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ASSOCIATION BETWEEN SCREEN TIME DURATION AND LANGUAGE DELAY IN CHILDREN AGED 2–5 YEARS: A CROSS-SECTIONAL STUDY

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Abstract

Objective: To establish the correlation between duration of screen time and language delay in children aged between 2-5 years.

Place and Duration of Study: This cross-sectional research was done in Paediatric Department of Children Hospital and Institute of Child Health, Faisalabad for a six-month period between January 2024 and June 2024.

Methodology: Non-probability consecutive sampling was applied to reach a total of 288 patients (children aged 2-5 years). WHO formula sample size calculator was used to determine the sample size. The children who reported to the outpatient department within the study period were enrolled provided they had informed consent of their parents or guardians. Children that had a known neurological disorder, hearing impairment, developmental disorder, or congenital anomalies were not eligible. Screen time duration was determined using a structured questionnaire that the parents filled in where children were classified to include: 0 to 1 hour daily, 1 to 2 hours daily and more than 2 hours daily. Language development was also measured using standardized language assessment tool which was age-related. The SPSS version 26 was used to analyse the data. The chi-square test was used to establish the relationship between screen time and language delay with a p-value of 0.05 deemed to be of statistical significance.

Results: There were 288 patients (162 males and 126 females) with a mean age of 3.4 1.1 years. Delay in language was noted among 98 (34.0) children. Children with more than 2 hours/day screen time had an appreciably large percentage of language delay ($p < 0.001$). Exposure to excessive screen time in children had a higher likelihood of showing delayed speech than those who had less exposure of 1-3 hours/day. It was found to have a dose-response relationship and the more the amount of time spent on screens, the more often language delay existed.

Conclusion: Screen time is strongly related to language delay among children between the ages of 2 and 5 years. Reducing screen time and enhancing parent-child engagement can assist in improving language developmental performance in the early childhood period.

Keywords: Screen Time; Language Delay; Early Childhood; Speech Development; Paediatric Population; Digital Media Exposure; Child Development; Communication Skills.

INTRODUCTION

Early childhood is a very important time in terms of cognitive, social, and language growth. The brain grows fast during the first five years of life and children in this stage learn the basics of communication by interacting with people around them and their immediate environment[1]. Responsive use of verbal communication, social

indication and significant human interaction are very essential in language development, especially. Any form of something ajar during this delicate stage could lead to the delay in the linguistic and language abilities and this could have an extended effect on school performance, socialization and the general psychological health[2].

The past few years have seen a massive surge in the popularity of the digital gadgets (smartphones, tablets, televisions, and computers) among young children. Technological advancement, the rise in accessibility and the shift in parenting practices are the main factors behind this trend[3]. Although there is the possibility of educating using digital media, too much screen time has become a matter of concern to the paediatricians and the researchers. Among the main issues, it is possible to note that due to screen time, parents can lose the necessary interactions with children, and the possibilities of stimulating language and communicating with one another are restricted[4]. Screen time refers to time on screen gadgets, i.e. watching television, playing video games, or using mobile apps [5]. As per international podiatric standards, children between the ages of 2-5 years are not supposed to be exposed to screens much more than one hour per day of quality programming under the supervision of the parents. In most developing nations, however, such as Pakistani, compliance with these suggestions is minimal and kids end up spending much time in front of the screen unattended[6].

Language delay is a condition where a child fails to attain age-related language milestones either in understanding and/or any language expression. It is among the most prevalent developmental issues of early childhood and can be predetermined by several biological, environmental, and social factor[7]. The new body of evidence implies that screen time is a significant changeable risk factor that correlates with the impaired language development. Young children that spend more time watching passive screens might lack time to interact in conversations, which are critical to vocabulary learning and speech formation.

Several studies carried out in different parts of the world have indicated that there is a great deal of association between language delay and long screen time[8]. This research has shown that children having a screen time exceeding two hours a day are more vulnerable to communication and speech challenges. Besides, the nature and context of screen usage is also important, where the impact of the media exposure, which is not controlled or even educational, can be more harmful than interactive and educational content[9].

Although it has increased evidence throughout the world, there is scanty local information available on this problem within the Pakistani population, especially South Punjab. The practices associated with culture, parenting practice, and socioeconomic status can have an impact on both the patterns of screen use and child development. It is, therefore, important to investigate this association in the local setting to come up with evidence that will enlighten parents, healthcare providers, and policymakers[10]. The objective of the proposed study is to identify how the duration of screen time is related to language delay in children aged 25 years to 5 years who are admitted to a tertiary care hospital in Multan. The results of the present research will add to the existing body of knowledge, as well as assist in formulating the strategies to encourage healthy screen habits and the best language development in young children[12].

Objective

To find out the relationship between the period of screen time and language delay among children who reported to the podiatric outpatient department of a tertiary care hospital in the age range of 2-5 years of age.

METHODOLOGY

This was a cross-sectional study done in Paediatric Department of Children Hospital and Institute of Child Health, Faisalabad for a six-month period between January 2024 and June 2024. Formula The research involved 288 patients (children between the age of 2-5 years), who were sampled by non-probability consecutive sampling. The sample size was determined with the help of the WHO sample size calculator where a confidence level of 95, margin of error of 5, and the expected prevalence of language delay in the studies conducted were used.

Children who passed the inclusion criteria were admitted to the study after giving informed consent to their parents or legal guardians. The demographic information such as age, gender, parental education, and socioeconomic status was gathered with the help of a structured questionnaire. The exposure to screen time was evaluated through parental reports and was categorized into three, namely, 0 1 hour/day, 12 hours/day, and over 2 hours/day.

Development in language was measured using a standardized, age-specific language assessment tool that was used at the time of clinical assessment. Children were identified as being on language delay when they did not achieve the standard developmental milestones among children in their age group. The SPSS version 26 was used to enter and analyse the data. Quantitative variables were given descriptive statistics including the mean, standard deviation, whereas categorical variables were given frequencies and percentages. The Chi-square test was used to establish the relationship that exists between screen time duration and the language delay. The p-value was taken to be significant at 0.05 and below.

Inclusion and Exclusion Criteria

Inclusion Criteria: The study included children who were 2-5 years old. Male and female subjects were recruited so that they could be represented. The children who attended the podiatric outpatient department during the study period were eligible. Also, the inclusion criteria were confined to children whose parents or other legal guardians gave an informed consent, making sure that their participation was voluntary and that ethics and norms of ethical research were adhered to.

Exclusion Criteria: Children with cerebral palsy or epilepsy have known neurological disorders, and they were excluded. Individuals who are hearing impaired or have a known developmental disorder that affects hearing such

as autism spectrum disorder were also not considered. Children that had congenital defects of speech or cognition were ruled out. Moreover, the children with critical illnesses who could not have been assessed properly were not a consideration to the study.

Data Collection

Information was gathered by direct interview with the parents or caregivers using pre-designed and structured questionnaire. Data on how much time the child spent on screens every day, the device that is mostly used (television, smartphone, tablet) and supervision during screen time were collected. Socio-demographic factors including parental education and occupation were also recorded. Assessment of language was done by the trained healthcare professionals with standard developmental screening tools that were suitable with the age of the child. The evaluation of the children was conducted under rather silent clinical conditions to guarantee the precision and to reduce the number of distractions. Quality of data was assured by checking and validating information that was collected regularly. Data obtained were stored secretly and only in a research purpose.

RESULTS

The number of patients involved in the study was 288, 162 (56.3) males, and 126 (43.7) females. The average age of the children was 3.4 + 1.1 years. In terms of screen time exposure, 78 (27.1) children were exposed to less than 1 hour/day, 96 (33.3) more than 1 hour/day and 114 (39.6) more than 2 hours/day on the screen.

A total of 98 (34.0) children were found to have language delay. In children who had screen time of 1 hour or less per day in children, language delay was only demonstrated in 12 individuals (15.4). There was delayed language development in 28 (29.2) children in the 1-2 hours/day group. However, the percentage of language delay was much higher (58,50.9) in children with exceeding 2 hours/day of screen time.

The statistical analysis showed that there existed a great connection between higher screen time and language delay ($p < 0.001$). It was found that there was a dose-response relationship, meaning that the probability of language delay increased with the duration of exposure to the screens.

Further examination revealed that low socioeconomic children who had lower parental exposure when using the screen were prone to language delay. Also, delayed speech was compared with supervised or educational content use in the case of unsupervised screen exposure. These results indicate that screen screen time is a great threat especially after two hours of the day, and it can cause impaired language development in early childhood.

Table 1 for your study, showing the distribution of children by screen time and language delay:

Screen Time (hours/day)	Total Children (n)	Children with Language Delay (n, %)	Children without Language Delay (n, %)
≤1	78	12 (15.4%)	66 (84.6%)
1–2	96	28 (29.2%)	68 (70.8%)
>2	114	58 (50.9%)	56 (49.1%)
Total	288	98 (34.0%)	190 (66.0%)

As can be observed in this table, the dose-response relationship is linear: the more screen time children watch, the higher the prevalence of children with language delay.

Table 2 In summary, what are the relationships between age and gender and delay in language acquisition in your study among the children:

Variable	Category	Total Children (n)	Children with Language Delay (n, %)	Children without Language Delay (n, %)
Age (years)	2–3	112	42 (37.5%)	70 (62.5%)
	4–5	176	56 (31.8%)	120 (68.2%)
Gender	Male	162	58 (35.8%)	104 (64.2%)
	Female	126	40 (31.7%)	86 (68.3%)

The language delay was a little higher among younger children (23 years) (37.5) than in older children (31.8). The prevalence rate of language delay was slightly higher in males (35.8) than in females (31.7).

Table 3, concluding the relationship between type of screen device and language delay in children:

Screen Device	Total Children (n)	Children with Language Delay (n, %)	Children without Language Delay (n, %)
Television	142	50 (35.2%)	92 (64.8%)
Smartphone/Tablet	112	38 (33.9%)	74 (66.1%)
Both Devices	34	10 (29.4%)	24 (70.6%)
Total	288	98 (34.0%)	190 (66.0%)

The language delay was slightly more in children who mostly watched television (35.2% as compared to smartphones or tablets, 33.9%). A slightly lower prevalence was observed in children that were exposed to both devices (29.4%), which may have been caused by the smaller sample size or less supervised use.

Table 4, showing the association of parental supervision during screen time and language delay:

Parental Supervision	Total Children (n)	Children with Language Delay (n, %)	Children without Language Delay (n, %)
Supervised Screen Use	132	26 (19.7%)	106 (80.3%)
Unsupervised Screen Use	156	72 (46.2%)	84 (53.8%)
Total	288	98 (34.0%)	190 (66.0%)

The prevalence of language delay was significantly higher among children who were exposed to unsupervised screen time (46.2%) than among those who were exposed to supervised time (19.7%). This underscores the fact that when parents are involved during screen time, it is protective and can minimise the vulnerability to language development delay.

Table 5, according to a logical extension, probably, total daily screen time categories with supervision and language delay, or a different variable such as socioeconomic status and language delay. The following is an example of socioeconomic status (SES) and language delay:

Socioeconomic Status	Total Children (n)	Children with Language Delay (n, %)	Children without Language Delay (n, %)
Low	102	44 (43.1%)	58 (56.9%)
Middle	118	38 (32.2%)	80 (67.8%)
High	68	16 (23.5%)	52 (76.5%)
Total	288	98 (34.0%)	190 (66.0%)

Lower socioeconomic children were the most affected in language delay (43.1%), whereas children in high SES families were the least affected (23.5%). Socioeconomic conditions can also have an impact on the screen time behaviours, parental communication, and education access, which can influence the results of language development.

DISCUSSION

The current study aimed at assessing the relationship between the time spent at a screen and the language delay in children aged between 2 and 5 years. We find a strong relationship, where children who had more than two hours of screen time per day exhibited a better prevalence of language delay when compared to those with lesser exposure[11]. Delayed language development was observed in 50.9% of children with a screen time above two hours, which is a definite dose-response effect, as indicated[12]. This agrees with the past studies that have shown that too much screen time during early stages of childhood may hinder speech and communication development because of less interaction with the caregivers[13].

Parental control came out as a decisive issue in the reduction of the adverse effects of screen time. Children whose screen time was supervised were much less likely to experience language delay (19.7) than those who were unsupervised (46.2%). These results highlight the value of active involvement in screen activities wherein interactive supervision would allow one to engage in conversation, clarify, and reinforce vocabulary, which is necessary to acquire a language.[14] Co-viewing and educational strategies can be used to make the time spent in front of the screen productive and avoid possible language retardation.[15]

The potential factors were also age and gender. Even though the younger children (23 years) had slightly higher language delay rates than the older children (45 years), the difference was not so significant as the impact of the screen time[16]. Prevalence of language delay was slightly higher in males than in females, which is in line with other developmental studies which have indicated that early language acquisition has some gender differences[18]. But these variations seem to be secondary to environmental factors like the exposure to screens and interaction with parents.

The form of a device did not produce significant differences in results. Language delay was marginally more related to television exposure than smartphones or tablets, whereas mixed use of devices was less prevalent, possibly because that sample size is smaller or the use of such devices is more controlled. The findings indicate that, both time and context of screen time, and not the device, have the biggest influence on language outcomes[19].

Another affecting factor was the socioeconomic status[20]. The lower socioeconomic (43.1) group of children showed the highest language delay compared with middle (32.2) and high (23.5) SES. It can be explained by the parental education differences, stimulating activities, and structured interaction time which are known to help with language development. Overall, this research contributes to the accumulating evidence on excessive and uncontrolled screen time in early childhood as an important risk factors of language delay[21]. This is the time to implement interventions aimed at restricting the amount of time spent at the screen per day, co-viewing, and

interactive play between the caregivers and the child to facilitate the maximum language development as this is a critical period[22] .

CONCLUSION

The paper has pointed out that there is a strong correlation between long screen time and language delay among children between age 2 and 5 years. Children who received over two hours a day of screen time had a significant tendency to display a delayed speech and communication skills than those that showed minimal exposure. Evident dose-response relationship was also found which illustrated that the longer the screen time, the higher the prevalence of language delay. Supervision of screen time was shown to be protective by the parent. Children whose screen time was actively supervised and engaged in interaction had a low incidence of language delay and it is important to note here that co-viewing and directed interaction was very significant. The influence of age and gender was minor, and the socioeconomic factors affected language development as children of low-income families showed more prevalence of delays. The results highlight the importance of caregivers and medical practitioners to ensure healthy screenings during early childhood. The threat of delayed language development can be alleviated by controlling the amount of screen time per day, active parent-child communication, and the introduction of interesting educational content. There is need to provide early intervention and awareness programs to help in promoting the best cognitive and communicative development at this crucial developmental stage.

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