

Screen time and social-emotional skills in preschoolers with developmental, behavioural or emotional issues in Singapore

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ABSTRACT

Introduction: This study aimed to determine patterns of screen viewing time (SVT) in preschool children with developmental, behavioural or emotional (DBE) issues, and to identify its relationship with social-emotional development.

Method: This cross-sectional study involved children aged 0–5 years who were referred to a developmental paediatric clinic for DBE issues. Parents completed a screen time questionnaire, and the Devereux Early Childhood Assessment-Clinical (DECA-C) questionnaire which assessed the social-emotional competence of the children. Data were analysed using logistic regression, correlational analyses and tests of comparison.

Results: Among 225 children (mean age: 32.4 months), mean daily SVT was 138 minutes. More than half (51.1%) of the children had clinical features of language delay, while 26.6% had features suggestive of autism spectrum disorder. Screen time was first introduced at a mean age of 13.8 months, with 32.4% of children previously experiencing higher SVT. Compared to SVT introduction after 1 year of age, SVT in the first 12 months was primarily to facilitate feeding ($P<0.05$). Children with higher past SVT had poorer attention, more aggression, and increased behavioural concerns. Children with DBE issues have significantly more screen time than same-aged peers.

Conclusion: Children with DBE issues are exposed to SVT at a very young age and have significantly more screen time than their peers. It is crucial to guide parents to reduce SVT in early childhood, particularly around mealtimes.

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Keywords: developmental concerns, preschool, public health, screen time, social-emotional skills

CLINICAL IMPACT

What is New

- This study reveals that children with developmental, behavioural or emotional (DBE) issues are exposed to screen time earlier than in recommended guidelines.
- The primary reason for early screen time introduction in children with DBE is to aid in feeding during infancy. This early exposure is linked to increased inattention, aggression and behavioural concerns in toddlers.

Clinical Implications

- Clinicians and child health professionals should actively inquire about both current and past screen time practices during screenings and routine surveillance.
- Anticipatory guidance on reducing screen time exposure, particularly around mealtimes, should begin as early as the antenatal period.

INTRODUCTION

Preschool children, particularly those with developmental, behavioural or emotional (DBE) issues, are highly vulnerable to the negative effects of excessive screen viewing time (SVT) on their social and emotional development.^{1,2} Singapore, an island nation with a declining birth rate,³ places significant emphasis on human potential, particularly the social and emotional development of its young children.⁴ There has been a noticeable increase in the number of young children in

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Singapore experiencing excessive SVT. The Singapore Longitudinal Early Development Study (SG LEADS) reported that nearly 50% of children under 3 years of age engage in SVT for entertainment purposes at least once a week.⁵ SVT is also used for learning, games⁵ and during mealtimes.⁶ Excessive SVT impacts children's development, including cognition, executive function, and social-emotional regulation.^{2,7,8} Children with neurodevelopmental disorders such as autism spectrum disorder (ASD), speech language delay (SLD), and attention deficit hyperactivity disorder (ADHD) already struggle with social and emotional regulation and are particularly prone to increased SVT and its adverse effects.^{2,9-11} Research has shown that SVT is higher in children with neurodevelopmental disorders compared to the general population.⁹ Additionally, SVT at 1 year of age has been linked to autism symptoms at 3 years of age.¹²

In response to these global trends, many SVT guidelines have been established.¹ The Ministry of Health in Singapore has implemented public health messages, including a 24-hour activity guideline and a screen use guideline, emphasising the importance of limiting SVT exposure in young children.^{13,15} We investigated whether such messages were effectively reaching the public in Singapore and whether SVT management in young children had improved. Our study aimed to: (1) examine patterns of SVT in children with DBE issues, including changes in SVT over time and reasons for its introduction; and (2) explore the relationship between SVT and social-emotional development in these children. We hypothesised that SVT might still be introduced too early to keep children occupied and would be associated with poorer social-emotional development, particularly in terms of attention and emotional regulation.

METHOD

Study participants

Data for this cross-sectional study was obtained from an ongoing study titled "Clinical Correlates, Contributions and Characteristics of Children with Developmental Issues in the Child Development Unit (5C Study)" conducted at the developmental paediatric clinic of the Child Development Unit at the National University Hospital, Singapore from September 2019 to August 2021. Inclusion criteria were: (1) children from birth up to age 4 years 11 months visiting the clinic for any DBE concerns; and (2) recruitment at first clinic visit before the commencement of any diagnostic assessment or intervention. The exclusion criterion

was parents/caregivers who could not read English. Ethics approval was obtained from the National Healthcare Board Domain Specific Research Board for all study-related procedures (DSRB reference 2019/00132-SSR6).

Measures

Short SVT questionnaire

A descriptive screen time questionnaire was developed by consensus of the authors, comprising 9 questions to gather details on when SVT was first introduced, reasons for its introduction, details of device use including content, current and past SVT duration, and background television information. This questionnaire was completed by parents or the caregiver accompanying the child (Supplementary Appendix S1).

The Devereux Early Childhood Assessment-Clinical (DECA-C)

The DECA-C is a standardised behaviour rating scale for children aged 2–5 years with behavioural difficulties in a clinical setting.^{16,17} It consists of 3 protective factor scales (initiative, self-control and attachment) contributing to a total protective factor (TPF) score, and 4 behavioural concerns scales (attention problems, aggression, withdrawal/depression, and emotional control problems) contributing to a total behavioural concern (TBC) scale. For protective factors, the initiative subscale measures the ability of the child to independently act to meet their needs. The self-control subscale reflects the child's ability to act and speak appropriately to express thoughts and feelings. The attachment subscale refers to the specific 2-way relationship between the child and a significant caregiver, such as a parent. The TPF score denotes the cumulative strength of these 3 protective factors, with higher scores representing better social-emotional development. For behavioural concerns, the attention problems subscale evaluates the child's ability to sustain focus on a task. The aggression subscale measures hostile or destructive acts aimed at other people or things. The withdrawal/depression subscale reports behaviours where a child is preoccupied with their thoughts or play, rather than engaging with others. The emotion control problems subscale explores a child's difficulties in moderating the expression of negative emotions to reach their goals. The TBC score represents a composite of these 4 scales, indicating the magnitude and severity of the child's behavioural problems, with higher scores denoting greater problems.

Demographic questionnaire

Parents completed a demographic questionnaire to provide information on their qualifications, the child's age, and their preschool grade level. Details of comorbid medical illnesses, the family's need for financial subsidies, and family history of developmental disabilities were retrieved using a standardised data extraction form from medical records. Information on parents' ethnic background was not collected.

Statistical analyses

Data were analysed with SPSS version 28.0 (IBM Corp, Armonk, NY, US); statistical significance was set at $P < 0.05$ (2-sided). Descriptive statistics for numerical variables are presented as mean $\pm$ SD for continuous variables or n (%) for categorical variables. The average SVT (in minutes) was derived using the following formula: (weekday screen time /day $\times$ 5) + (weekend screen time /day $\times$ 2) / 7. Logistic regression was performed to determine the association for the reasons for first introducing SVT within a year of age. Odds ratios with 95% confidence intervals were computed. Correlational analysis was used to determine the strength of association between numerical screen time variables and numerical DECA-C scores. The analyses were adjusted for demographic and family variables.

RESULTS

Study cohort and screen time data

Data were obtained from 225 participants who completed the questionnaires. One parent returned an incomplete questionnaire. The mean $\pm$ SD age of children was 32.4 ± 11 months (range 10.8–58.8 months). The average daily SVT was 138.1 ± 109.2 minutes, which is over 2 hours. SVT was first introduced at a mean age of 13.8 ± 8.9 months. The longest past daily SVT, at mean 262.6 ± 140.7 minutes, exceeded 4 hours. The mean background television viewing duration was 3 hours 54 minutes (234.8 ± 174.6 minutes). Demographic information is summarised in Table 1. One hundred and fifty-one (67.1%) of children were boys, and 151 (67.4%) were enrolled in preschool. Among the parents, 104 (46.2%) mothers and 98 (43.6%) fathers had educational qualifications of university or higher. Sixty-seven (29.8%) children lived with grandparents, and 32 (14.2%) had a live-in domestic helper (Table 1). One hundred and fifteen children (51.1%) had clinical features of SLD, while 60 (26.6%) had features suggestive of ASD (Table 1). One in 5 parents ($n=47$, 20.8%) reported a family history of either mental health conditions (5 mothers and

1 grandparent with depression) or DBE conditions, including siblings with autism ($n=10$; 4.4%), speech or developmental delay ($n=6$, 2.7%). A minority ($n=28$; 12.4%) of children had other chronic medical conditions.

Table 1. Demographics and descriptive data of study participants ($n=225$).

Demographic	n (%)
Sex	
Male	151 (67.1)
Female	74 (32.9)
DBE diagnosis	
SLD	115 (51.1)
ASD	60 (26.6)
Behavioural dysregulation ^a	19 (8.4)
GDD	17 (7.6)
Others ^b	13 (5.8)
Child's school enrolment status	
In school	151 (67.1)
Not in school	73 (32.4)
Data not provided	1 (0.5)
Child's school grade level	
Playgroup (PG) /Nursery 1 (N1)	47 (20.9)
Nursery 2 (N2)	87 (38.7)
Kindergarten	17 (7.6)
Child has siblings	
Yes	140 (62.2)
No	83 (36.9)
Data not provided	2 (0.9)
Mother's highest educational level	
Primary to post-secondary	60 (26.7)
Diploma	51 (22.7)
Degree/post-graduate	104 (46.2)
Data not provided	10 (4.4)
Father's highest educational level	
Primary to post-secondary	70 (31.0)
Diploma	48 (21.3)
Degree/post-graduate	98 (43.6)
Data not provided	9 (4.1)

Table 1. Demographics and descriptive data of study participants (n=225). (Cont'd)

Demographic	n (%)
Other information	
Living with immediate family	202 (89.8)
Household includes domestic helper	32 (14.2)
Household includes grandparents	67 (29.8)
Child has medical issues	28 (12.6)
Child has existing developmental issues	29 (13.1)
Family history of mental health or DBE conditions	47 (20.9)

ASD: autism spectrum disorder; DBE: developmental, behavioural or emotional issues; GDD: global developmental delay; SLD: speech language delay

^a Includes inattention and hyperactivity.

^b Includes chronic medical conditions or syndromes such as ex-premature, coordination disorders, etc.

Patterns of SVT

The top 3 reasons for first introducing SVT were for keeping children occupied, to facilitate mealtime routines, and for play (Table 2). Fifty-four (24.0%) children had their screen devices, with 35 (64.8%) having a tablet and 26 (48.1%) having a mobile phone. One hundred and thirty-eight (61.3%) children watched television, and 137 (60.9%) could change the screen content themselves. One hundred and sixteen (51.6%) viewed entertainment suitable for children, while 62 (27.6%) viewed educational content as indicated by parents. Seventy-three (32.4%) had more SVT in the past, and a further 78 (34.7%) had SVT in the first year of life. There was no significant age difference between children using SVT as entertainment compared to education (mean age 2.69 vs 2.87 years; $P=0.61$). Only 11 children (4.9%) played video games, and they were slightly older at 2.94 years. The quality of screen time was not evaluated.

Table 2. Patterns of SVT as reported by parents/caregivers (n=225).

SVT pattern	n (%)
Reason(s) for SVT introduction	
Meal time	103 (45.8)
Play	97 (43.1)
Keep child calm	68 (30.2)
Keep child occupied	120 (53.3)

Table 2. Patterns of SVT as reported by parents/caregivers (n=225). (Cont'd)

SVT pattern	n (%)
Education	89 (39.6)
Others	15 (6.7)
Child has own device	
Yes	54 (24.0)
Tablet	35 (64.8)
Mobile phone	26 (48.1)
Others	2 (3.7)
No	167 (74.2)
Data not provided	4 (1.8)
Device child uses most often	
TV	138 (61.3)
Mobile phone	50 (22.2)
Tablet	39 (17.3)
Child is able to change device programming	
Yes	137 (60.9)
No	82 (36.4)
Data not provided	6 (2.7)
Screen time content	
Entertainment for child	116 (51.6)
Educational content	62 (27.6)
Playing games	11 (4.9)
Entertainment for parents	10 (4.4)
History of more SVT in the past	
Yes	73 (32.4)
No	147 (65.3)
Data not provided	5 (2.3)
SVT introduced in the first year of life	
Yes	78 (34.7)
No; introduced after 1 year	147 (65.0)
SVT: screen viewing time	

SVT associations

When SVT was first introduced under 1 year of age, it was predominantly for mealtime purposes (adjusted odds ratio [AOR] 2.6, 95% confidence interval [CI] 1.3–5.1, $P=0.005$, Table 3). Children who had SVT on mobile phones were more likely

to be introduced to screen time at a younger age (mean±SD 10.6±5.4 vs 14.3±9.2 months, $P=0.026$), after adjusting for parental and demographic variables shown in Table 1. A higher level of parental education appeared predictive of lower SVT in children. Higher maternal education (i.e. degree and above) was associated with lower SVT per day, compared to diploma and primary to post-secondary (mean±SD time of 114±99 vs 161±112 vs 168±113 minutes, $P=0.003$). Similarly, higher paternal education (i.e. degree and above) was also associated with lower SVT per day, compared to diploma and primary to post-secondary (mean time of 115±102 vs 129±91 vs 177±124 minutes, $P=0.001$). Children enrolled in preschool had less SVT compared to those who were not (84±90 vs 150±192 minutes, $P=0.001$). Children who lived with grandparents were less likely to have SVT to keep them occupied (41.8% vs 58.2%; AOR 0.4, 95% CI 0.2–0.9, $P=0.018$). Children who live with siblings compared to those who were only children were more likely to use television for SVT (71.2% vs 51.9%; AOR 2.4, 95% CI 1.2–4.7, $P=0.013$).

Screen time and social emotional measures on the DECA-C

Table 4 shows the results of analysis of DECA-C scores against SVT patterns. Higher initiative scores were associated with later age of SVT introduction ($r=0.156$, $P=0.02$). In addition, longer weekend SVT was associated with poorer emotional control scores (2.8±2.6 vs 2.1±1.9, adjusted $P=0.04$) and poorer TBC scores (2.7 vs 2.1, unadjusted $P=0.040$ and adjusted $P=0.388$). Children who had more SVT in the past had poorer attention scores compared to those who did not (mean±SD: 58.7±10.4 vs 55.6±11.6; $P=0.030$); higher aggression scores (mean±SD:

50.3±11.5 vs 47.2±10.3; $P=0.016$); and, higher TBC scores (mean±SD: 56.6±10.4 vs 53.0±11.8; $P=0.032$) (Table 5).

Population, age and COVID-19 pandemic comparisons

There was no significant difference in mean SVT between the 0–2 and 3 and above age groups ($P=0.563$ for SVT involving television, and $P=0.472$ for SVT involving other electronic devices; regardless of weekday or weekend) (Table 6). There was also no significant difference in mean weekday ($P=0.23$) and weekend ($P=0.18$) SVT before and during the pandemic when comparing children enrolled before ($n=55$) and after March 2020 ($n=170$) during which pandemic-related work-from-home measures were applied.¹⁸ When compared to a typical preschool population from another study,¹⁹ children with DBE conditions in our cohort have significantly more SVT ($P<0.05$; Table 6).

DISCUSSION

Children in this study received SVT exposure much earlier than is recommended by international guidelines, which advise no screen time for children under 2 years old.²⁰ This pattern is also reported globally and aligns with existing studies in Singapore.^{5,20} In our study, almost a quarter of children had their own screen devices, such as tablets (65%) or mobile phones (48%). Similar numbers were reported in the SG LEADS study, with up to 21% of children under 3 years and 32% of children over 3 years using electronic devices for entertainment daily.⁵ However, children in our study with DBE concerns had significantly higher SVT than those in the SG LEADS study, which represents a typical preschool population (Table 6). This finding is consistent with data

Table 3. Reasons for first introduction of SVT.

Reason	SVT introduction, n (%)		Unadjusted odds		Adjusted odds ^a	
	Within a year (n=78)	After a year (n=147)	OR (95% CI)	P value	OR (95% CI)	P value
Meal time	44 (56.4)	59 (40.1)	1.9 (1.1–3.4)	0.020	2.6 (1.3–5.1)	0.005
Play	29 (37.2)	68 (46.3)	0.7 (0.4–1.2)	0.191	0.7 (0.3–1.2)	0.185
Keep child calm	23 (29.5)	45 (30.6)	0.9 (0.5–1.7)	0.861	0.9 (0.5–1.8)	0.751
Keep child occupied	42 (53.8)	78 (53.1)	1.0 (0.6–1.8)	0.911	1.0 (0.5–1.8)	0.970
Educate	30 (38.5)	59 (40.1)	0.9 (0.5–1.6)	0.807	0.9 (0.5–1.8)	0.873

OR: odds ratio; SVT: screen viewing time

^a adjusted for all variables in Table 1.

Values in bold are significant at $P<0.05$.

Table 4. Correlations between SVT variables and DECA-C scores.

DECA-C scales	When SVT was first introduced (months)	Average SVT per day (hours)	Average SVT on weekends (hours)
Initiative	0.156	0.112	0.123
Self-control	0.021	0.025	0.022
Attachment	-0.022	0.004	0.066
TPF	0.050	0.072	0.098
Withdrawal	-0.084	0.031	0.056
Emotional control	0.052	0.087	0.138
Attention	-0.099	0.081	0.109
Aggression	0.038	0.009	0.051
TPC	-0.019	0.059	0.113

DECA-C: Devereux Early Childhood Assessment-Clinical; SVT: screen viewing time; TBC: total behavioural concern; TPF: total protective factor
Values in bold are significant at $P < 0.05$.

Table 5. Association between higher SVT exposure in the past and DECA-C scores.

DECA-C scores	Ever have more SVT in the past, mean $\pm$ SD		Unadjusted Odds	Adjusted Odds*
	No (n=147)	Yes (n=73)	P value	P value
Initiative	36.2 $\pm$ 8.1	36.7 $\pm$ 7.7	0.596	0.923
Self-control	40.9 $\pm$ 9.9	41.1 $\pm$ 8.6	0.920	0.868
Attachment	39.6 $\pm$ 11.6	40.9 $\pm$ 9.6	0.403	0.387
TPF	36.1 $\pm$ 8.4	36.8 $\pm$ 8.0	0.556	0.749
Withdrawal	57.2 $\pm$ 12.1	59.1 $\pm$ 11.3	0.271	0.407
Emotional control	51.8 $\pm$ 12.3	54.9 $\pm$ 10.9	0.069	0.072
Attention	55.6 $\pm$ 11.6	58.7 $\pm$ 10.4	0.056	0.030
Aggression	47.2 $\pm$ 10.3	50.3 $\pm$ 11.5	0.043	0.016
TBC	53.0 $\pm$ 11.8	56.6 $\pm$ 10.4	0.030	0.032

DECA-C: Devereux Early Childhood Assessment-Clinical; SVT: screen viewing time; TBC: total behavioural concern; TPF: total protective factor

* adjusted for all variables in Table 1.

Values in bold are significant at $P < 0.05$.

in Singapore showing that children with DBE conditions have higher SVT.²¹ Pandemic-related restrictions did not result in significant differences in SVT, possibly due to the already high levels of use.

We found that SVT was introduced to children under 12 months of age to facilitate easier feeding during meal times, representing a novel and important finding in Singapore. Children with DBE concerns may experience more feeding

difficulties than typically developing children. Atypical eating behaviours and feeding difficulties are more common in children with ASD,²² where another preschool study suggested an association between hyperactivity, authoritarian feeding style, and feeding difficulties in children with ASD.²³ This could explain the use of SVT during feeding. We also speculate that the use of SVT for feeding may be cultural and occur even among typically developing children in Singapore, although this

Table 6. Comparison of data between SG LEADS study¹⁹ and the current study.

Study	Source of screen time, weekday/ weekend	Duration of screen time		P value (comparing children under 2 years vs those over 3 years in current study)	P value (SG LEADS vs current study)
		Children aged 0–2 years old	Children aged 3–4 years old		
SG LEADS	TV, weekday	42 minutes	50 minutes	0.563	<0.05 ^a
Current study		2 hours	1 hour 45 minutes		
SG LEADS	TV, weekend	51 minutes	1 hour 18 minutes	0.563	<0.05 ^a
Current study		2 hours 11 minutes	2 hours 48 minutes		
SG LEADS	Other electronic devices, weekday	12 minutes	21 minutes	0.472	<0.05 ^a
Current study		1 hour 54 minutes	1 hours 48 minutes		
SG LEADS	Other electronic devices, weekend	16 minutes	30 minutes	0.623	<0.05 ^a
Current study		2 hours 18 minutes	2 hours 42 minutes		

SG LEADS: Singapore Longitudinal Early Development Study

^a One sample t-test

was not directly evaluated in this study. Findings from another study on food parenting practices in typically developing preschoolers supports the observation that Singaporean parents use more coercive control practices compared to Western counterparts, putting more pressure on a child to eat, and using bribes and threats for a child to finish meals quickly.²⁴ Differential expectations related to feeding could potentially contribute to parents in our study using SVT to expedite feeding through distraction rather than encouraging independent eating. The use of SVT during meals has also been reported in other countries.²⁵ In Thailand, more than half (58%) of typically developing toddlers had SVT for meals.⁶ This highlights the need for education on developmentally appropriate mealtime routines to reduce the need for screen-based distractions for both children with DBE conditions and typically developing children.

Unsurprisingly, school enrolment reduced screen time as children spend less hours at home and more time in a largely screen-free environment. Children under the care of grandparents had less screen time, possibly because grandparents can engage more with children than domestic workers. However, no significant difference was found between domestic worker care and screen time. Domestic workers are employed by many households in Singapore to take on caregiving responsibilities amid other household duties.²⁶ The presence of siblings increased the likelihood of SVT due to television sharing. Similarly, an Australian study found that having 1–2 siblings increased SVT, but having more siblings encouraged other activities to displace SVT.²⁷ While the distribution of educational qualifications

within our sample is consistent with national norms,²⁸ our finding that parents with higher educational levels gave their children less SVT is similarly described in other studies.^{29,30} A past history of higher SVT use was present in about one-third of children, suggesting that parents reduced SVT by the time of the first specialist consultation. However, reasons for this reduction were not elicited. Asking whether a child “ever” had more SVT in the past may be a useful measure, as parents’ reports of current SVT exposure may not always be reliable compared to real-time measures.³¹

We found that earlier SVT introduction was associated with lower initiative scores on the DECA-C. Initiative, the ability to take independent action to achieve a goal, is a key component of social emotional regulation. Studies have shown that excessive SVT can negatively impact the development of initiative and self-regulation.^{32,33} However, the children in this study with DBE issues could have started with lower initiative scores. Longer weekend SVT was associated with poorer emotional control, but this was not observed with longer weekday SVT. This may be due to children being solely in parents’ care on weekends, compared to weekdays when other caregivers are involved, leading to more accurate reporting of SVT history. Emotional control, managing one’s emotions and behaviours in different situations, is crucial for social-emotional development. Excessive SVT in children has been linked to negative effects on emotional control.³⁴ SVT can be overstimulating, altering brain chemistry;³⁵ it may disrupt the development of social skills like communication and empathy;³⁶ and lead to

a sedentary lifestyle, which is linked to poorer emotional control.³⁷ The content and quality of SVT can also impact emotional control, as educational programmes and interactive games may positively influence cognitive development and social skills, indirectly improving emotional control.¹ A past history of “ever” having more SVT correlated with higher aggression scores, poorer attention and more total behavioural concerns. This likely reflects that prolonged SVT exposure can impact a child’s ability to self-regulate. Excessive SVT in early childhood has been associated with increased aggression and other behavioural problems.¹ The children in our study have poorer initiative scores, emotional control, higher aggression scores, poorer attention, and more total behavioural concerns related to early and excessive SVT use. These findings could be influenced by multiple confounding factors, including underlying developmental delay, obesity,³⁸ parental income and educational level, number and type of devices in the home, and number of older siblings using devices.^{39,40} Nonetheless, our findings emphasise the need to continue public health education efforts to improve awareness of healthy screen time practices, understand reasons for its use and delay the early introduction of SVT to children.

The finding of SVT introduction in infancy for mealtime routines among children with DBE concerns requires special attention. Healthcare professionals need to be aware of the higher likelihood of SVT use during feeding in children with DBE conditions, particularly ASD, and provide appropriate counselling and support. Furthermore, parents and caregivers of all children require knowledge and explicit coaching about developmentally appropriate mealtime routines even before an infant is weaned. Anticipatory guidance for mealtime habits could be provided for all children during the first postnatal visit at 8 weeks of age and subsequent well-child visits. The reasons why one-third of parents had reduced SVT by the time of the first tertiary clinic visit need to be explored to understand what influenced their decision. Parents can better understand and practise developmentally appropriate ways to engage children without relying on electronic and media devices. However, they cannot do this alone and require the support of a well-integrated public health approach with a central message on delaying and limiting SVT in young children, and engagement of all stakeholders to improve outcomes for both “at risk” and typically developing children in Singapore. Further research on parents and caregivers’ knowledge of guidelines would be useful for reviewing public health efforts in disseminating childcare and health information,

identifying the gaps, and instituting enhancing measures.

One of the key limitations of the study is the lack of a comparative sample of typically developing children without DBE issues. Hence, our findings on SVT patterns and their relation to socio-emotional development may not be generalisable to the broader population. This limitation was partially addressed by comparing our data with a separate study in Singapore on typically developing children to understand which findings were potentially more generalisable. Further studies should apply similar measures of socio-emotional development to typically developing children to better understand this topic. We also did not collect data on potential study participants who declined to participate, which may have introduced a selection bias and limit the wider applicability of the results. Lastly, the setting of study recruitment within a tertiary clinic may not have been ideal for parents experiencing indirect stress associated with the visit; this could have affected their reported SVT history, which was based on parent recall rather than objective measures,³¹ and may be subject to reporting bias. We sought to mitigate this by providing a child-friendly environment and ample time as needed for questionnaires completion.

Our study shows that in children with DBE concerns, SVT is introduced too early and remains excessive. Early introduction in the first year of life is related to mealtime routines. Early and excessive SVT is associated with poorer social emotional regulation related to initiation, emotional control, and attention. Public health messaging on SVT needs to be well-integrated, and delivered as early as possible in a child’s life, i.e. antenatally, and can benefit both children with DBE conditions and those who are typically developing. Parents have demonstrated that they can change the behaviour and reduce SVT in their children; reasons for this should be explored further. The findings of this study contribute to the well-being and success of preschool children with DBE issues in Singapore and may hold lessons for similar cultures.

Declaration

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