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Prevalence of delayed language acquisition with smartphone usage in toddlers in Erbil city-Iraq

Shayda Ziyad Jamil*
Ali Shakir Dauod**
Zaher Taher Gardi***

Abstract

Background & Objectives: Worldwide, speech delay is the most common developmental disorder in 3 to 6-year-old children. In the normal population, many children have speech delays, of which more than one-third of them will not resolve spontaneously and need further management.The aim of the study was to find any statistical correlation of speech delay with smart phone usage .

Methods: A cross-sectional study was conducted and data were collected from randomly selected 300 toddlers aged 12-36 months who attended two primary health care centers in Erbil city-Iraq during the period from the 1st of January 2020 to the end of January 2021. A designed questionnaire was used to assess the speech delay in the toddlers and evaluate factors that may affect language development including (socio-echonomic state, hours of use, type of videos…etc)

Results: The mean age of the study participants was 26.7months. Despite the higher percentage of speech delay in the user group (among which the delay was more in those watching non-age-appropriate videos than age-appropriate videos with percentages of 84%, 53.2% respectively) than the nonuser group, but it was statistically non-significant. The delay was more prominent among those using smart devices for four hours or more (76.1%).the percentage of delayed speech was higher in those who watch videos with same mother language (76.9%)with lower in those with other language videos (53.1%).

Conclusion: Prevalence of speech delay was higher in toddlers using smart phone with significant increase in the percentage of delay associated with longer duration of usage.

Key words: Speech delay, Smartphone, Toddlers.

Introduction

Touchscreen tablets like smartphones and tablet computers are typical with a mobile operating system that is handled in a single, thin and flat package and becoming widely used by families.[1]Before emerging of smart devices, the effect of conventional screen media like television and child development has been widely studied. These studies concluded that excessive or age-inappropriate media seen by children had bad outcomes regarding health and development such as sleep, obesity, child executive function, and infant self-regulation.[2] The American Academy of Pediatrics (AAP) revealed that electronic media consumption has harmful effects on children aged under 2 years old .[3,4] In 2013, the AAP showed its concern about the potentially unfavorable effects of pictures and messages produced through what it is called “new media“, including smartphones and tablets. Parents' role in encouraging their children’s use of electronic devices was established by

*Department of Family Medicine, Department of Community Medicine.
College of Medicine, Hawler Medical University, Erbil, Iraq ,Email: shaydatalabany@gmail.com.
** JBFM, Ph.D., MPH, M.B.Ch.B. Assistant Professor of Family Medicine, Department of Community Medicine, College of Medicine, Hawler Medical University, Erbil, Iraq.
*** C.A.B.P. M.B.Ch.B. Consultant Pediatrician, Rapareen Teaching Hospital, Erbil, Iraq.

previous studies.[5] One study states that parents belive that digital devices are good self teaching resources and to some extent make the children independent of the support learning by the parents.[6] There is a new scientific evidence that suggests both negative and positive effects of digital technology on behavior and brain function, these include some psychosocial disorders like attention-deficit symptoms, impaired emotional and social intelligence, technology addiction, and sleep disturbance.[7] The argument of AAPs about electronic media differs between "foreground media "and "background media", foreground media, unlike background media, refer to age-appropriate content which children eagerly focus on and can understand to a certain extent and may have some educational benefits. One of the researches on smartphones reveals that certaian types of programs have been described to have good educational effects, especially better language skills, social skills, and above 2 years old children's school readiness.[8] While other studies have found no evidence of benefit for those who are under 2 years old.[9-12]A variety of developmental domains like motor, language, and social skills may be engaged during usage of electronic smart devices. Many uncertain worries and assumptions are surrounding their use by young children, although, there is no sufficient evidences to show the relationship between electroinc device use and early developmental health problems[13]. Furthermore, it has been shown that children learn less from television programs than real-life experiences, While pediatricians recommend limiting the time young children spend in front of a screen, the use of smartphones and tablets with young children is becoming very common. Therefore, this study aimed to find out the prevalence of speech delay among children's smartphone users.

Materials and methods

A cross-sectional survey was conducted in Erbil city, the capital of Kurdistan Region-Iraq. A randomly selected sample was chosen, total of 300 toddlers aged 12-36 months who visited two primary health care centers (Brayaty and Shady) in Erbil city for different reasons during the period from the 1st of January 2020 to the end of January 2021 had participated in the study(children with neuropsychiatric disorders, genetic syndromes, hearing impairment and those with family history of speech delay had been excluded). The two selected family medicine centers are opened daily (except for public holidays), from 8.00 am to 2.00 pm, and on average 50-100 patients are seen on daily basis. To escape sampling bias, simple random samples of 300 toddlers with their parents that attend clinics every other day were taken from both centers**.** All participants' parents were interviewed and informed of the study objectives, then enrolled after obtaining verbal informed consent. Participants were assessed for language milestones using the Centers for Disease Control and Prevention (CDC) milestone scale.[14] The questionnaire was prepared and designed based on the previous researches.[1,4,13,15]The questionnaire was then revised by two researchers one family medicine consultant and one consultant pediatrician. The questionnaire consisted of 2 sections, the first part included questions to evaluate participants' sociodemographic characteristics according to 21 point scoring data (which involves educational level and occupation of the parents, number of household members, family income, numbers of rooms, homeownership, and car ownership) that divides the participants into three categories: less than 8 (low), 8-14 (medium), and 15-21 (high) (according

to a local consensus statement that is agreed by the department of community medicine/college of Medicne, HMU) . The second part assessed participants' details of smartphone usage including hours of usage, contents of the videos (age-appropriate or not), the language of the videos, and lastly parental concern about using a smartphone.[16] The study was approved by the Research Ethics Committee of the Kurdistan Board of Medical Specialties.Data was entered and analyzed using the Statistical Package for Social Sciences (SPSS, version 25). Chi-square test of association was used to study the association between 'language acquisition evaluation' with the studied factors like: age, duration of usage, age appropriate video..etc. A p-value of ≤ 0.05 was considered statistically significant.

Results

Three hundred children were included in the study. Their mean age ± SD was 26.7 ± 8.3 months. The median was 28.5 months, and the age range was 12 – 36 months. The largest proportion (49.7%) of the sample were aged 30-36 months. The male: female ratio was 1: 1. All the educational levels are represented in the studied sample starting from the illiterate to the college graduates, where 25% of mothers and 30% of fathers were college graduates (largest proportions of the sample). The largest proportion of the mothers (60.3%) were housewives, while 48.3% of fathers were working as unskilled manual workers. The majority (85.3%) of the children were living in urban areas, and 65% were living in owned houses. The majority (74.7%) of the families had a car. Regarding the socio-economic status (SES), which is a summary of the previous variables, 41.3% were of low SES, 38.3% were of medium SES, and the rest (20.3%) were of high SES. The result of language evaluation is presented in Figure 1, where it is evident that 42% of the children were normal, 29.7% had more than 6 months speech delay, 18% had 4-6 months delay, and 10.3% had ≤ 3 months delay.

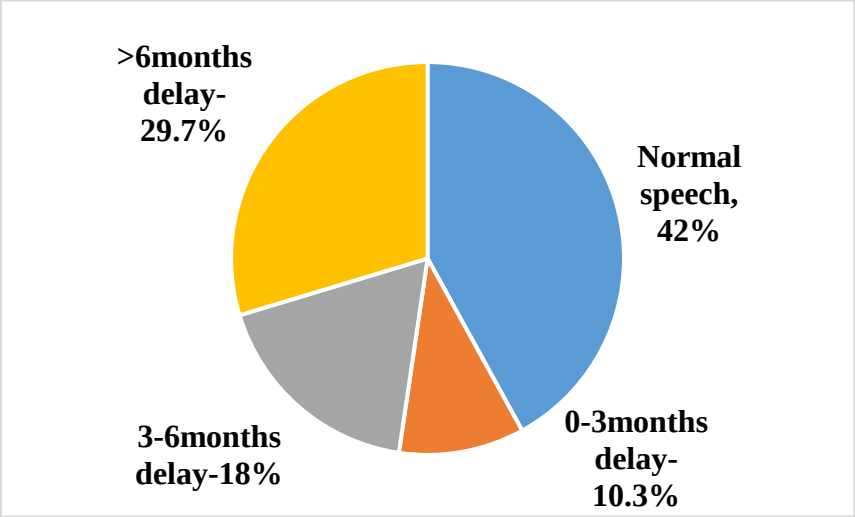

Figure (1): Language evaluation of the studied sample.

No significant association was detected between the result of language evaluation with the following socio-demographic variables: age (p = 0.838), gender (p = 0.349), residency (p = 0.863), child rank (p = 0.224), and SES (p = 0.161) as presented inTable(1).

Table (1): Language acquisition evaluation by socio-demographic characteristics.

	Language evaluation						
	Normal		Delayed		Total		
	No.	(%)	No.	(%)	No.	(%)	p value
Age							
12-17	23	(44.2)	29	(55.8)	52	(100.0)	
18-23	26	(46.4)	30	(53.6)	56	(100.0)	
24-29	17	(39.5)	26	(60.5)	43	(100.0)	
30-36	60	(40.3)	89	(59.7)	149	(100.0)	0.838
Gender							
Male	59	(39.3)	91	(60.7)	150	100.0)	
Female	67	(44.7)	83	(55.3)	150	(100.0)	0.349
SES							
Low	47	(37.9)	77	(62.1)	124	(100.0)	
Medium	47	(40.9)	68	(59.1)	115	(100.0)	
High	32	(52.5)	29	(47.5)	61	(100.0)	0.161
Total	126	(42.0)	174	(58.0)	300	(100.0)	

Table (2) shows that 59.6% of smartphone users had delayed language acquisition compared with 51.7% of non-users, but the difference was not significant (p = 0.266). The same table shows a significant association with the hours of using the smartphone (p = 0.003) where it is evident that the prevalence of delayed language acquisition increased to 76.1% among those using the phone for ≥ 4 hours per day. The prevalence was significantly high (84%) when the videos watched were not age appropriate, compared with 53.2% when the videos were age appropriate (p <0.001). It is evident in the table that the prevalence is significantly high when the videos watched were of the same mother tongue of the child (76.9%) compared with 53.1% when the videos were of a foreign language (p = 0.001). No significant association was detected between the prevalence of delayed language acquisition with parental concern (p = 0.101), and the language spoken, whether one or more than one language (p = 0.536).

Table (2): Language acquisition evaluation by smart phone characteristics.

	Language evaluation						
	Normal		Delayed		Total		
	No.	(%)	No.	(%)	No.	(%)	p value
Use of smartphone							
Yes	97	(40.4)	143	(59.6)	240	(100.0)	
No	29	(48.3)	31	(51.7)	60	(100.0)	0.266
Hours of use							
< 1	32	(51.6)	30	(48.4)	62	(100.0)	
1	21	(48.8)	22	(51.2)	43	(100.0)	
2	11	(50.0)	11	(50.0)	22	(100.0)	
3	12	(48.0)	13	(52.0)	25	(100.0)	
≥ 4	21	(23.9)	67	(76.1)	88	(100.0)	0.003
Type of videos							
Age appropriate	89	(46.8)	101	(53.2)	190	(100.0)	
Not age appropriate	8	(16.0)	42	(84.0)	50	(100.0)	<0.001
Same mother language							
Yes	15	(23.1)	50	(76.9)	65	(100.0)	
No	82	(46.9)	93	(53.1)	175	(100.0)	0.001

Language spoken							
One language	111	(42.7)	149	(57.3)	260	(100.0)	
More than one language	15	(37.5)	25	(62.5)	40	(100.0)	0.536
Total	126	(42.0)	174	(58.0)	300	(100.0)	

Discussion

Language acquisition rate has considerable variation between developmentally normal individuals till the age of 3 years, by which age many of them obtain good verbal communication[17]. Different factors could impact the normal developmental pathway, in particular smartphones use. Nowadays, smartphones are widely used by toddlers that has shown to impact their language developmemt in a number of developing countries[15].The prevalence of speech delay in our study was considerably higher (58%) compared to two other studies that were performed in United Kingdom and Baghdad 10%,10.6%,respectively), that can be explained by the difference in the age groups included in the studies, as many toddlers may have defect in language development which may resolve spontaneously[16,18]. In the mean time, the current study revealed no significant corelation between speech delay and age (p value 0.838), this result is consistant with a previous study that was done by Saeed et al[1]. There was no significant association between speech delay and gender (p value 0.349), that contrasts the result of a study conducted by Yasin et al,which reported higher speech delay percentage among male children and considerd male gender as a risk factor, this may be explained by the difference in the proportion of male participants in both studies as majority of their perticipants were male[19].The current study showed higher percentage of delayed language acquision in the user group (59.6%) than the non-user group (51.7%), by which we alien with previously reported negative effects of such devices on expressive language development by Moon et al[20]. The apparent evidence from memory research was that infants will face difficulty to put on what they obtain from different circumstances, they can not convey information from media[21].An alternative description for the association between device usage and expressive language delay could be the parental permission for their children's extra use of such smart devices and educational applications for the purpose of learning[22].However there was no statistically significant correlation betweem the smart phone use and speech delay (p value 0.266), that rises a controversy for the continuous blame of smart devices and excess media exposure for speech delay, provided that underlying organic causes have been excluded from the study, necessitating the search for more factors behind that high prevalence of delayed in language milestone.Another key finding,we noticed was the significantly higher percentage of delay among those using smart phone for longer duration (p =0.003), this result was similar to that of Heuvel et al. which reported any longer duration of usage resulted in higher risk for developing speech delay, for that reason time limiting is recommended[23].The delay was more prominent in those who watch age inappropriate videos (background media), (84%) than those watching age appropriate videos (foreground) (53.2%), so exposing the children to videos with age inappropriate contents may increase the risk of delay in language and that was expected as previously warned by AAP in their 2013 recommendations[24].Another appealing fact was that the delay was more among those who watched videos with the same mother language, that may be due to the children's more interaction with the video as they understands it and to be

more dissociated from the environment which he or she is in need to develop normally.Our study allocated that there is no significant association of delayed language with the number of languages spoken at home (p=0.536), here we agree with Byers-Heinlein et al who found no evidence of confusion in language delevelopment in bilingual infants[25].This study has some limitation. First, the prevalence and effects observed depends on a cross sectional nature of the study with a small sample size because of COVID-19 pandemic and difficulty to enroll more toddlers. Secondly, we only evaluated the language milestone and duration of smartphone uses, while spesch sound and articular problems had not been assessed.

Conclusion

There can be no doubt that majority of toddlers in this study have some degree of speech delay and more than two third of them use smartphone for more than 1 hour. To address this problem a larger longitudinal study is needed with different age groups and factors that determine the language delay should be evaluated. We recommend primary health care doctors and pediatricions to cunsel the parents in limiting the time of smart phone usage.

Conflicts of interest

There were no conflicts of interest.

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