 cases with excessive screen time and 113 cases with moderate zone. When incomplete forms were excluded, $n = 76$ (85%) LSE and $n = 62$ (89%) HSE cases were enrolled for further analysis. Table 1 shows the characteristics of mother–child pairs according to screen time. Slightly more than half (55.1%) of children involved in the study were male. The mean ages of children were 3.3 years in LSE group and 3.5 years in the HSE group. Gender, child's age and parent's age were similar in the HSE and LSE groups. The HSE group had a higher OR for home care, birth order ≥2, mothers being unemployed, and lower maternal and paternal education level than their counterparts (Table 1). It was found that the group with HSE started screen watching earlier. The mean (±SEM; standard error of the mean) age of onset in the HSE group was 15.6 (±1.0) months, whereas this was 20.7 (±0.9) months in LSE group ($P < 0.001$).

Overall, 43% of mothers used the screen while feeding, 13% used for sedating and 67% used it while busy doing household chores. There was no statistically significant difference between the groups ($P > 0.05$) (Table 1). Although 25.6% of the mothers whose children watched screens for under 1 h were using the screen to silence their crying children, this rate was 43.5% in the HSE group (OR = 2.23 (CI: 1.08–4.60)). Approximately 20% of children in the LSE group were usually watching screen on their own, whereas this rate was 39% in the HSE group (OR = 2.48 (CI: 1.15–5.32)) (Table 1).

The parental acceptance–rejection and control scores of mothers in LSE-HSE groups

Total PARQ scores were found to be lower in the LSE group than in the HSE group ($P = 0.015$). In addition, higher hostility, neglect and reverse affection scores (higher affection scores show lower affection) were detected in the HSE group ($P = 0.033$, $P = 0.003$, $P = 0.047$, respectively). Undifferentiated rejection and control grades were similar in both groups (Table 2). The parental control subscale revealed that 50% and 42% of mothers were found to be

Table 1 The characteristics of parent–child pairs according to screen time

Characteristics	Screen time		Odds ratio	95% CI
	<1 h (n = 76)	>4 h (n = 62)		
Gender, male, %	52.7	59.7	1.33	0.67–2.78
Age, year, mean ± SD	3.3 ± 0.9	3.5 ± 0.9		
Maternal age, year, mean ± SD	33.1 ± 4.4	32.9 ± 5.3		
Paternal age, year, mean ± SD	35.7 ± 4.2	37.0 ± 5.8		
Birth order ≥2, %	36.9	56.5	2.22	1.12–4.40
Maternal education ≤12 years, %	23.7	62.9	5.46	2.61–11.43
Paternal education ≤12 years, %	28.9	54.8	2.98	1.47–6.02
Maternal occupation, housewife, %	26.3	53.2	3.13	1.56–6.50
Day-care centre, absence, %	64.5	88.7	4.32	1.73–10.82
Starting age for using screen month, mean ± SEM (median)	20.7 ± 0.9 (23.0)	15.6 ± 1.0 (12.0)*		
Screen time characteristics of children, %				
Use of the screen during the meal	40.5	46.7	1.28	0.65–2.54
Use of screen to make children sleep	12.1	14.5	1.22	0.45–3.30
Use of screen to calm crying children	25.6	43.5	2.23	1.08–4.60
Use screen while busy with household chores	62.1	72.5	1.61	0.77–3.34
Mostly watching screen on their own	20.2	38.7	2.48	1.15–5.32

*$P < 0.001$, Mann Whitney U-test. CI, confidence interval; SD, standard deviation; SEM, standard error of the mean.

Table 2 The parental acceptance–rejection/control scores (PARQ/C) and its relation with excessive screen time

Categories	Score range	Screen time		*P* value†
		<1 h (*n* = 76), mean ± SD (median)	>4 h (*n* = 62), mean ± SD (median)	
Total PARQ/C (rejection) score	60–240	82.7 ± 13.2 (80.5)	89.3 ± 17.2 (88.5)	0.015
Affection	20–80	27.6 ± 5.9 (26.0)	29.8 ± 6.7 (29.0)	0.047
Hostility	15–60	21.4 ± 4.5 (21.0)	23.5 ± 6.6 (23.0)	0.033
Neglect	15–60	20.3 ± 3.6 (19.0)	22.5 ± 4.9 (22.0)	0.003
Undifferentiated rejection	10–40	13.2 ± 2.5 (13.0)	13.3 ± 2.5 (13.0)	0.969
Parental control	13–52	38.0 ± 5.0 (39.0)	39.3 ± 5.0 (40.0)	0.148
Control groups, %				0.748
Permissive control	13–26	1.3	1.6	
Moderate control	27–39	54.0	45.2	
Firm control	40–45	39.5	45.2	
Strict control	46–52	5.2	8.0	

†Student's t-test. SD, standard deviation.

Table 3 The association between parental acceptance–rejection/control (PARQ/C) behaviours and excessive screen time

Categories	Scores, Q	*n* (%)	OR (95% CI)	AOR (95 % CI)†	AOR (95 % CI)‡
Total PARQ	Q1 < 73.7	12 (35.3)	1	1	
	Q2 = 73.7–83.4	15 (42.9)	1.38 (0.52–3.63)	2.28 (0.66–7.90)	
	Q3 = 83.5–95.0	14 (38.9)	1.17 (0.44–3.08)	1.40 (0.42–4.59)	
	Q4 > 95	21 (63.6)	**3.21 (1.18–8.71)**	**4.27 (1.22–14.98)**	
Affection	Q1 < 24	15 (36.6)	1	1	1
	Q2 = 24–27	13 (39.4)	1.13 (0.44–2.90)	1.20 (0.39–3.69)	1.05 (0.29–3.72)
	Q3 = 27.1–33	15 (45.5)	1.45 (0.57–3.68)	1.80 (0.54–5.98)	1.23 (0.24–6.12)
	Q4 > 33	19 (61.3)	**2.75 (1.05–7.18)**	2.78 (0.87–8.90)	1.09 (0.20–5.57)
Hostility	Q1 < 18	17 (39.5)	1	1	1
	Q2 = 18–22	13 (39.4)	0.99 (0.39–2.51)	0.91 (0.29–2.79)	0.56 (0.11–2.89)
	Q3 = 22.1–25	12 (41.4)	1.08 (0.41–2.81)	1.19 (0.37–3.86)	0.23 (0.03–1.68)
	Q4 > 25	20 (60.6)	2.35 (0.93–5.95)	1.79 (0.57–5.59)	0.64 (0.06–6.68)
Neglect	Q1 < 18	16 (36.4)	1	1	1
	Q2 = 18–20	7 (26.9)	0.64 (0.22–1.86)	0.54 (0.13–2.27)	0.54 (0.10–2.91)
	Q3 = 20.1–24	20 (57.1)	2.33 (0.94–5.78)	**4.39 (1.36–14.17)**	**9.51 (2.04–44.34)**
	Q4 > 24	19 (57.6)	2.37 (0.94–5.98)	**5.28 (1.56–17.82)**	**14.38 (2.15–95.90)**
Undifferentiated rejection	Q1 < 11	15 (37.5)	1	1	1
	Q2 = 11–13	23 (51.1)	1.74 (0.73–4.14)	1.82 (0.62–5.31)	1.67 (0.35–7.92)
	Q3 = 13.1–15	13 (44.8)	1.35 (0.51–3.58)	1.14 (0.34–3.77)	0.90 (0.14–5.64)
	Q4 > 15	11 (45.8)	1.41 (0.50–3.93)	0.65 (0.18–2.38)	0.19 (0.02–1.42)
Parental control	Q1 < 35.7	13 (38.2)	1	1	1
	Q2 = 35.8–39	16 (43.2)	1.23 (0.47–3.18)	1.37 (0.44–4.26)	2.84 (0.65–12.39)
	Q3 = 39.1–42	17 (45.9)	1.37 (0.53–3.53)	1.09 (0.36–3.32)	2.11 (0.48–9.21)
	Q4 > 42	16 (53.3)	1.84 (0.68–5.00)	1.13 (0.30–4.20)	3.15 (0.52–18.79)

†The association between each subscale, total scale and HSE were analysed by multiple logistic regression after adjusting for child's age, gender, birth order, maternal age, maternal education and care giver; other subscales/scale. ‡The association between all PARQ/C behaviour subscales and HSE were determined by multiple logistic regression after adjusting for child's age, gender, birth order, maternal age, maternal education and care giver. AOR, adjusted odds ratio; CI, confidence interval; HSE, high screen time; OR, odds ratio; Q, quartile.

moderate- and firm-controlled, respectively; however, there was no significant difference in frequencies of controlled type between two groups. After controlling possible confounding factors that might affect excessive-screen time, multiple logistic regression analysis revealed that the HSE groups had an increased risk of having the fourth quartile of the total PARQ score by 4.27 times compared to having the first quartile (95% CI: 1.22–14.98). Similarly, the HSE group had a higher risk of having the fourth quartile of neglect subscale scores after adjusting confounding factors (adjusted OR: 5.28, 95% CI: 1.56–17.82). When we put all confounding factors with

scores of subscales, the multiple logistic regression model showed that the HSE group had increased risk for the fourth quartile of neglect score by 14.38 times (95% CI: 2.15–95.90) (Table 3).

In the multivariate logistic regression model, the HSE group had slightly increased odds for higher affection and hostility subscale scores, but this association was not statistically significant. The HSE group had similar risk quartile distribution for the total control score and undifferentiated rejection score in multivariate analysis (Table 3).

Discussion

Our study revealed that mothers whose children were exposed to screen of >4 h daily had higher maternal rejection (high PARQ) and neglect subscale scores compared to those with <1 h a day. This is the first study to evaluate the association between parental acceptance–rejection behaviours and children's excessive screen time. From a different viewpoint, parental acceptance–rejection, a significant amount of research has been conducted to investigate the relationship between parenting style and the duration of children's screen exposure.[4,8–10,18,19] A previous study investigated the effect of parenting style (warmth and hostility) of mothers on their 2-year-old children's screen and outdoor play time and reported a relationship between low mother's hostility and children's 2-h outdoor play and no relation was found between mother's warmth or hostility levels and the children's screen time.[9] In a study involving parents of children aged 8–11 years, an authoritative parenting style was associated with low sedentary screen time in boys, whereas a neglected parenting style was associated with high sedentary screen time in both boys and girls.[10] Another study including over 4 h of screen exposure was found 5.2 times more frequently in permissive mothers' children than among children of authoritative mothers.[18] In a study, the children of parents with authoritative or authoritarian parenting styles had lower screen-watching durations than the children of permissive and negligent families, but no statistically significant difference was found.[20] In another study, it was shown that children of authoritarian mothers, authoritarian fathers, and permissive mothers were watching more TV.[8] Previous studies show that there might be a relationship between some parenting characteristics and children's screen time. In addition, parental control behaviour is also expected to affect children's screen time. Jago *et al*. investigated the relationship between parenting styles and parental self-efficacy to limit screen time of 5–6 year-old children and parental control was shown to be associated with lower screen-watching duration.[19] However, no relationship between excessive screen time and maternal control was found in our study. Child's age might have a role in the difference; our study included children aged 2–5 years. Despite higher neglect, affection, hostility subscale scores and maternal total PARQ scores in children with excessive screen time in univariate analysis, the risk of children for excessive screen time increased only in mothers with high neglect and high total PARQ scores after controlling confounding factors. Further studies in parents with known neuropsychiatric problems will clarify these interactions.

In our study, one of the most important factors that increased the risk of HSE was low parental education. Similarly, another study reported that as the level of maternal education decreased, TV exposure was shown to increase.[7] On the other hand, taking care of children at home instead of sending them to a day-care centre increased this risk by an average 4.3 times in our study. Similarly, in the study by Christakis *et al*., which examined the duration of TV viewing of pre-school children in day-care settings, it was concluded that children who received home care services were exposed to more television with a significant difference compared with children who received care in nursery care centres.[21] Pre-school aged children who are cared for at home are exposed to television for 2.4 h, and those in a nurseries and childcare centres are exposed to television for 0.4 h daily.[21]

In our study, some 70% of the mothers whose children had HSE said that they made their children watch a screen while they were busy with household chores. The children in the HSE group were watching a screen on their own at a higher rate than the LSE group. Mothers with low levels of education and who do not work and who have multiple children may not be able to spend quality time with their children because they have to manage housework and care for their children, they may make their children watch the screen to keep them occupied. Among the mothers who allowed their children to view screens for >4 h, 14.5% said that they used screen viewing to make their children sleep, 47% while feeding, and 43.5% used it to calm their children when they were crying. However, the AAP recommended that watching screens was to be stopped at least 1 h before sleep and watching screens should not be used to calm crying children and during meals.[2] Given the limited knowledge of most mothers about screen use guidelines, it is important to check media use and give recommendations during well-child care.

Some limitations and strengths were present in our study. First, whilst we recruited mother–child pairs from the outpatient clinic at our hospital, the absence of any chronic or serious health problem in the sample suggests that our results may generalise to the broader community. Questionnaires were given to all mothers in the waiting room without discrimination and then voluntary participants completed them. Children's neurologic disabilities and maternal psychiatric problems may disrupt the relationship between parent and child. Therefore, additional studies are necessary to detect their situation. In addition, maternal intellectual impairment or psychiatric problems might be underreported. On the other hand, this limitation is valid for both groups. Secondly, we did not evaluate the paternal PARQ/C scores. Although mothers are more effective with pre-school children, paternal behaviours may also be effective.[22] There are no studies examining the relationship between acceptance–rejection behaviours of both parents or only fathers and excessive screen time of children. Further studies which will included both parents could show parental influence at the same time. Another limitation is that we did not take screen time exposure for weekdays and weekends separately. Weekday and weekend screen times may vary. However, we only aimed to detect low- and high-exposure groups and we collected data about screen times as categorised. Additional studies in which screen time is collected as a continuous variable will report the association between the exposure duration parental behaviour. Moreover, when calculating the screen time, we accepted the reports of the mothers as being correct. Mothers with high level of education who probably know the detrimental effect of excessive screen exposure may have reported less screen time. Future studies measuring children's screen time using a chronometer for weekend and weekdays could be designed to clarify these limitations. On the other hand, the

strength of the study is that it is the first to examine the effect of maternal acceptance–rejection/control behaviours on children's excessive-screen time. The sample size of the study was sufficient to demonstrate the relationship between maternal acceptance–rejection, neglect, hostility behaviour, and excessive screen exposure. It is important to highlight the relationship between parents and children with excessive screen exposure.

Conclusion

In conclusion, excessive screen time was associated with the mothers' low acceptance of their children and high neglect scores. It should be kept in mind that the relationship between parents of children with excessive screen time may be problematic. In each child follow-up visits including any clinician and parent interaction, the screen time of children should be questioned from an early age. Parents should be informed about early brain development, the negative effects of the screen exposure, and how long and how to use screen watching. Activities that contribute to the psychosocial development of children and strengthen the parent–child relationship should be offered.

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