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Parents' knowledge, attitude, and practice on children's screen time at home and the implications for nurses in promoting health: a cross-sectional study

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ABSTRACT

Introduction: The present study investigated the parent's knowledge, attitude, practice, and experience of the screen time spent by their children at home aged below 5 years old, identifying the common screen-based devices used, content type, and level of screen time spent by the children.

Methods: A cross-sectional survey of parents having children aged 0 to 4 years old attending the Maternal and Child Health Care Clinics in four districts in Brunei Darussalam was conducted. A questionnaire was developed through the Qualtrics platform. Data were analyzed using R Studio Desktop version 1.2.1335. The statistical analyses included descriptive statistics and Fisher's exact test.

Results: Parents' knowledge, attitude, and practice of screen time spent by their children are generally positive; parents who correctly answered the knowledge section overall average of 30.1% (n=34). Children studied (<2 years old and 3 to 4 years old) were found to spend more time watching television. A statistically significant association was observed between children of both age groups with time spent on tablet device (p=0.037) and (p=<0.001). Also, a significant association between parents' knowledge, attitude and practice with gender of the parents, household income, and total number of children was reported.

Conclusions: We conclude that the children in our study exceeded the recommended guidelines on screen time behavior and the parents' health knowledge with regard to screen time was poor which emphasized the need for improvement and further study.

Keywords: children, parent's attitude, parent's knowledge, parent's practices, screen time,

Introduction

'Screen time' is defined by the World Health Organization (WHO) as the amount of sedentary time spent passively on screen-based devices without active physical activity (World Health Organization, 2020). WHO (2020) has released a WHO 24-hour movement guidelines recommending that children aged 2-4 years should have less than one hour of screen time per day while limiting to none for infants below 2 years of age (WHO, 2020). However, given the rapid pace of technological change nowadays whereby ownership of technological devices has been made easier, children growing up with technology has increased rapidly, thus raising concern on the negative impacts it brings to their overall aspect of health that could hinder their optimal growth and well-being (Bennetts et al., 2016).

The evolution of screen devices gives rise to several access to educational applications and programs that facilitate children's development in many different ways, especially in teaching and parenting (LeBlanc et al., 2017). Screen devices through games and other educational applications promote interactive learning and stimulate cognitive development (Ponti, 2023). These include early literacy, numeracy, and problem-solving skills (Tatar et al., 2023). By contrast, excessive screen time may pose several limitations that can lead to physical inactivity, sleep disturbances, and delayed language development. Dependence on screen devices may limit face-to-face social interactions, impacting children's social development (Canadian Paediatric Society, 2017; Carson et al., 2010). Numerous research has also indicated that excessive screen time negatively contributes to addiction to the screen devices, causing behavioral and attention issues (Garmy et al., 2018). Overall, monitoring and limiting screen time are not without challenges to the parents which may lead to conflicts in relationships with their children (Chandra et al., 2016 Chandra; Hale et al., 2018). It may be inferred that while screen devices offer educational and entertainment benefits for young children, it's crucial to use them with caution and in moderation to mitigate adverse impacts on children's development (WHO, 2020).

In Brunei, there are no known published local articles about the level of engagement the Bruneian children spend with screen-based devices that have been publicly disclosed or made possible to access. In view of this, it is the researcher's interest to investigate parents' knowledge, attitude and practice on their children's screen time and the level of screen time spent by the children at home to obtain insight into Brunei's current situation.

Table 1: Demographic characteristics of the sample (n=113)

Characteristics	n	(%)
Parents		
Mother	103	(91.2)
Father	10	(8.8)
District		
Brunei-Muara	99	(87.6)
Tutong	9	(8.0)
Belait	2	(1.8)
Temburong	3	(2.7)
Ethnicity		
Melayu-Brunei	89	(78.8)
Tutong	4	(3.5)
Dusun	2	(1.8)
Belait	2	(1.8)
Kedayan	5	(4.4)
Murut	0	(0)
Bisaya	0	(0)
Others	11	(9.8)
Income		
0-500	21	(18.6)
501-1000	26	(23.0)
1001-2000	28	(24.8)
2002-3000	15	(13.3)
3001-4000	8	(7.1)
4001-5000	7	(6.2)
More than 5000	8	(7.1)
No. of children		
1	40	(35.4)
2	65	(57.5)
3	8	(7.1)
Children Gender		
Male	101	(52.1)
Female	93	(47.9)
Age		
1	79	(40.7)
2	43	(22.2)
3	48	(24.7)
4	24	(12.4)
Nursery/Daycare		
Yes	33	(17.0)
No	161	(83.0)
No. of household screen-based devices		
1 to 3	45	(39.8)
4 to 6	40	(35.4)
More than 7	28	(24.8)
Screen-based devices types		
Television	113	(37.7)
Computer/Laptop	43	(14.3)
Tablet device	31	(10.3)
Smartphone	113	(37.7)

Materials and Methods

Study design and settings

A cross-sectional study using self-administered questionnaire was employed. The parents of children aged 0 to 4 years old attending the Maternal and Child Health Care Clinics in four districts in Brunei Darussalam were invited to participate in this study. The study sites were the primary services that solely provide supportive care to mothers and children with adequate healthcare facilities for maternal and child healthcare.

Table 2. Pearson correlation between CKD – SBI symptom dimensions and KDQOL -36 subscales (N = 320)

	<2 years old (n=17)		3-4 years old (n=16)		Total		
Nursery/daycare day (for children attending nursery and/or daycare only)	**n**	**(%)**	**n**	**(%)**	**n**	**(%)**	**P=value**
Television							0.617
None	5	(29.4)	5	(31.3)	10	(30.3)	
Less than 30 minutes	7	(41.2)	4	(25.0)	11	(33.3)	
Between 30 minutes to 1 hour	2	(11.8)	4	(25.0)	6	(18.2)	
Between 1 hour to 2 hours	3	(17.6)	2	(12.5)	5	(15.2)	
More than 2 hours	0	(0.0)	1	(6.3)	1	(3.0)	
Computer/Laptop							0.571
None	14	(82.4)	15	(93.8)	29	(87.9)	
Less than 30 minutes	1	(5.9)	0	(0.0)	1	(3.0)	
Between 30 minutes to 1 hour	1	(5.9)	1	(6.3)	2	(6.1)	
Between 1 hour to 2 hours	1	(5.9)	0	(0.0)	1	(3.0)	
More than 2 hours	0	(0.0)	0	(0.0)	0	(0.0)	
Tablet Device							0.098
None	15	(88.2)	12	(75.0)	27	(81.8)	
Less than 30 minutes	2	(11.8)	0	(0.0)	2	(6.1)	
Between 30 minutes to 1 hour	0	(0.0)	3	(18.8)	3	(9.1)	
Between 1 hour to 2 hours	0	(0.0)	1	(6.3)	1	(3.0)	
More than 2 hours	0	(0.0)	0	(0.0)	0	(0.0)	
Smartphone							0.500
None	13	(76.4)	9	(56.3)	22	(66.7)	
Less than 30 minutes	2	(11.8)	2	(12.5)	4	(12.1)	
Between 30 minutes to 1 hour	2	(11.8)	4	(25.0)	6	(18.2)	
Between 1 hour to 2 hours	0	(0.0)	0	(0.0)	0	(0.0)	
More than 2 hours	0	(0.0)	1	(6.3)	1	(3.0)	
Non-nursery/daycare day (for children attending nursery and/or daycare only)	**n**	**(%)**	**n**	**(%)**	**n**	**(%)**	**P=value**
Television							0.724
None	3	(17.6)	1	(6.3)	4	(12.1)	
Less than 30 minutes	5	(29.4)	3	(18.8)	8	(24.2)	
Between 30 minutes to 1 hour	3	(17.6)	5	(31.3)	8	(24.2)	
Between 1 hour to 2 hours	5	(29.4)	6	(37.5)	11	(33.3)	
More than 2 hours	1	(5.9)	1	(6.3)	2	(6.1)	
Computer/Laptop							0.719
None	13	(76.4)	14	(87.5)	27	(81.8)	
Less than 30 minutes	2	(11.8)	1	(6.3)	3	(9.1)	
Between 30 minutes to 1 hour	0	(0.0)	0	(0.0)	0	(0.0)	
Between 1 hour to 2 hours	1	(5.9)	0	(0.0)	1	(3.0)	
More than 2 hours	1	(5.9)	1	(6.3)	2	(6.1)	
Tablet Device							0.450
None	12	(75.0)	10	(62.5)	22	(66.7)	
Less than 30 minutes	3	(17.6)	2	(12.5)	5	(15.1)	
Between 30 minutes to 1 hour	1	(5.9)	2	(12.5)	3	(9.1)	
Between 1 hour to 2 hours	1	(5.9)	0	(0.0)	1	(3.0)	
More than 2 hours	0	(0.0)	2	(12.5)	2	(6.1)	
Smartphone							0.462
None	9	(52.9)	6	(37.5)	15	(45.5)	
Less than 30 minutes	4	(23.5)	4	(25.0)	8	(24.2)	
Between 30 minutes to 1 hour	4	(23.5)	4	(25.0)	8	(24.2)	
Between 1 hour to 2 hours	0	(0.0)	0	(0.0)	0	(0.0)	
More than 2 hours	0	(0.0)	2	(12.5)	2	(6.1)	
Public holiday (for children attending nursery and/or daycare only)	**n**	**(%)**	**n**	**(%)**	**n**	**(%)**	**P=value**
Television							0.290
None	2	(11.8)	1	(6.3)	3	(9.1)	
Less than 30 minutes	6	(35.3)	2	(12.5)	8	(24.2)	
Between 30 minutes to 1 hour	3	(17.6)	3	(18.8)	6	(18.2)	
Between 1 hour to 2 hours	1	(5.9)	5	(31.3)	6	(18.2)	
More than 2 hours	5	(29.4)	5	(31.3)	10	(30.3)	
Computer/Laptop							0.512
None	14	(82.4)	14	(87.5)	28	(84.9)	
Less than 30 minutes	1	(5.9)	0	(0.0)	1	(3.0)	
Between 30 minutes to 1 hour	1	(5.9)	0	(0.0)	1	(3.0)	
Between 1 hour to 2 hours	0	(0.0)	0	(0.0)	0	(0.0)	
More than 2 hours	1	(5.9)	2	(12.5)	3	(9.1)	
Tablet Device							0.480
None	12	(70.6)	10	(62.5)	22	(66.6)	
Less than 30 minutes	3	(17.6)	1	(6.3)	4	(12.1)	
Between 30 minutes to 1 hour	1	(5.9)	1	(6.3)	2	(6.1)	
Between 1 hour to 2 hours	1	(5.9)	2	(12.5)	3	(9.1)	
More than 2 hours	0	(0.0)	2	(12.5)	2	(6.1)	

Less than 30 minutes	2	(11.8)	3	(31.3)	5	(15.2)	
Between 30 minutes to 1 hour	3	(17.6)	5	(31.3)	8	(24.2)	
Between 1 hour to 2 hours	1	(5.9)	2	(12.5)	3	(9.1)	
More than 2 hours	0	(0.0)	2	(12.5)	2	(6.1)	
	>2 years old (n=105)		3-4 years old (n=56)		Total		
Weekdays and weekends (for children not attending nursery and/or daycare only)	**n**	**(%)**	**n**	**(%)**	**n**	**(%)**	**P=value**
Television							0.094
None	21	(20.0)	6	(10.7)	27	(16.8)	
Less than 30 minutes	30	(28.6)	12	(21.4)	42	(26.1)	
Between 30 minutes to 1 hour	24	(22.9)	15	(26.8)	39	(24.2)	
Between 1 hour to 2 hours	15	(14.3)	17	(30.4)	32	(19.9)	
More than 2 hours	15	(14.3)	6	(10.7)	21	(13.0)	
Computer/Laptop							0.703
None	93	(88.6)	52	(92.9)	145	(90.1)	
Less than 30 minutes	7	(6.7)	3	(5.4)	10	(6.2)	
Between 30 minutes to 1 hour	2	(1.9)	0	(0.0)	2	(1.2)	
Between 1 hour to 2 hours	0	(0.0)	0	(0.0)	0	(0.0)	
More than 2 hours	3	(2.9)	1	(1.8)	4	(2.5)	
Tablet Device							0.037
None	83	(79.0)	35	(62.5)	118	(73.3)	
Less than 30 minutes	9	(8.6)	3	(5.4)	12	(7.5)	
Between 30 minutes to 1 hour	7	(6.7)	12	(21.4)	19	(11.8)	
Between 1 hour to 2 hours	3	(2.9)	2	(3.6)	5	(3.1)	
More than 2 hours	3	(2.9)	4	(7.1)	7	(4.3)	
Smartphone							<0.001
None	57	(54.3)	17	(30.4)	74	(46.0)	
Less than 30 minutes	27	(25.7)	9	(16.1)	36	(22.4)	
Between 30 minutes to 1 hour	12	(11.4)	15	(26.8)	27	(16.8)	
Between 1 hour to 2 hours	3	(2.9)	11	(19.6)	14	(8.7)	
More than 2 hours	6	(5.7)	4	(7.1)	10	(6.2)	
Content type					n	(%)	
Interactive					104	(50.0)	
Educational					45	(21.6)	
Passive					41	(19.7)	
Others					18	(8.7)	

Note: [a] Fisher's exact test

Population and sample

The target population is parents having children aged 0 to 4 years old attending the Maternal and Child Health Care Clinics in four districts in Brunei Darussalam. The inclusion criteria were (1) Parents who have responsibility for a child, such as a mother or a father, (2) have children they cared for with age ranging from 0 to 4 years and (3) the parents also needed to have sufficient literacy to read in either English or Malay language, whereas exclusion criteria include: (1) Parents who have children aged 5 years and above or have no children, (2) parents who present difficulty to access the online questionnaire through Qualtrics link (e.g. internet problem) and (3) parents who have problem reading both in English and Malay language.

Research instrument

A self-reported questionnaire was designed from a review of the literature on salient areas of concern with regard to screen time (e.g. Chandra et al., 2016; Duch et al., 2013). The questionnaire was developed by the research team who comprised a student nurse, a pediatrician, a children's nurse, and academics specialized in children's nursing, biostatistics and Community Health Nursing. The questionnaire consisted of three sections namely; (1) Sociodemographic, (2) Screen-Based Devices accessible to the children and Screen Time Spent by Children at Home and (3) Parents' Knowledge, Attitude and Practice of Screen Time Spent at Home. This questionnaire has been modified after pre-testing with five mothers having the same inclusion criteria to ensure that the questions are well-defined and clearly understood between one parent and another. All research team members approved the final version of the questionnaire.

Statistical analysis

Data were analyzed using R Studio Desktop version 1.2.1335. The statistical analyses included descriptive statistics and Fisher's exact test to determine the parents' level of knowledge, attitude and practice of the screen time spent by their children at home as well as determining common screen-based devices used, content type and level of screen time spent by their children. All statistical tests are two-sided and a p-value less than 0.05 is considered significant. However, we also emphasize the importance of considering any assumptions made when using the Fisher's exact test, particularly when dealing with small sample sizes for some cells.

Ethical consideration

The research received full approval from the Joint Research Ethics Committee of Pengiran Anak Puteri Rashidah Sa'adatul Bolkiah Institute of Health Sciences Research Ethics Committee (IHSREC) and Medical and Health Research Ethics Committee of the Ministry of Health, Brunei Darussalam (UBD/PAPRSBIIHSREC/2020/56). The research is also approved by the University Research Ethics Committee (UREC), Universiti Brunei Darussalam. Participation was voluntary by clicking the "I agree" button prior to proceeding with completing the survey. Participants were informed that they could withdraw from the study at any time before clicking the 'submit' button. They were also explained that, once responses were submitted, the anonymous nature of the study would hinder retrieval of participant data for withdrawal.

Results

Either one or both parents could participate in the study. The final sample included 113 parents of which 91.2% were mothers. The participants were predominantly of the Melayu-Brunei ethnicity (78.8%) and about 57.5% of parents having at least two children aged <4 years old. An overall total of 194 children was gathered whereby approximately 52.1% were male, the majority were below the age of 2 years old (62.9%) and about 83% did not attend a nursery and/or daycare services. In terms of household screen-based devices, most parents reported having fewer than six devices (75.2%) available at their home and each had at least a television and a smartphone. The descriptive characteristics of the study sample and their children are as displayed in Table 1.

Table 2 presents descriptive characteristics of the children's total time spent on each screen-based device by gender. When examining the total screen time spent by all children in the study, regardless of whether they are attending a nursery and/or daycare service, it was found that the television was the most commonly used screen-based device among the children of both groups aged <2 years old groups compared to other screen-based devices, The majority of children aged <2 years old (70.6%) who attended nursery and/or daycare service spent more time watching television (between <30 minutes to >2 hours). Similar time spent for watching television was also observed during non-nursery and/or daycare days and during public holiday for children aged <2 years old (82.3% and 88.2%, respectively). It was also found that children aged <2 years old (47%) spent more time on a smartphone between less than 30 minutes to 1 hour during non-nursery and/or daycare day compared to nursery and/or daycare day (23.6%). Likewise, increment in the number of children aged 3 to 4 years old engaging in television-viewing of >1 hour during nursery and/or daycare day (18.8%), non-nursery and/or daycare day (43.8) and public holiday (62.6%) was observed. However, no significant difference was reported in children of both age groups attending the nursery and/or daycare day with total screen time spent on each screen-based device at home during nursery and/or daycare day, non-nursery and/or daycare day and public holiday.

For children not attending the nursery and/or daycare service, there is a significant association observed between the age of children and their total screen time spent on a tablet device ($p=0.037$) and smartphones ($p\leq0.001$). No other significant differences were detected. Furthermore, interactive form of screen time was the common content type of screen-based activities mostly spent by the children (50%) compared to educational (21.6%) and passive (19.7%) forms of screen time content.

Table 3 illustrates the parents' knowledge, attitude and practice based on their scoring of 'correct' and 'agree' only. Analysis revealed that there is no significant difference between parents and knowledge but it was observed that there was on average less than 50% of both mothers and fathers who answered correctly on the knowledge of screen time. A significant association was observed between parents' attitudes and the time spent by children on their screen time. It was observed that both mother and father significantly agreed to have the responsibility of controlling their children's screen time and the appropriateness of the activity ($p=0.035$) and that children's use of screen time interferes with family quality time ($p=0.030$). Next, both parents generally scored higher on practice and there is a significant association found between parents with practice ($p=0.008$).

Table 4 demonstrates the association between parents' knowledge and practice based on 'correct' and 'agree' scores with demographic factors, highlighting the effects of parents' income and their total number of children. Analysis revealed that there is no significant difference between parents and practice, thus it will not be reported in our findings. First, the analysis revealed that there is a significant association between the income of less than BND$2000 and parents' knowledge on screen-time associated sleep problems (Q2, $p=0.033$), screen-time-associated emotional, mental and behavioral

Table 3. Parents' knowledge, attitude and practice based on 'correct' and 'agree' scores

	Mother (n=103)		Father (n=10)		Total (n=113)		
Knowledge (correct only)	**n**	**(%)**	**n**	**(%)**	**n**	**(%)**	**P=value**
Q1	37	(35.9)	1	(10.0)	38	(33.6)	0.098
Q2	41	(39.8)	3	(30.0)	44	(39.0)	0.158
Q3	17	(16.5)	1	(10.0)	18	(15.9)	0.390
Q4	15	(14.6)	1	(10.0)	16	(14.2)	0.924
Q5	29	(28.2)	4	(40.0)	33	(29.2)	0.672
Q6	49	(47.6)	3	(3.0)	52	(46.0)	0.199
Attitude (Agree only)	**n**	**(%)**	**n**	**(%)**	**n**	**(%)**	**P=value**
Q1	94	(91.2)	8	(80.0)	102	(90.3)	0.035
Q2	8	(7.8)	2	(20.0)	10	(8.6)	0.424
Q3	44	(42.7)	2	(20.0)	46	(40.7)	0.272
Q4	41	(39.8)	5	(50.0)	46	(40.7)	0.821
Q5	31	(30.1)	4	(40.0)	35	(31.0)	0.070
Q6	71	(68.9)	7	(70.0)	78	(69.0)	0.176
Q7	69	(70.0)	5	(50.0)	74	(65.5)	0.030
Q8	64	(62.1)	5	(50.0)	69	(61.1)	0.322
Practice (Agree only)	**n**	**(%)**	**n**	**(%)**	**n**	**(%)**	**P=value**
Q1	86	(83.5)	8	(80.0)	94	(83.1)	0.872
Q2	87	(84.5)	8	(80.0)	95	(84.1)	0.008
Q3	77	(74.8)	7	(70.0)	84	(74.3)	0.668
Q4	41	(39.8)	5	(50.0)	46	(40.7)	0.715
Q5	77	(74.8)	9	(90.0)	86	(76.1)	0.537
Q6	34	(33.0)	5	(50.0)	39	(34.5)	0.534
Q7	64	(62.1)	8	(80.0)	72	(63.7)	0.481

Note: [a] Fisher's exact test

Knowledge

Q1 Increase in children's screen time is likely to decrease their effort in physical activity.
Q2 Children's sleep pattern and quality can be disrupted by increase in their screen time.
Q3 Increased children's screen time may increase risk of the children being overweight/obesity
Q4 Increased children screen time is more likely to increase consumption of soft drinks and snacks.
Q5 Children that spend more screen time are at risk of emotional, mental and behavioral problems.
Q6 Uncontrolled children's screen time can lead to addiction to the devices.

Attitude

Q1 I have the responsibility to control our child(ren)'s screen time by paying close attention on the appropriateness of the screen time activities.
Q2 I should not be concerned about our child(ren)'s screen time and they can engage for as long as they want.
Q3 It is challenging to manage our child(ren)'s screen time when there is a lot of screen-based devices available in out household.
Q4 It is difficult to constantly supervise our child(ren)'s screen time activity when there is increase household and/or work demand.
Q5 I would not consider my child(ren)'s level of screen time to be a serious matter if he/she/they is/are active, healthy and well-behaved.
Q6 I am aware that our child(ren) engagement with screen time is influenced by our use of screen-based devices and/or by others (e.g. siblings and/or friends).
Q7 I observed that our child(ren)'s use of screen device interferes with our family quality time.
Q8 I am concerned about our child(ren)'s unhealthy food intake when engaging in screen-based activity.

Practice

Q1 I encourage my child(ren) to play with toys or talk face-to-face rather than spending time every waking hour, using mobile phone, watching TV/video, and on laptop.
Q2 I ensure that I take away my child(ren) screen-based devices at home when they play or have social activities.
Q3 I try to limit or not use screen-based devices whenever I am with my child(ren).
Q4 I give screen-based devices to my child(ren) to keep them temporarily occupied and be quiet especially in time when I am busy and when he/she get fussy or moody.
Q5 I usually stop my child(ren)'s screen time at least an hour before bedtime to get him/her to fall asleep.
Q6 I offer screen-time to my child(ren) as a reward for good behavior and removing it as a punishment for bad behavior.
Q7 I do not allow my child(ren) to have any kinds of screen-based devices during family time (e.g. meal time) or in his/her/their bedroom.

problems (Q5, p=0.038) and screen time addiction (Q6, p=0.042) than those who have an income more than BND$2000. Additionally, parents with at least two children demonstrated more knowledge on associated emotional, mental and behavioral problems (Q5, p=0.014) than those parents with one child or more than two children. Furthermore, there is a significant association between parents' attitude (Q4) and income as well as the total number of children reported in the analysis, whereby it was observed that parents with an income between 1000 to 3000 (p=0.009) and having at least two children (p=0.037) were found to significantly give screen-based devices to their children to keep them temporarily occupied in busy times or when their children get fussy or moody. No significant differences were detected in other factors.

Discussions

The findings indicated that all parents have television at their home and watching television was the most commonly used sedentary screen-based activity among the children with smartphones being the second regardless of whether they are attending the nursery and/or daycare service or not. This finding supported earlier research conducted in

Table 4: Factors associated with parents' knowledge, attitude and practice scores (n=119)

	Q1		Q2		Q3		Q4		Q5		Q6		Q7		Q8	
Knowledge (correct only)	**n**	**(%)**	**n**	**(%)**	**n**	**(%)**	**n**	**(%)**	**n**	**(%)**	**n**	**(%)**	**n**	**(%)**	**n**	**(%)**
Income																
0-500	11	(29.0)	14	(31.8)	5	(27.7)	2	(12.5)	9	(27.3)	17	(32.7)				
501-1000	9	(23.6)	10	(22.7)	3	(16.7)	3	(18.7)	8	(24.2)	11	(21.1)				
1001-2000	8	(21.0)	9	(20.4)	5	(27.7)	5	(31.3)	9	(27.3)	10	(19.2)				
2001-3000	2	(5.3)	3	(6.8)	1	(5.6)	1	(6.3)	1	(3.0)	3	(5.8)				
3001-4000	2	(5.3)	2	(4.6)	1	(5.6)	2	(12.5)	1	(3.0)	3	(5.8)				
4001-5000	2	(5.3)	2	(4.6)	1	(5.6)	0	(0.0)	2	(6.1)	3	(5.8)				
More than 5000	4	(10.5)	4	(9.1)	2	(11.1)	3	(18.7)	3	(9.1)	5	(9.6)				
P=value	0.070		0.033		0.310		0.174		0.038		0.043					
No. of children <4 years of age																
1	8	(20.0)	15	(37.5)	5	(12.5)	4	(10.0)	8	(20.0)	16	(40.0)				
2	28	(70.0)	23	(57.5)	24	(60.0)	27	(67.5)	24	(60.0)	22	(55.0)				
3	4	(10.0)	2	(5.0)	11	(27.5)	9	(22.5)	8	(20.0)	2	(5.0)				
P=value	0.150		0.353		0.421		0.476		0.014		0.422					
Attitude (agree only)	**n**	**(%)**	**n**	**(%)**	**n**	**(%)**	**n**	**(%)**	**n**	**(%)**	**n**	**(%)**	**n**	**(%)**	**n**	**(%)**
Income																
0-500	21	(20.5)	2	(20.0)	10	(21.7)	5	(10.9)	6	(17.1)	18	(23.1)	16	(21.6)	17	(24.6)
501-1000	21	(20.5)	1	(10.0)	7	(15.2)	6	(13.0)	10	(28.6)	15	(19.2)	14	(18.9)	16	(23.2)
1001-2000	25	(24.5)	4	(40.0)	11	(23.9)	11	(23.9)	10	(28.6)	17	(21.8)	18	(24.3)	13	(18.8)
2001-3000	14	(13.7)	1	(10.0)	10	(21.7)	11	(23.9)	2	(5.7)	10	(12.8)	12	(16.2)	9	(13.0)
3001-4000	7	(6.6)	0	(0.0)	3	(6.5)	4	(8.7)	1	(2.9)	5	(6.4)	4	(5.4)	3	(4.4)
4001-5000	7	(6.6)	1	(0.0)	2	(4.4)	6	(13.0)	3	(8.6)	7	(9.0)	5	(6.8)	6	(8.7)
More than 5000	7	(6.6)	1	(10.0)	3	(6.5)	3	(6.5)	3	(8.6)	6	(7.7)	5	(6.8)	5	(7.3)
P=value	0.642		0.497		0.303		0.009		0.227		0.440		0.596		0.285	
No. of children <4 years of age																
1	32	(31.4)	1	(10.0)	12	(26.1)	10	(21.7)	13	(37.1)	27	(34.6)	24	(32.4)	21	(30.4)
2	62	(60.8)	8	(80.0)	29	(63.0)	30	(65.2)	20	(57.1)	44	(56.4)	43	(58.1)	41	(59.4)
3	8	(7.8)	1	(10.0)	5	(10.9)	6	(13.0)	2	(5.7)	7	(9.0)	7	(9.5)	7	(10.1)
P=value	0.082		0.137		0.188		0.037		0.590		0.675		0.415		0.361	

Note: [a] Fisher's exact test

Korea, whereby television and smartphones are the most popular devices among the children sample (Lissak, 2018). This shows that, despite the growing technological advancement whereby devices with screens become more sophisticated and accessible, television has remained an important medium in the family time since its introduction in the 1950s (Poulain et al., 2019) which could potentially explain the reported finding. Children's sedentary television viewing can be an outcome of co-viewing with their parents due to its perceived benefits as an educational medium and early learning (Robinson et al., 2017).

However, the finding obtained showed that 50% of children are exposed to an interactive form of screen time content compared to educational (21.6%) and passive (19.7%); this shows that the concept of giving screen time is leaning more toward recreational basis rather than learning. In Brunei, it has become a culture seen in parents' ways of parenting to give screen time to their children as a source of entertainment or distraction tool, which was on par with the finding in our study whereby 40.7% of parents practiced the idea of giving screen-based devices to keep their children temporarily occupied when they are busy or when the children get fussy or moody. Parents' screen time behavior can be a potential causal factor contributing to the children's television viewing as 69% of the parents reported that they are aware that their use of screen-based devices influenced their children's sedentary screen time behavior, which supported earlier research stating that children learned the behavior of their parents' use of screen-based devices as an indicative sign that encourages them to maximally fulfill their screen time as means of personal interest, just like their parents (Bennetts et al., 2016). However, we are unable to confirm this assumption as information on the nature of parents' screen time behavior is not available. Hence, this finding should serve as a baseline to further expand current findings targeting the association between parents' screen time and children's level of screen time, thus, contributing to existing literature.

Secondly, our findings reported that 70.6% of children aged <2 years old spent more time watching television (between <30 minutes to >2 hours) during nursery and/or daycare day as well as during non-nursery and/or daycare day and on public holiday of 82.3% and 88.2%, respectively. Our study also reported that 47% of children aged <2 years old spent more time on a smartphone of <1 hour during non-nursery and/or daycare day compared to nursery and/or daycare day of only 23.6%. Also, 18.8%,

43.8% and 62.6% of children aged 3 to 4 years old are found to engage in television viewing of >1 hour during nursery and/or daycare day, non-nursery and/or daycare day and public holiday, respectively. To compare these findings with the recommended guidelines for time spent on screen as according to WHO stating that children aged 2 to 4 years should have <1 hour of screen time/day while screen time is not recommended for infants below 2 years of age, it can be concluded that the most children in our study have exceeded the advised screen time recommendation (Ansari, 2019). This finding is consistent with other research whereby 60.8% of children of 1.5 years old had screen time <2 hours daily, with about 40% having >2 hours spent on screen time/day (Robinson et al., 2017). Additionally, 96.1% of 259 infants sampled were exposed as early as the age of 6 months with a mean total screen time of 152.7 minutes/day. Furthermore, a study conducted in Thailand found that 68% of the 200 pre-school children had screen time spent >1 hour/day whilst 28% of them had screen time spent >2 hours/day (Sigmundová et al., 2016).

For children not attending the nursery and/or daycare service, there is a significant association observed between the age of children (aged <2 years and 3 to 4 years) and their total screen time spent on a tablet device (p=0.037) and very strong association on smartphones (p=<0.001). This shows that children as young as <2 years old have access to smartphones and tablet devices which is in line with our finding whereby all the parents reported having smartphones. This is consistent with other earlier study conducted in Philadelphia, whereby out of the sample of families having children <4 years old being investigated, 83% owned a tablet device, 77% owned a smartphone and almost all of the children (96.6%) had used these devices even before turning 1 year old (Song et al., 2020). This clearly indicates that touch devices use is getting more prevalent among the children in Brunei. Interestingly, our findings observed notable increments in children total screen time of both age groups during nursery and/or daycare day/weekdays, non-nursery and/or daycare day/weekends and on public holiday and we postulated that every additional hour of free time is associated with an increase in screen time spent on screen-based devices. This is congruent with other research stating that pre-school children spent more time on weekends on average of less than one hour whereas children on weekends spent an average of more than 78 minutes (Tambalis et al., 2018). A study conducted in Korea also reported that 39% of the children sample involved in sedentary behavior of watching television almost on daily basis and during weekends the children watched television of >1 hour (Robinson et al., 2017).

Lastly, a statistically significant association is observed between parents' socioeconomic status (income <2000) and their knowledge on screen time-associated sleep problems (p=0.033), emotional, mental and behavioral problems (p=0.038) and screen time addiction (p=0.042). This association is noteworthy as it may reflect that the lower the household income, it increases the children's sedentary screen time. This assumption is consistent with earlier research which reported that excessive screen time is more prevalent among low-income children rather than high-income children (Twenge & Campbell, 2018; Twenge et al., 2019). Additionally, parents of two children were found to have statistically significant knowledge on emotional, mental and behavioral risks of screen time (p=0.014) and, to the best of the author's knowledge, this area of association has not been studied previously. Moreover, a significant association between parent's income between 1000 to 3000 (p=0.009), having at least two children (p=0.037) with an attitude of parents giving screen time to their children to keep them temporarily occupied in time of busy hour was noted in the finding. This could reflect the idea of increasing workload and increased responsibility in childcare significantly contributes to increasing time spent on screen. However, the association between socioeconomic status, having siblings and total sedentary screen time is not well-characterized as there are studies which identified that they found no significant and/or unclear association (Tambalis et al., 2018; Twenge et al., 2019). Therefore, further investigation is warranted to explore the role of socioeconomic status and the presence of siblings on children's sedentary screen time to help in future interventions. The parents' level of knowledge on screen may help to understand these findings. The majority of parents being significantly aware of the responsibility in controlling their children's screen time and its appropriateness (p=0.035) and believing that children's use of screen time interferes with their family quality time (p=0.030) which further constitutes their practice on taking over their screen-based devices when they play or have social activities (p=0.008), shows that they are aware of the importance of limiting their children's screen time; however, the reported low number of parents who answered correctly on the knowledge of screen time (<50%) remains concerning given the association of

screen time with the other medical, emotional and behavioral risks it imposes and may explain the greater prevalence of excess screen time reported in findings.

Implications for nurses' roles in promoting health

The prevalence of excessive screen time has become a concerning problem worldwide and findings suggest that majority of the children aged <4 years old in Brunei also exceed the recommended maximum limit of screen time, which requires immediate attention. The incidence of poor screen time knowledge among parents also calls for intervention strategies. These findings should serve as a baseline to provide ground discussion for collaboration between professional healthcare practitioners and possibly coordinated school health committees to liaise in promoting healthy screen time behavior at all healthcare facilities and at schools that accommodate service to children and/or the parents in guiding and education in the importance of practicing screen time behavior in moderation. These may include workshops, school programs and parental education sessions. Evidence of health risks impact of screen time faced by the children in Brunei is lacking, thus, more prospective studies are warranted to bring substantial benefits to the community in providing evidence for health education and consultations necessary to support the child's overall health and well-being. Moreover, whether parents' media use, the influence of socioeconomic factors and the presence of siblings have a significant relationship with a child's sedentary screen time should be investigated.

Limitations

The study sample size was small. Future studies should aim for a larger, more diverse sample size. The external generalizability of these findings is potentially restricted to children age <4 years old only and not beyond. The parent-reported nature of the questionnaire could be subject to response bias which may not provide an accurate overall representation of important variables due to the fact of the possibility of inaccurate and misclassification of information (Wang & Cheng, 2020). A potential way to counteract this in the future study should include such as cross-checking with electronic logs.

Conclusion

To summarize, the parents' attitudes of screen time spent by their children are generally positive; however, the practice on screen time was found to exceed the maximum recommended time of the WHO (2020). This study also demonstrated that less than 50% of the parents have correct knowledge on screen time. It is suggested from the evidence that the majority of the children studied significantly spent more time on television, exceeding the recommended guidelines on screen time behavior, which correlates with the trend worldwide. Further health promotion activities are recommended that include developing understanding through monitoring prospective studies on the association of parental media use, socioeconomic factor and presence of siblings for their effect on children's sedentary screen time which could provide insight into strategies emphasizing healthy screen time behavior and improving parental efficacy. This may include workshops, school programs and parental education sessions.

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