SCREEN TIME AND LANGUAGE DELAY IN CHILDREN: A CROSS-SECTIONAL STUDY IN A SOUTHEAST ASIAN COUNTRY

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Abstract

Background: This questionnaire-based cross-sectional study aimed to ascertain the: (1) prevalence of excessive screen device usage among children with speech and/or language delay, (2) age of first introduction of screen device(s), and (3) association between children's total screen time and media parenting practices.

Methods: 62 children aged 1-5 years who were referred for speech and/or language delay were recruited from a general paediatrics clinic. Data on children's total screen time, age of exposure to screen device(s), parents' total screen time and media parenting practices were collected.

Results: 56 children (90.3%) had excessive screen time. There was a high prevalence of excessive screen time with early exposure to screen devices. A significant positive relationship was found between parents' and children's screen time (p=0.010). Children's screen time was negatively associated with parental encouragement of non-screen activities (p=0.006) and positively associated with parental reduction of screen time as punishment (p=0.015).

Conclusions: Parents should model good screen time practices and create opportunities for non-screen based alternative activities within the home environment. Usage of screen time as a means of regulating behaviour should be discouraged.

Keywords: Children, Language Delay, Screen Time, Southeast Asia, Speech Delay

Introduction

Screen time encompasses any activities involving the use of a digital screen (1). Young children in this era of technological advancement are growing up in homes where the availability, portability, interactivity and functionality of screen devices are high. Due to these factors, modern screen devices tend to be the preferred media choice of children (2).

Many children begin using screen devices as infants and use increases throughout childhood (3-5). A United States national survey found that 68% of children below age 2 used screen devices during a typical day (3). A Malaysian study showed that 27% of pre-schoolers exceeded 2 hours of screen time each day (6). The World Health Organization (WHO) recommends 0 screen time for infants. Children from ages 1 to 2 years should not have sedentary screen time, whereas those over age 2 years are permitted a maximum of 1 hour per day (7).

Consistent evidence has revealed that children are spending more time using screen devices than they should (1, 8). Long hours of screen device usage are linked to delay in speech and language development (9-11). A study conducted in Thailand reported that 95.5-100% of their speech and/or language delay cohort exceeded the recommended screen time, compared to 36% of children without speech/language delay. Additionally, a higher percentage of children with speech delay had unsupervised screen use (9). Children with excessive screen time lack the opportunity to participate in more beneficial activities such as interactive play which involves socialisation. Background television exposure may affect development by limiting interaction between parents and children (12, 13).

Speech and/or language delay is described as a developmental delay whereby language development begins later and proceeds slower than expected (14). Prevalence of reported speech and/or language delay

varies widely. This discrepancy may be due to variation in screening tools (15). The Thai study revealed that children later diagnosed with language delay had a history of watching television from as young as 10 months (9). Those who began watching television below the age of 1, for more than 2 hours daily, were 6 times more likely to develop speech and/or language delay.

Apart from language development, increased screen media exposure is linked to negative outcomes in other developmental domains (16). These domains include interpersonal, motor, communication, cognitive and social development (17). These children are also at risk of obesity, aggressive behaviour, and reduced attention span (18). Another study found that children who began watching 2 hours or more of television per day before the age of 3 had lower cognitive and academic achievement scores at 3 to 5 years (19).

Cognitive stimulation at home is an important factor that is negatively associated with screen time among children (12, 20). Longitudinal associations have been established between screen device exposure at the age of 6 months with lower cognitive and language development at 14 months (3). Other studies have described the association between language delay and early screen device exposure in more diverse samples (9, 19, 21, 22). A study of children aged 8 years and below in the United States of America found that children's screen time was strongly associated with parental screen time (1). Another study found that television viewing by mothers was a strong predictor of total screen time of children, aged 2 to 3 years (23).

Additionally, parental modelling of screen use showed a positive association with children's total screen time (24). Children's screen habits are reflective of that of their caregivers as children learn, are influenced by and adopt behaviours that they have observed (25).

Media parenting practices, defined as specific methods parents use to regulate the media use of their children, are important determinants of children's screen time (24). These practices include parental modelling (parents' own screen practices which their children may model), parental screen use to control children's behaviour, screen use during mealtimes and bedtime and parental limitation of children's screen time (3). Children's total screen time is strongly associated with parental screen time as well as media parenting practices (1, 3, 24).

Although widely studied in international research, there is limited data on the screen time of young Malaysian children and no local studies to date within the speech and/or language delay cohort. This study explored the prevalence of excessive screen time and the associations between screen time with age of first exposure to screen device(s), parents' screen time, media parenting practices and socio-demographic factors.

Methods

University Malaya Medical Centre (UMMC) is a tertiary medical centre in Kuala Lumpur. The General Paediatrics Clinic (GPC) is an outpatient clinic within the Paediatric Department of UMMC that receives paediatric case referrals from primary healthcare centres within Klang Valley. It is overseen by a consultant paediatrician and is run by trained paediatric medical officers, supported by registered staff nurses.

Study design

This cross-sectional study was conducted at the GPC of UMMC. Data collection was conducted over a 6-month time frame (1st August 2019 to 31st January 2020). The study population comprised of children referred for concerns regarding speech and/or language delay (henceforth referred to as language delay). Children were referred from primary health care centres (i.e.: community health clinics and the outpatient clinic of the Department of Primary Care Medicine, UMMC) and private clinics within Klang Valley. This study was approved by the UMMC Medical Ethics Committee (MECID No. 201971-7579).

Inclusion & exclusion criteria

Children aged 1-5 years with language delay who presented for the first time to the GPC for the above-mentioned complaint were recruited. For the purpose of the study, language delay was defined as failure of attaining any of the age-appropriate communication milestones as per the Centres for Disease Control (CDC) Language and Communication Milestone Checklist (26). This included expressive and/or receptive language delay. This checklist was used as a reference by the principal investigator at the point of recruitment. Examples of criteria in the checklist were: children who failed to acquire the use of at least 1 meaningful word by the age of 18 months were considered to have language delay. At age 2 years: inability to point to named objects or pictures and/or body parts, absence of use of at least 2-word phrases, and inability to follow single step instructions (without accompanying visual cues), were classified as language delay. For those who were 3 years old: difficulty following 2-step instructions, not being able to carry on a conversation with 2 to 3 sentences, and speech that was incomprehensible to strangers, were criteria that were used for inclusion. The following were the exclusion criteria: language delay with an established diagnosis of autism or another confirmed developmental diagnosis (children who were referred for suspected autism or other developmental diagnoses and those with confirmed autism or other developmental diagnoses made by a developmental paediatrician were excluded from the study), hearing impairment (confirmed by a formal hearing assessment), known genetic/neurological disorder(s), hospitalisation/acute illness within the prior week, parental refusal to participate, and parental inability

to comprehend both English and Malay. Our centre has a parallel developmental paediatrics clinic to which children with suspected autism or developmental diagnoses are often referred directly, without necessarily going through the GPC.

Sample size & data collection

Universal sampling was utilised. Parents of children who fulfilled the inclusion criteria were approached to obtain written informed consent. For children who fulfilled the criteria but could not be recruited on the same day, their parents were contacted via telephone by the principal investigator at a mutually convenient time during which verbal informed consent was obtained, and the questionnaire was administered via a telephone interview. All data collection was performed by a single principal investigator to retain uniformity. After consent was obtained, a questionnaire was completed by parents in the presence of the principal investigator to facilitate clarification. All telephone interviews were conducted within a period of 4 weeks from the first clinic encounter and were conducted by the principal investigator to avoid inter-observer bias.

Research tool

The information obtained from the questionnaire included: (1) family and sociodemographic characteristics, (2) parent-reported total screen time of the child and parents, and (3) parents' media parenting practices. The questionnaires were administered in 1 of the 2 languages (English or Malay) depending on the language preference of the parent/legal guardian. The presence or absence of comorbidities and sociodemographic data were obtained via a proforma that was completed by the reviewing medical officer during the initial GPC visit.

31 questions pertaining to screen time of children and parents, and parents' media parenting practices were largely based on questions used in several other studies, whereby the items in our questionnaire were a combination of the questions used in these studies (24, 27, 28). To assess child's and parent's screen time, parents were asked to provide the average of total daily screen time (measured in hours) in the past week. Information regarding child's screen time included: (1) total time the child spent using screen devices, (2) screen use on their own, (3) screen time for entertainment/leisure purposes, (4) screen use with active interaction with parents, and (5) duration of background television.

Information regarding parent's screen time included: (1) total time the parent spent on screen devices, (2) screen time related to work, (3) screen time for entertainment/leisure purposes, (4) screen time using social media and (5) screen time in front of their child without interacting with

them. To assess media parenting practices, 8 statements were listed aiming at describing parent's usual practices in terms of their own use of screen devices and their regulation of their children's usage. These practices included parental modelling, mealtime and bedtime screen use, use of screens to control children's behaviour and limit setting (parents' efforts in limiting children's screen use and encouragement of non-screen activities). These practices were assessed via a 2-point Likert scale. The main information in the questionnaire is as tabulated in Table 1.

Table 1: Main information in questionnaire

Main component	Sub-component(s)
Child and Illness-Related Factors	• Age (For children who were born late pre-term, defined as > 35 weeks, with a current chronological age of below 2 years old the corrected gestational age was used) • Gender • Ethnicity • Gestation at birth • Co-morbidities
Family and Socioeconomic Factors	• Main caregiver • Number of siblings and the child's birth order • Parents' age • Parents' education level (none, primary school, secondary school, tertiary level) • Parents' occupational grade (professional, skilled, semi-skilled, unskilled, unemployed) • Total monthly household income
Child's screen time *(measured in cummulative hours in a day)*	• Child's average daily screen time in hours • Child's average daily screen time on his/her own • Child's average daily screen time for entertainment/leisure purposes • Child's average daily screen time involving parent or caregivers' participation/active interaction • Average time with television in the background
Parent's screen time *(measured in cummulative hours in a day)*	• Average parent's daily screen time in hours • Average parent's daily screen time involving work-related activities • Average parent's daily screen time for entertainment/leisure purposes • Average parent's daily screen time involving social media • Average parent's daily screen time in front of child without interacting with child

Table 1: Main information in questionnaire (continued)

Main component	Sub-component(s)
Media parenting practices *(Asssessed via a 2-point Likert scale)*	1) Parental modelling • *I use a screen-based device (mobile phone, computer, TV etc.) while I am with my child* • *I make an effort to reduce my screen time when I am with my child* 2) Mealtime screen use • *At home, we often have the television/other screen device on during meals* 3) Bedtime screen use • *I allow my child to use a screen-based device (mobile phone, computer, TV etc.) just before sleeping* 4) Use of screens to control behaviour • *I reward my child with extra screen time when he/she is good* • *I punish my child by limiting his/her screen time when he/she is naughty* 5) Limit setting • *I limit my child's screen time* • *I encourage my child to do activities that do not include use of screen devices (e.g.: outdoor play, social activities)*

Statistical analysis

Data was analysed via the Statistical Package for Social Sciences (SPSS) software Version 25 (IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.) The normality of data was first tested using the Kolmogorov Smirnov test. The distribution of data was skewed, therefore continuous variables were reported as median and inter-quartile range (IQR). Mann-Whitney U test was used to analyse the relationship between child's screen time and media parenting practices as well as the relationship between children' screen time and demographic factors. Spearman rank-order correlation analysis (2-tailed test of significance) was utilised to study the association between parents' screen time and children's screen time. For all the analyses, $p<0.05$ was considered statistically significant.

Results

62 children were recruited (response rate of 90.3%). Table 2 summarizes the demographic data of children and their parents. The majority (72.6%) were male and of Malay (80.6%) ethnicity. Median age was 2.8 years (range of 1.5 to 5 years). Median paternal and maternal ages were 34 years. Almost all the parents received at least a secondary level of education. Median monthly household income for the various economic groups were grouped according to the Ministry of Economic Affairs categories (29). The majority (53.2%) were in the middle-income group. Grandparents

were most often the primary caregivers (37.1%). The majority (53.2%) of children were exposed to 2 languages at home.

Table 2: Demographic data of children and parents

Demographic factors		
Children	62	
Age (years)	2.8 (2.2-3.9)	
Gender		
Male	45 (72.6)	
Female	17 (27.4)	
Ethnicity		
Malay	50 (80.6)	
Chinese	8 (12.9)	
Indian	4 (6.5)	
Parents	Father (n=62)	Mother (n=62)
Parental age (years)	34 (31-38)	34 (30-37)
Highest education		
Primary	1 (1.6)	0
Secondary	21 (33.9)	22 (35.5)
Tertiary	40 (64.5)	40 (64.5)
Total household income*		
T20	12 (19.4)	
M40	33 (53.2)	
B40	17 (27.4)	
Care arrangement		
Parents	19 (30.6)	
Grandparents	23 (37.1)	
Babysitter	15 (24.2)	
Domestic helper	5 (8.1)	
Number of Languages Used by Carers at home		
One	25 (40.3)	
Two	33 (53.2)	
Three	4 (6.5)	

Median (IQR) were used for continuous variables, while number (percentage) were used for categorical variables
*Monthly household income for the various economic groups in Malaysia: Low income (B40) group – less than RM4360, Middle income (M40) group – RM4360 to less than RM9619 and High income (T20) group – RM9619 and above (Ministry of Economic Affairs, 2018)

Exposure to screen devices and language delay

All the children had been exposed to at least 1 screen device and 79% had been introduced to screen devices before the age of 2 years. Median age of exposure was 1 year (IQR = 0.8-1.5). Median age when first suspected to have speech and/or language delay was 2 years (IQR

= 1.5-2.8) (Range: 1 to 4 years). Televisions (93.5%) and smartphones (82.3%) were the 2 most utilised screen devices. Less than 20% had access to only 1 type of screen device; the rest used between 2 to 4 devices (Table 3).

Table 3: Types of screen devices used by children

Types of screen devices used	n (%)
Television	58 (93.5)
Smartphone	51 (82.3)
Tablet	18 (29.0)
Video Games Console	3 (4.8)
Computer	3 (4.8)
Cumulative types of screen devices	n (%)
1 device	12 (19.4)
2 devices	31 (50.0)
3 devices	17 (27.4)
4 devices	2 (3.2)

Screen time practices, total screen time and prevalence of excessive screen time

56 (90.3%) children had excessive screen time according to the WHO age-specific limits. Median total daily screen time was 3 hours and was for entertainment purposes (Table 4). Two-thirds of the time (2 hours) was spent unsupervised. Median background television was 3 hours (1.4-5.0).

Table 4: Total daily screen time and media practices of children and parents

Screen time of children (hours)	Median (IQR)
Total daily screen time	3.0 (2.0-4.3)
Screen time for entertainment purposes	3.0 (1.9-4.0)
Screen time on their own	2.0 (0.5-3.0)
Screen time with active participation of parents	1.0 (0.5-2.0)
Duration of background television	3.0 (1.4-5.0)
Screen time of parents (hours)	Median (IQR)
Parents' total daily screen time	6.3 (4.0-10.0)
Parents' screen time related to work	4.8 (1.0-7.0)
Parents' screen time unrelated to work	2.0 (1.0-4.0)
Parents' screen time for entertainment purposes	2.0 (1.5-3.3)
Parents' screen time using social media	2.0 (1.0-3.3)
Parents' screen time without interaction with child	1.0 (0.5-2.0)

Parental screen time and media parenting practices

Median total screen time of parents was 6.3 hours; most of the time was spent on work-related activities (Table 4). Almost one-third of the time was for entertainment and social media activities. Parents used screen device(s) in front of their children without interacting with them for 1 hour daily.

Association of demographic factors with total screen time

There was no association between gender, ethnicity, total household income, or fathers' and mothers' education levels with children's total screen time.

Association between age of first exposure to screen devices and total screen time

Children who had exposure to screen devices at a younger age (0-12 months), had significantly higher current screen time compared to those first exposed at 13 months onwards (p=0.037), (Figure 1A).
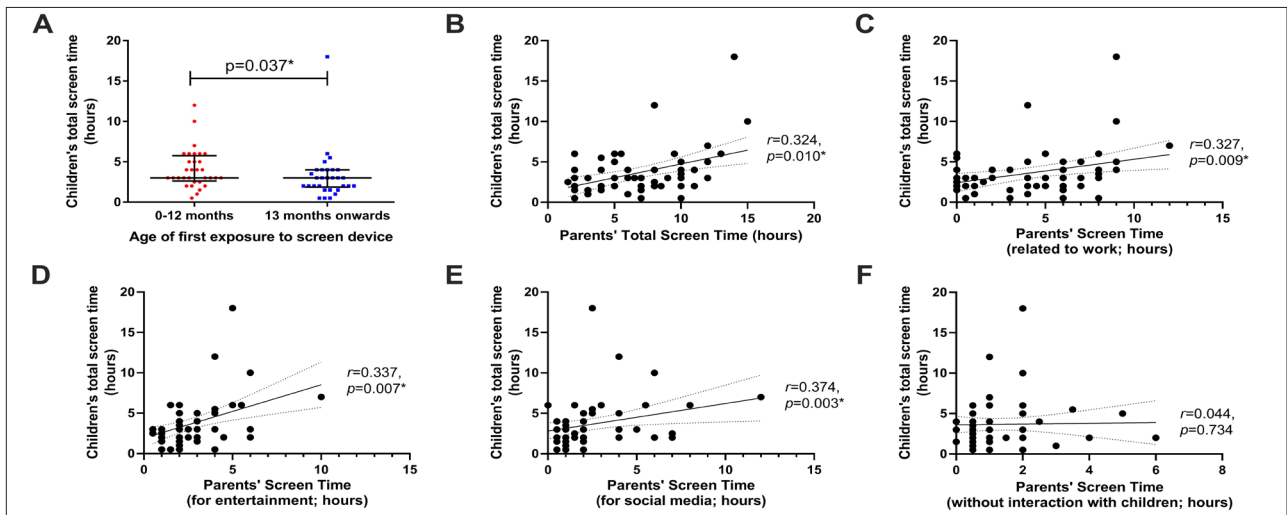
Association between parents' screen time and children' screen time

There was a significant positive relationship between parents' screen time and children's total screen time (r=0.324, p=0.010; Figure 1B). This pattern was also observed for all forms of parental screen activities; whether it was for work (r=0.327, p=0.009; Figure 1C), entertainment (r=0.337, p=0.007; Figure 1D), or social media use (r=0.374, p=0.003; Figure 1E). However, lack of parental interaction with children during parental screen activities did not affect children's total screen time (r=0.044, p=0.734; Figure 1F).
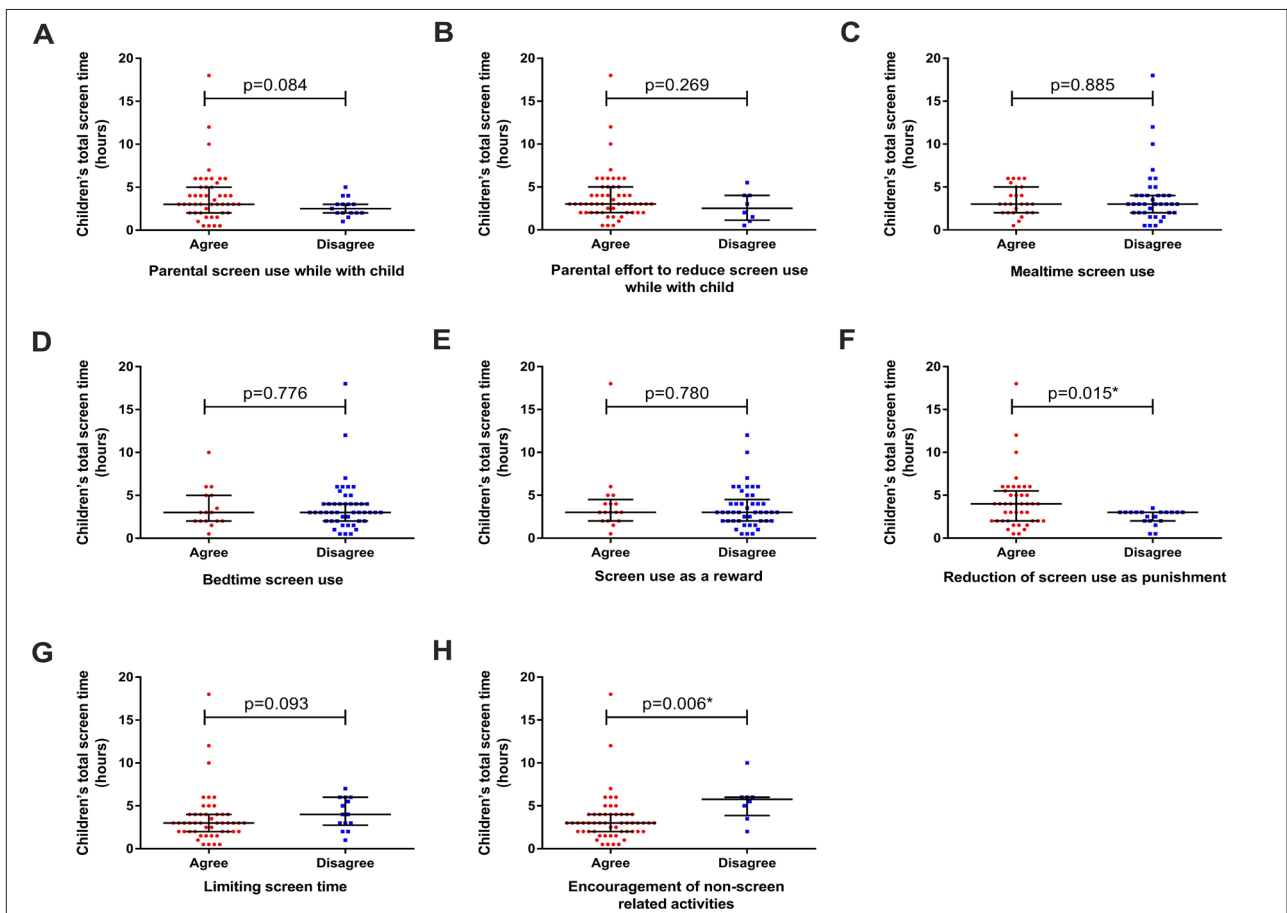
Association between media parenting practices with total screen time

Total screen time was significantly less for those whose parents encouraged non-screen related activities (p=0.006; Figure 2H), while significantly more for those whose parents restricted screen use as a form of punishment (p=0.015; Figure 2F). There were no statistically significant associations with other media parenting practices (Figure 2A-E, G).

Figure 1: Associations between children's total screen time with age of first exposure to screen devices and parents' screen time. (A) Comparison of children's total screen time between age groups of first exposure to screen devices. P-value was calculated using Mann-Whitney U test. The middle line represents median, and the bars represent interquartile range. Correlation of children's total screen time with (B) parents' total screen time, (C) parents' screen time related to work, (D) parents' screen time for entertainment and (E) parents' screen time for social media, were calculated using Spearman rank-order. r denotes Spearman's rho coefficient. p<0.05 was considered significant and denoted with *. Dotted lines indicate 95% confidence interval

Figure 2: Associations between children's total screen time with parental media practices. (A) Parental screen use while with child, (B) Parental effort to reduce screen use while with child, (C) mealtime screen use, (D) bedtime screen use, (E) screen use as a reward, (F) reduction of screen use as punishment, (G) parents' limitation of screen time and (H) encouragement of non-screen related activities. * denotes significant p-value calculated using Mann-Whitney U test. The middle line represents median, and the bars represent interquartile range

Discussion

Early introduction to screen time (9, 19, 21, 22) and excessive screen time (9-11) are known to be associated with later development of language delay. However, we were not able to ascertain a causal relationship due to the type of study. This could possibly be explored via a case-control longitudinal study. Additionally, children with excessive screen time are at a higher risk of developing language delay, based on the literature review. However, they are not necessarily at a higher risk of poorer parental media practices (and higher parental screen time). Poorer parental media practices and higher parental screen time are associated with higher screen time in children (which predisposes children to a higher risk of language delay), but it is unclear whether there is a direct relationship between poorer parental media practices and higher parental screen time, with language delay in children.

Age of exposure to screen time

All the children in our study had been exposed to screen devices. Of these, 79% were exposed before the age of 2 years, with a median age of exposure of 1 year. The prevalence of early exposure was higher than a study of typically developing children in India which found that 50% were exposed to screen devices before 2 years of age (30). Exposure before the age of 1 year was positively associated with higher total screen time. This is important as early screen habits may impact on longer term screen time practices. From existing evidence, early screen exposure is associated with lower cognitive and language development at a later age (3). Other studies have also described language delay associated with early screen exposure in different populations of children (9, 19, 21). In our study, causation of the language delay could not be ascertained, but this warrants further exploration in our population.

Amount and frequency of screen time and language delay

The prevalence of screen use (100%) and excessive screen time (90.3%) were high among children who presented with language delay at our centre. The prevalence of excessive screen time in our study far exceeded that of typically developing Malaysian pre-schoolers (27%) as reported by Lee et al. (6) thus supporting that excessive screen time may be a contributory factor in language delay.

Median total daily screen time of this sample (3 hours) was very similar to other studies (3, 9, 24). More than half (67%) of the time was spent on self-directed screen use with a median of 2 hours per day. This is in line with the findings by Duch et al. (3) of Hispanic toddlers in an urban setting, in the United States of America. In that study, lower communication scores were found in children who had more than two hours of daily screen time. A study by Chonchaiya & Pruksananonda (9) found an association between early introduction of screen time and higher frequency screen time, with language delay.

Reported duration of background television was high (3 hours per day). Background television has been found to cause a negative effect on children's speech and language development. Background television affects children's play activities, reduction in quality of parent-child interactions and the number of words used (12, 13).

Children's and parents' screen time

Our study showed a significant positive but weak correlation between children's and parents' total screen time. This is consistent with the findings of existing studies (1, 23). This association was also observed in all forms of parental screen activities, whether it was for work, entertainment, or specifically involving social media. A possible explanation is parents who have higher screen time themselves understate the importance of screen time limitation in their children (25). Additionally, children's screen habits are reflective of that of their parents. However, as the majority (69.4%) of children in the study had non-parent primary caregivers, this correlation might be confounded by the screen behaviour of non-parent caregivers, and this information could not be captured.

The findings of the current study are consistent with previous research by Tang et al. (24), indicating that children's total daily screen time was significantly lower in the group whose parents encouraged non-screen related activities such as physical activities. This is consistent with the findings of Mansor et al. (31) in which parents with low self-efficacy to influence their children's physical activity had higher parental barriers in restricting children's screen time. Children's total daily screen time was significantly higher for those whose parents used withdrawal of screen time as a form of punishment, like several other studies (24, 28, 32). This is likely because baseline screen time in these families was already high. Interestingly, there was no association between screen time and parental usage of screen time as a reward for good behaviour. A longitudinal study should be conducted for further analysis of such a relationship.

In contrast to previous research by Tang et al. (24), this study found a lack of association between parental modelling with children's total screen time. This is probably because non-parent primary caregivers were the majority (69%). Efforts to limit screen time should ideally target all caregivers.

Other factors

Boys outnumbered girls in this study, which is in accordance with males being at higher risk of language delay (15). However, there was no statistically significant association between gender and children's total screen time. This is consistent with the findings of several other studies (33, 34).

There was no statistically significant difference in total screen time of children from different income groups in our study. A systematic review of 10 studies had mixed findings;

half the studies showed no association between screen time and household income (35). Nonetheless, in our study children from the low-income group (B40) did show higher median screen time. One possible explanation is that for lower income families, usage of screen devices is a more affordable activity compared to other entertainment options. Our findings are consistent with a local study on parents of children younger than five years which found that lower income families faced more barriers to reducing children's screen time (31).

There was no significant association between mealtime screen use with total screen time, in contrast to the findings of other studies (4, 24, 36) whereby there was a significant positive association. Exploration of the quality of parent-child interaction at these times would be important to explore in future studies. Unlike the outcome reported by Tang et al. (24), we did not find a significant association between screen use during bedtime and total screen time.

Strengths and limitations

The strength of this study is the analysis of media parenting practices and the association with total screen time within a high-risk population. To the knowledge of the authors, there is limited information on this subject pertaining to the Malaysian population as well as that of its neighbouring countries in Southeast Asia. Available guidelines on children's screen time such as the WHO and American Academy of Paediatrics (AAP) guidelines are mainly derived from western populations. Results of this study would therefore be informative for national health care authorities in strategizing interventions and programmes to reduce screen time in Malaysian children.

One of the limitations was that this was not a case-control study. Hence, we did not recruit children with normal development as a control group. We acknowledge that it would have strengthened the study findings had we recruited a control group. This would have enabled comparisons of children with language delay with those with typical language development. Additionally, the sample size was relatively small. Nonetheless, universal sampling was employed to include all the children who fulfilled the inclusion criteria. Thus, the study findings are representative of the children who presented to the GPC within the time frame of the study. In future studies, recruitment should ideally be performed in a primary care clinic, at which there would likely be more children who fulfil the study criteria.

This study was conducted at a single tertiary centre that caters to an urban population and is thus not fully representative of the entire Malaysian population, as the care arrangements and home settings vary vastly. Nevertheless, the findings may be relevant to the local area. We also did not obtain information on the screen time practices of non-parent primary caregivers. Causal inferences could not be determined due to the cross-sectional nature of the study. A longitudinal study would be useful in the future to track screen time practices as well as language development over time. Both children's and parents' screen time were based on parent-report and therefore may have resulted in social-desirability bias and recall bias to a certain extent. Levels of validity can be variable in self-reported measures of screen time when compared to objective measures. The information bias related to these measures may consequently have led to an underestimation of the true associations.

Conclusion

A multi-centre study would be an effective means to increase the sample size and broaden the study scope to include children from different regions of the country. A longitudinal study looking into the effect of an intervention model in this population using data derived from this study would also be useful. Inclusion of information regarding media parenting practices of non-parental primary caregivers and the characteristics of their care settings would enable more screen time impacting factors to be studied.

Since socio-demographic factors such as ethnicity, parental education level and income group did not significantly affect the screen time practices of children, public health and educational campaigns targeting healthy screen time practices would be equally beneficial to varied socio-economic groups.

As the use of screen devices becomes more ubiquitous, caution needs to be exercised to avoid excessively early exposure and excessive use of screen devices. Media parenting practices should target encouraging alternatives within the home environment, such as parent–child play activities. Reading and a language-rich home environment can further enhance the language abilities of children. Parents should refrain from the practice of using screen time to control children's behaviour.

Interventions for children work best via positive encouragement and modelling. Hence, parents should create a home environment that includes regular physical activity so they can be role models for their children, instead of merely focusing on limiting screen use.

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Competing interest

The authors declare that there is no conflict of interest.

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