

ORIGINAL RESEARCH

The Association Between Parents' Problematic Smartphone Use and Children's Speech Delay

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Abstract

Objective: Children's use of television is an important environmental risk factor associated with speech delay. Although the relationship between television use and speech delay has been examined, there is no study in the literature investigating the relationship between parent's smartphone use and speech delay. In this study, we aimed to investigate the relationship between speech delay and problematic smartphone use and to test the hypothesis that the rate of problematic smartphone use is higher in the parents of children with delayed speech compared to those parents of children with healthy development.

Methods: 20 children with delayed speech and their parents (patient group) and 20 children with normal speech development and their parents (control group) were included in the study. The development of children evaluated with Ankara Developmental Screening Inventory. The problematic smartphone use measured by Problematic Mobile Phone Usage Scale.

Results: Problematic Mobile Phone Usage Scale score was significantly higher in parents of children with speech delay. This difference continues after controlling confounding effect of parent's age, education, and income level.

Conclusion: In this study, problematic smartphone usage was found to be more frequent in families of children with speech delay. According to our knowledge this is the first study which investigates the association with speech delay and parent's use of smartphone. While evaluating children with speech delay in clinical practice, it is essential that the smartphone usage of the parents is taken into consideration further prospective, follow-up studies can be conducted on this topic.

Keywords: Language, Smartphone, Development, Communication, Interaction

INTRODUCTION

Speech is one of the most fundamental tools in communicating. Universally, all children begin to use meaningful words at the end of first year. The approximate vocabulary that children have is around 10 words at 8 months, while it reaches up to 50 words at the age of one and about 200-400 at the age of two. 3-year-old children usually begin to form sentences made up of 3 words (1,2). Speech delay is the failure to acquire the normal speech skills and may be caused by primary factors such as developmental speech delay,

expressive language disorder and receptive language disorder, as well as other pathologies such as hearing loss, intellectual disability, autism spectrum disorder, physical speech problems and selective mutism (3). The frequency of expressive language disorder in children aged between 18-36 months is reported to be between 13.5% and 17.5% (4). Even if the presence of expressive language delay is not a poor prognosis disorder (5), speech and language impairment is usually associated with low academic achievement during school years (6) and with increased difficulties in reading, writing, paying attention and socialization (7).

Children's use of television and mobile devices are important environmental risk factors associated with speech delay. It is commonly reported that there is certainly a relationship between increased TV watching in childhood and speech delay (8). It is stated that the use of mobile media devices by children may lead to speech delay as well (9). In addition, to the child's use of TV and mobile devices, the decrease in the interaction

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of parents with their children while watching TV is also mentioned as an environmental factor that negatively affects speech (10). Today, the time spent in front of a TV is replaced by smartphones, which has become a challenging obstacle in the development of speech delay. Intensive exposure with smartphones, especially when raising children, may result in the child being deprived of healthy stimuli. Although the relationship between TV use and speech delay has been examined, there is no study in the literature investigating the relationship between parent's smartphone usage and speech delay. In this study, we aimed to investigate the relationship between speech delay and problematic smartphone usage, which negatively affected parents' communication with their children. We aimed to test the hypothesis that the rate of problematic smartphone use is higher in the parents of children with delayed speech compared to those parents of children with healthy development.

METHODS

This descriptive study was carried out from May to December 2019 on preschool-aged children admitted to Child and Adolescent Psychiatry Clinic of Training and Education Hospital, Aksaray University Medical Faculty for initial assessment of speech delay. Approximately 98 children under six years old were evaluated for speech delay. Patients previously diagnosed with a neurodevelopmental, neuropsychiatric, genetic or metabolic disorder were excluded, as well as children who were likely to be adversely affected by their neurological developmental process, in order to assess the interaction and communication skills of the parents in the most objective condition. For this reason, we excluded the children whose mothers had complications that might affect the development of the child negatively during pregnancy, the children who had any postpartum complications, the mothers that were drinking alcohol during pregnancy, whose mothers had been smoking during pregnancy and the children who had severe head trauma. Similarly, in order to equalize other stimuli in the children included in the study, we excluded children who had received preschool education, children with caregivers apart from parents, and children whose parents had chronic health problems. Finally, 20 patients with speech delay were included. Medical history obtainment, physical examination and observation of child's play were performed by the child and adolescent psychiatrist. Twenty children with similar characteristics and typical development were included in the study as

a control group. Inclusion of participants is shown in the flowchart below. Informed consent was taken from all participants.

Ankara Developmental Screening Inventory (ADSI)

The development of both groups was assessed with the Ankara Developmental Screening Inventory (ADSI), which is a valid and culturally relevant tool used to measure developmental status of children. ADSI consists of a 154-item questionnaire designed to evaluate children aged between 0–6 years, based upon maternal or caregiver answers coded as “yes”, “no”, or “I don't know”. Each “yes” response is assigned one point. The child is assigned a “general developmental score”, which is the sum of four inventory subscales; (i) language/cognitive skills; (ii) fine motor skills; (iii) gross motor skills; and (iv) social/activities of daily living skills. The language/cognitive subscale consist of 65 items including basic and complex linguistic statements, self-expression, enumeration, etc. Twenty-six items comprise the fine motor subscale, with questions measuring visual motor coordination and skills. Movement, balance and coordination are measured in the 24-item gross motor subscale. Lastly, the social/activities of daily living subscale consist of 39 items including feeding, grooming and social interaction skills (11). Global developmental delay (GDD) definition was used for the impairment of two or more developmental domains, such as speech/language, motor function, cognition, social/personal and activities of daily living. After initial assessment, a follow-up was recommended to all children with speech delay. ADSI was applied by a trained psychologist, ADSI is used as a routine tool for evaluate the development in our department.

Problematic Mobile Phone Usage Scale (PMPUS)

Problematic Mobile Phone Usage Scale (PMPUS) was applied to both mothers and fathers. This scale was developed by Augner and Hacker (12). The excessive use of mobile phones, relationship between mobile phone use and some mental health variables, and the negative effects that may arise from the long-term use of mobile phones can be measured by means of this tool. It consists of three parts: ‘addiction’ (9 questions), ‘social relations’ (7 questions), and ‘results’ (10 questions). It is a Likert type scale that is scored between 0 (no) –4 (very frequent) for the addiction and social relations section; and 0 to 4 points (0 = strongly disagree, 4 = strongly agree) for the results section. The total score for the entire scale ranges from 0–104 (points above 30 are

regarded as problematic use). High score indicates that individual is more problematic and addictive in terms of mobile phone use. The Turkish validity and reliability study of the scale was completed by Tekin et al. (2014) (13). Cronbach Alpha value calculated for the reliability analyses of the scales was found 0.854 and the test-retest correlation coefficient of the scale for the total points was found 0.86. It is mentioned in this study that Turkish version of this scale is a valid instrument for measuring problematic smartphone use.

The analysis of the data has been performed by using a Statistical Package programmer for Social Sciences (SPSS) 22.0 statistical software. The chi square test is used to analyze the differences between groups in categorical variables. The normal distribution of the data was evaluated with the skewness and kurtosis value. All values of continuous variables were between -2 and $+2$. In this situation, normality of distribution was accepted (14). After normality of the distribution of variables is acceptable, the Student's t-test has been used to analyze the differences of psychiatric test scores between groups. ANCOVA analysis was used to control the effect of potential contributing factors between groups. Ethical approval of this study was obtained from Aksaray University Ethics Committee in April 2019. (Number of Approval: 2019/03-01 19.04.2019)

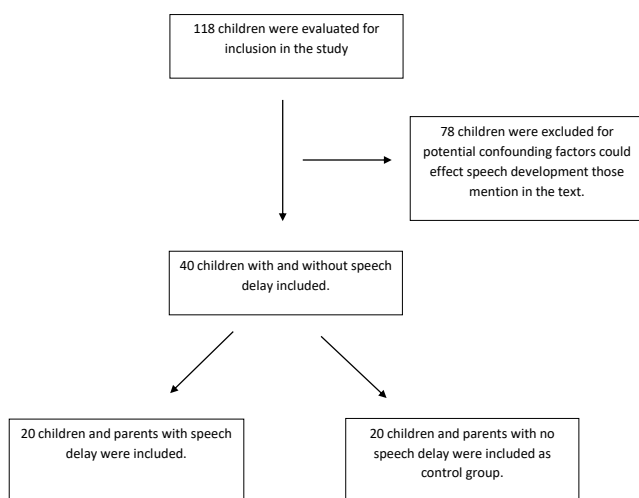


Figure 1. Inclusion of participants

RESULTS

The study sample consisted of 40 children and 80 parents, of which 20 children with delayed speech and their parents (patient group) and 20 children with

normal speech development and their parents (control group). The average age of the speech delay group was 36.4 months and the average age of the control group was 39.9 months. There was no statistically significant difference between the two groups ($p = 0.307$). When the differences between the parental ages of two groups were evaluated, there was not a significant difference between father education level ($p = 0.319$) and mother education level ($p = 0.240$), nor between mother age ($p = 0.131$) and father age ($p = 0.423$). When the relationship between the ADSI results of the group with delayed speech and the control group was evaluated, there was a significant difference between two groups only in terms of developmental outcomes in the language-cognitive domain, but not in other domains. The average language/cognitive development subtest was detected as 21.55 months in the speech delay group and 39.1 months in the control group, and there was a statistically significant difference between the two groups ($p < 0.001$). Parents' age and statistics of ADSI results are given in Table 1.

Table 1. Comparison of demographic data and ADSI results

	Patient		Control		Statistics	
	N	%	N	%	χ^2	p
Sex (Male/Female)	15/5	75/25	12/8	60/40	1.026	0.311
	Mean	SD	Mean	SD	t/Z	p
Age (month)	36.40	9.30	36.90	11.92	1.035	0.307
Father age (year)	32.90	5.93	34.40	5.76	0.811	0.423
Father Education Level (year)	9.75	3.66	10.90	3.53	1.009	0.319
Mother age (year)	29.35	5.51	32.45	7.07	1.545	0.131
Mother Education Level (year)	8.25	3.20	9.65	4.14	1.194	0.240
ADSI-General Development (month)	33.15	8.38	38.55	12.09	1.641	0.109
ADSI-Gross Motor Skills (month)	36.10	8.34	39.25	10.87	1.028	0.310
ADSI – Social/ activities of Daily Living Skills (month)	33.95	9.41	39.30	11.53	1.607	0.116
ADSI – Fine Motor Skills (month)	33.25	8.19	36.35	12.51	0.927	0.360
ADSI – Language/ Cognitive skills (month)	21.55	5.86	39.10	12.62	-4.473	<0.001
ADSI: Ankara Developmental Screening Inventory						

Problematic Mobile Phone Usage Scale scores for the patient and control groups were compared separately for the parents. Average total scale scores for the mothers was 37.35 in the patient group and 19.45 in the control group, which shows a statistically significant difference between the two groups ($t = -4.525, p < 0.001, \text{Cohen's } d = 1.431$). When the subscales of mobile phone problematic use scale were examined, a statistically significant difference was found between the two groups in all (Dependence, Social interaction and Consequences) subscales. Table 2 presents the subscales and total scores obtained from the mothers of the patients and control groups.

In the patient group, the average scale score of the fathers was 31.7 and 16.4 in the control group, which demonstrates a statistically significant difference between the two groups. ($t = -4.456, p < 0.001, \text{Cohen's } d = 1.409$). When the subscales of mobile phone problematic use scale were examined, a statistically significant difference was found between the two groups in all (Dependence, Social interaction and Consequences) subscales. Table 3 shows the subscales and total scores obtained from the fathers of the patient and control groups.

Table 2. Comparison of Problematic Mobile Phone Usage Scale (PMPUS) Scores of Patient and Control Group Mothers

	Patient		Control		Statistics		
	Mean	SD	Mean	SD	t	p	cohen's d
Dependence Subscale	16.15	5.71	9.20	5.83	-3.805	0.001	1.203
Social interaction Subscale	14.15	4.45	8	5.38	-3.939	<0.001	1.245
Consequences Subscale	7.05	4.68	2.25	4.68	-3.239	0.002	1.024
Total Score	37.35	11.99	19.45	13	-4.525	<0.001	1.431

Table 3. Comparison of Problematic Mobile Phone Usage Scale (PMPUS) Scores of Patient and Control Group Fathers

	Patient		Control		Statistics		
	Mean	SD	Mean	SD	t	p	cohen's d
Dependence Subscale	13.85	5.13	8.10	3.95	-3.967	<0.001	1.254
Social interaction Subscale	11.50	4.50	5.50	3.64	-4.631	<0.001	1.464
Consequences Subscale	6.35	4.78	2.80	2.52	-2.935	0.006	0.928
Total Score	31.7	12.94	16.4	8.24	-4.456	<0.001	1.409

In order to compare the scale scores of mobile phone problematic usage between the patients and the control group for the parents, ANCOVA analysis was used to control the effect of potential contributing factors such as parent's age, education and income level that may affect mobile phone problematic use. As a result of the analysis, it was found that there was a statistically significant difference between the patient and control groups when the mother's age, family income and education level were checked in terms of the scale scores of mobile phone problematic use ($F(1,35)=15.15, p < 0.001$). When the father's age, family income and education level were checked, it was found that there was a statistically significant difference between the scale scores of mobile phone problematic use. ($F(1,35)=18.52, p < 0.001$). Table 4 shows the result of this analysis.

Table 4. Comparison of Problematic Mobile Phone Usage Scale (PMPUS) Scores of Patient and Control Group with ANCOVA

	Patient		Control		ANCOVA ^a	η ²
	Mean	SD	Mean	SD		
Mothers' Total PMPUS Score	37.35	11.99	19.45	13	F(1,35)=15.15, p<0.001	0.302
Fathers' Total PMPUS Score	31.70	12.94	16.40	8.24	F(1,35)=18.52, p<0.001	0.346

^a Covariates: parent's age, education and income level

DISCUSSION

In this study, we have compared two groups that showed no difference in terms of age, gender and general development. The scale scores of problematic smartphone use of the parents of children with speech delay were statistically higher than those in the group without speech delay. This difference still existed when the variables that may affect smartphone usage such as age, income and education level were controlled. In order to minimize the effects of confounding factors, the two groups were examined in terms of their general development and socio-demographic characteristics of the families. Additionally, in order to equalize the level of the stimulus given by the parents, children who did not receive preschool education and who were not cared by others except cared for by their parents were evaluated. The predominance of male gender in the speech delay group seems to be consistent with the literature (15). According to our knowledge this study is the first research in the literature evaluating the effects of parents' problematic smartphone use in children with speech delay.

The American Academy of Pediatrics recommends reducing media exposure to children in early childhood. It particularly emphasizes the importance of social communication and interaction to support the healthy mental and social development of children, especially during the period under 2 years old (16). It has been stated in many studies investigating the effect of early television exposure on children that media exposure under 3 years has negative effects on cognitive development, and could affect 7-year-old children's word recognition skills (17). As detected by another study conducted on this subject, children's (under 18 months) exposure to television for 4 hours or more can lead to a delay in meaningful speech, which did not change when the parent interacted with the child while watching TV. In an observational study conducted by the same researchers, it was found that parents' conversations with their children decreased in quality and quantity when the television was on; however, more efficient communication was observed when it was off. This finding has revealed to what extent early television exposure had negative consequences for parent-child communication and affected the child's speaking ability adversely (10). In a similar study conducted in Korea on this subject, television exposure of more than 2 hours in 2-year-old children was found to be associated with delay in the development of language skills (18). In the light of all these studies, it can be suggested that early TV exposure may adversely affect speech development in children. Considering the frequent use of smartphones in today's world (19) this study outstands for revealing the fact that parents of children with speech delay use their smartphones more intensively and frequently than parents of children without speech delay. Our study contributes to the literature on accounts of emphasizing the importance of a healthy and quality interaction between parents and their children and provide new data about the relationship between the use of mobile phones and children's speech development.

According to the ADSI results evaluating the general development of the participants, there was only a significant difference between the two groups in the language-cognitive domain, but no significant difference was found in other subtests. Hereby, the effect of parental use of mobile phones on the child's language development was evaluated more objectively. The scale scores of problematic smartphones use of the parents whose children have speech delay were significantly higher than the parents whose children do not have speech delay. This situation can be considered as a result

of the lack of healthy stimulus of the children due to the parents' insufficient care.

In studies conducted with children those speech delay, parents of children with delayed speech were compared with those of children who developed normal speech, and the number of new words and total words used in communicating were similar in both groups. However, it was stated that the parents of the children with delayed speech just started to talk about a new subject rather than responding to the communication efforts of the children, and changed the subject that was spoken with the child more frequently, trying to involve the child in his own subject (20). Through this study, it can be argued that the parents of the speech delay group have higher problematic smart phone use scale scores and that they adopt the above mentioned communication style because of the more intensive use of smartphone in their interaction with children.

In addition to influencing social communication and interaction, the pathological use of smartphones by the parents may cause both the mother and father to be more tired, less tolerant, and less pleasant. It can cause them to be sleepy during the day, and may lead to poor quality of time spent with the child (21). Moreover, psychiatric pathologies were more common in people with high scores on pathological mobile phone use scales (22–24). This situation may affect social communication and interaction which is one of the important components of language development in children and may adversely affect the child's development.

Some of the main limitations of our study were as follows: it was a cross-sectional study; it could not reflect the causality relationship very well because it did not pursue a long-term follow-up, and it had a small number of samples. However, the evaluation of social media addiction and problematic internet usage, which is an important component of problematic smartphone usage, could make the data more comprehensive. It should also be considered that when the parents spend time at the pathological level with the phone, the child may have been exposed to the smartphone longer than normal, which may be associated with speech delay and may be a confounding factor for our study. In addition, it should be noted that parents who use more smartphones may have poor vocabulary and verbal skills and this may be associated with speech delay, in which case it can be discussed whether problematic smartphone use is a cause or a common result.

In conclusion, we found that problematic smartphone

usage was found to be more frequent in families of children with speech delay. During the evaluation process of patients with speech delay, it is essential that the mobile phone usage of the parents is taken into consideration with regard to the disruption in the language development of the child. Further prospective follow-up studies can be conducted on this issue, considering other factors affecting speech delay.

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