Research Article

Prevalence of Use of Smart Devices in Children Aged Five Years or Less and Associated Factors in Kuwait

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Abstract

Background: This study aimed to find prevalence of use of smart devices in children aged five years or less and associated factors in Kuwait.

Methods: A cross-sectional study of 964 parents conducted by distributing a questionnaire. Following the American Academy of Pediatrics (AAP) recommendations for the smart devices use in children, our population was divided into two groups (less than 2 years old and 2-5 years old).

Results: Reported prevalence of use was 53.2% in children less than 2 years old and 86.3% in 2-5 years old. A significantly higher mean age of fathers was seen in children who used smart devices compared to

those who did not in both age groups. The use of smart devices in children less than 2 years was significantly associated with Kuwaiti nationality, family income and governorate. In addition, the higher the family income, the more the use of smart devices. The highest use of smart devices was seen in Capital (60%) and Ahmadi (58.3%). While the lowest was seen in Jahra (30%). In both age groups, most of the parents who reported the smart devices use in their children knew that its use at early age might harm their child.

Conclusion: Young children use of smart devices is prevalent in Kuwait. Campaigns need to be carried out to increase parents' knowledge about the potential risks of smart devices on children's brains and development.

Keywords: Smart Devices; Prevalence of Use; Children

1. Background

Smart device use by children is an important issue because of the portability and availability of these devices. Smart devices have the ability to effectively distract young children and these devices are increasingly used to occupy children and control their behavior. Existing systematic reviews on screen time have focused mainly on the traditional fixed screen devices such as television [1]. Very little research regarding smart device use and impact has been conducted [1]; especially in the Middle East. The first five years in a child's life is a critical period of brain development, building secure relationships, and establishing health behaviors [2]. Fundamental skills like self-regulation, empathy, social skills, and problem solving are primarily learned through children exploring their natural environment, interacting with friends and caregivers and playing in unstructured, creative ways. According to Cristia et al., for every hour children under 2 years of age spend watching TV they spend approximately 50 minutes less interacting with their parents and about 20 minutes less in creative play [3]. According to the American Academy of Pediatrics (AAP), children under 2 years of age should not spend any time on any form of screen viewing, such as smart devices and electronic media. Whereas, for children 2 to 5 years of age, the AAP recommends screen time to be limited to 1 hour or less per day of high-quality programming and monitoring children's media content [4]. Parents need to realize that their own use of smart devices can negatively affect their children and limit the face-to-face interaction with them [5, 6]. Reducing parental media use and enhancing parent-child interaction is an important area of behavioral change [4]. The aim of our study is to identify prevalence and associated factors of smart devices use in children aged 5 years or less in Kuwait.

2. Methods

This is a cross sectional study. The primary outcome was the prevalence of smart devices use among children aged 5 years or less in Kuwait. The secondary outcome was the associated factors of using smart devices among this age group. Literature review was done in PubMed and Google scholar. After the review, a questionnaire was formed and distributed for piloting. Then a final draft of the questionnaire was constructed. The study was carried out using Arabic and English versions of an online self-conducted questionnaire. It was distributed through social media over a period of 1 week from 4th to 12th January 2018. It consisted of 31 questions and was divided into 4 sections. The first section is socio-demographic

factors. The second section assessed smart devices use in children less than 2 years old. The third section assessed smart devices use in children 2-5 years old. The fourth section examined parent's knowledge and their use of smart devices.

The study included families living in Kuwait with children aged 5 years or less. For each family, only one parent participated. Our population was further divided into two age groups based on the AAP recommendations [4]. The first age group was children aged less than 2 years. The other age group was children aged 2-5 years. A total of 1122 parents participated in the study. From which, 158 participants were excluded because they were either married couples without children or parents of children older than 5 years. The final sample size was 964 participants. Questionnaires with missing data were not excluded from the study. The missing data did not affect the prevalence of use in our population. However, it affected other variables as the totals do not always add up to 100%. The data entry and analysis were performed using Statistical Package for Social Sciences (SPSS) software version 25 for windows (SPSS, Chicago, IL, USA). Data quality was checked and the P value ≤0.05 was used for statistical significance. Ethical approval was taken from the ministry of health standing committee for coordination of health and medical research. Consent was taken for each participant.

3. Results

3.1 Socio-demographic characteristics

The participants included 129 (13.4%) fathers, and 835 (86.6%) mothers. Mean age of fathers was 34.6 years and the mean age of mothers was 31 years. The majority of the participants were Kuwaitis (90.8%). Moreover, 97.9% of the participants were married. Most of the participating parents had bachelor's degree: 50.3% of the fathers and 61.8% of the mothers. Approximately half of the participants (50.8%) declared a total family income of more than 2000 KD per month, while the rest declared a family income of 2000 or less per month. The sample distribution among Kuwait governorates was: Hawalli 38.1%, Capital 25.4%, Mubarak Al-Kabeer 19.8%, Ahmadi 8.1%, Farwaniya 6.7%, and Jahra 1.9%. Furthermore, the median number of children per family in the sample was 2 with an interquartile range of 2 (Table 1).

3.2 Children aged less than 2 years

Our data showed that the prevalence of smart devices use in less than 2 years old children was 53.2%. Mean age of fathers (34.1 years) who stated children use of smart devices was greater than the mean age of mothers (30.3 years). Mean age of fathers was different for children use of smart devices ($P = 0.005$). Post hoc analyses indicated that the mean age of fathers was significantly higher in the group of children who used smart devices compared to those who did not use. With regards to Nationality, 55% of Kuwaiti participants reported use of smart devices compared to 33.3% of Non-Kuwaitis ($P = 0.004$). Approximately half of the married parents (53%) declared children use of smart devices. A higher percentage of usage (71%) was seen in children of divorced/separated/widowed parents. In addition, the higher the education of parents and family income, the more the usage of smart devices among their less than 2 years old children. More than half (58.4%) of children of families with an income more than 2000 KD used smart devices, while 49.2% of those with family income of 1001-2000 KD and 46.1% of 1,000

KD or less used smart devices (P = 0.022). It was noticed that a higher percentage of smart device use was in the Capital (60%) and Ahmadi (58.3%) residents, while less use was reported in Mubarak Al-Kabeer (51.1%), Hawalli (50.9%), Farwaniya (50%) and Jahra (30%) governorates (P = 0.021) (Table 2.1).

Of the less than 2 years old children who used smart devices, 47.9% used it on a daily basis. In addition, 73.3% used it one hour or less per day, while 25% used it for more than one hour. Most children (53.4%) used smart devices during their free time. When parents were asked about the reason of giving their children smart devices, most (56.1%) declared that they did so to calm their children down. As reported by the parents, watching videos was the most activity (85%) done on smart devices. With regards to parental restrictions on the use of smart devices in the less than 2 years old children, most (82%) restricted time and content, 12.3% restricted content only and 0.6% time only (Figure 1, and 3, Table 2.2). In the group of parents who reported smart devices use in their less than 2 years old child, 49.8% of parents used smart devices for more than 4 hours a day, whereas only 12% used it for less than 2 hours a day. Moreover, 31.4% of them always used their smart devices around their children compared to 66.9% who sometimes used it around their children. Surprisingly, 88% of parents who reported smart devices use in this age group knew that smart devices use at an early age might harm their children (Table 2.3).

3.3 Children aged 2-5 years

The prevalence of smart devices use in children aged 2-5 years was found to be 86.3%. Mean age of fathers (35.7 years) who stated use of smart devices in children 2-5 years old was greater than mean age of mothers (32 years). Mean age of fathers was different for children use of smart devices (P = 0.006). Post hoc analyses indicated that the mean age of fathers was significantly higher in the group of children who used smart devices compared to those who did not use. Furthermore, 87% of Kuwaiti parents reported use of smart devices compared to 78% of non-Kuwaiti parents. With regards to marital status, divorced/ separated/widowed parents reported higher use of smart devices than married (93.7% vs. 86.1% respectively). In addition, no difference in use was seen among all levels of parents' education, family income and governorates. (See Table 3.1)

Variables	**n (%)**
Gender	
Male	129 (13.4)
Female	835 (86.6)
Age of Father (mean±SD)	34.6 ± 6.34
Age of Mother (mean±SD)	31.0 ± 5.62
Nationality	
Kuwaiti	875 (90.8)
Non-Kuwaiti Arab	84 (8.7)
Non-Kuwaiti Non-Arab	5 (0.5)
Marital Status	

Married	944 (97.9)
Divorced/Separated	17 (1.8)
Widow/Widower	3 (0.3)
Education level of Fathers	
Read and write only	4 (0.4)
High school or less	111 (11.9)
Diploma	208 (22.3)
Bachelor's Degree	469 (50.3)
Higher education	141 (15.1)
Education levels of Mothers	
Read and write only	1 (0.1)
High school or less	43 (4.6)
Diploma	170 (18.0)
Bachelor's Degree	583 (61.8)
Higher education	147 (15.5)
Family income/month	
Less than 500 KD	14 (1.4)
500 – 1000 KD	150 (15.6)
1001 – 2000 KD	310 (32.2)
More than 2000 KD	490 (50.8)
Governorate	
Farwaniya	65 (6.7)
Hawalli	367 (38.1)
Capital	245 (25.4)
Jahra	18 (1.9)
Mubarak Al-Kabeer	191 (19.8)
Ahmadi	78 (8.1)
Number of Children [M(IQR)]	2 (2)

Table 1: Socio-demographic characteristics of the study sample.

Variables	All n (%)	Yes (n=315)	Used to (n=57)	No (n=220)	p-value
Gender					0.055a
Male	90 (15.2)	58 (64.4)	5 (5.6)	27 (30.0)	
Female	502 (84.8)	257 (51.2)	52 (10.4)	193 (38.4)	
Age of Father (mean±SD)	34.6 ± 6.34	34.1 ± 6.69	33.4 ± 6.03	32.4 ± 5.13	0.005d

Age of Mother (mean±SD)	31.0 ± 5.62	30.3 ± 5.65	30.5 ± 6.04	29.2 ± 4.88	0.045d
Nationality					0.004a
Kuwaiti	532 (89.9)	295 (55.5)	50 (9.4)	187 (35.1)	
Non-Kuwaiti	60 (10.1)	20 (33.3)	7 (11.7)	33 (55.0)	
Marital Status					0.413b
Married	585 (98.8)	310 (53.0)	56 (9.6)	219 (37.4)	
Divorced/Separated/Widow	7 (1.2)	5 (71.4)	1 (14.3)	1 (14.3)	
Education level of Fathers					0.311c
High school or less	72 (12.6)	35 (48.6)	7 (9.7)	30 (41.7)	
Diploma	113 (19.7)	62 (54.8)	9 (8.0)	42 (37.2)	
Bachelor's Degree	300 (52.3)	153 (51.0)	33 (11.0)	114 (38.0)	
Higher education	88 (15.4)	53 (60.2)	6 (6.8)	29 (33.0)	
Education levels of Mothers					0.558c
High school or less	28 (4.8)	15 (53.6)	3 (10.7)	10 (35.7)	
Diploma	108 (18.5)	57 (52.8)	12 (11.1)	39 (36.1)	
Bachelor's Degree	367 (63.1)	187 (51.0)	37 (10.1)	143 (38.9)	
Higher education	79 (13.6)	49 (62.0)	5 (6.4)	25 (31.6)	
Family income/month					0.022c
1000 KD or Less	110 (18.6)	51 (46.4)	13 (11.8)	46 (41.8)	
1001 – 2000 KD	191 (32.3)	94 (49.2)	19 (9.9)	78 (40.9)	
More than 2000 KD	291 (49.1)	170 (58.4)	25 (8.6)	96 (33.0)	
Governorate					0.021b
Farwaniya	42 (7.1)	21 (50.0)	4 (9.5)	17 (40.5)	
Hawalli	226 (38.2)	115 (50.9)	20 (8.8)	91 (40.3)	
Capital	135 (22.8)	81 (60.0)	4 (3.0)	50 (37.0)	
Jahra	10 (1.7)	3 (30.0)	3 (30.0)	4 (40.0)	
Mubarak Al-Kabeer	131 (22.1)	67 (51.1)	18 (13.8)	46 (35.1)	
Ahmadi	48 (8.1)	28 (58.3)	8 (16.7)	12 (25.0)	
Number of Children [M(IQR)]	2 (2)	2 (1)	2 (1)	2 (2)	0.302e

Table 2.1: Socio-demographic factors and use of smart devices in less than 2 years old children.

Variables	**All n (%)**	**Yes (n=315)**	**Used to (n=57)**	**No (n=220)**
Do you have child less than 2 years with special needs?				
Yes	6 (1.0)	4 (1.2)	1 (1.7)	1 (0.4)
No	576 (99.0)	306 (97.1)	55 (96.4)	215 (97.7)

Does your less than 2 years old child use smart device on daily basis?				
Yes	157 (40.7)	151 (47.9)	5 (8.7)	0 (0.0)
No	229 (59.3)	162 (51.4)	48 (84.2)	0 (0.0)
Hour/s on average does your less than 2 years old child spend using smart device?				
1 hour or less per day	277 (75.3)	231 (73.3)	41 (71.9)	0 (0.0)
More than one hour per day	91 (24.7)	80 (25.3)	8 (14)	0 (0.0)
When does your less than 2 years old child use smart device?				
Before bed (yes)	75 (24.8)	64 (20.3)	9 (15.7)	0 (0.0)
During meal time (yes)	157 (48.0)	140 (44.4)	17 (29.8)	0 (0.0)
During transportation (yes)	175 (55.0)	149 (47.3)	24 (42.1)	0 (0.0)
During free time (yes)	192 (59.6)	169 (53.6)	21 (36.8)	0 (0.0)
Why do you give your less than 2 years old child smart device?				
Because you are busy (yes)	104 (35.4)	92 (29.2)	12 (21.0)	0 (0.0)
Because your child asks for it	115 (39.4)	103 (32.6)	12 (21.0)	0 (0.0)
To calm him down (yes)	199 (59.9)	177 (56.1)	19 (33.3)	0 (0.0)
Other reasons (yes)	153 (51.5)	129 (40.9)	22 (38.5)	0 (0.0)
What activity does your less than 2 years old child do on the smart device?				
Videos (yes)	312 (86.9)	270 (85.7)	39 (68.4)	0 (0.0)
Photographs and use camera	114 (38.1)	97 (30.7)	16 (28.0)	0 (0.0)
Games (yes)	82 (27.2)	68 (21.5)	13 (22.8)	0 (0.0)
Educational programs (yes)	187 (60.3)	155 (49.2)	30 (52.6)	0 (0.0)
Video calling (yes)	88 (29.4)	80 (25.3)	7 (12.2)	0 (0.0)
Do you restrict your less than 2 years child use of smart device according to				
Time and content	313 (84.8)	261 (82.8)	47 (82.4)	0 (0.0)
Content only	45 (12.2)	39 (12.3)	4 (7.0)	0 (0.0)
Time only	2 (0.6)	2 (0.6)	0 (0.0)	0 (0.0)
None	9 (2.4)	9 (2.8)	0 (0.0)	0 (0.0)

Table 2.2: Parent use of smart devices in age group <2 years.

Variables	**All n (%)**	**Yes (n=315)**	**Used to (n=57)**	**No (n=220)**
Do you have a smart device?				
Yes	584 (98.6)	312 (99)	55 (96.4)	217 (98.6)
No	8 (1.4)	3 (1)	2 (3.5)	3 (1.3)
How many hours on average do you spend on smart device/s per day?				
Less than 2 hours	80 (13.7)	38 (12)	12 (21)	30 (13.6)

2-4 hours	227 (39.0)	116 (36.8)	22 (38.5)	89 (40.4)
More than 4 hours	275 (47.3)	157 (49.8)	21 (36.8)	97 (44)
Do you use your smart device around your children?				
Always	178 (30.6)	99 (31.4)	15 (26.3)	64 (29)
Sometimes	398 (68.4)	211 (66.9)	38 (66.6)	149 (67.7)
Never	6 (1.0)	1 (0.3)	1 (1.7)	4 (1.8)
Do you know that smart devices use at early age might harm your child?				
Yes	536 (91.2)	277 (88)	55 (96.4)	204 (92.7)
No	52 (8.8)	36 (12)	2 (3.5)	14 (6.3)

Table 2.3: Parent use of smart devices in age group <2 years (n = 592) column %.

Variables	All n (%)	Yes (n=596)	Used to (n=68)	No (n=27)	p-value
Gender					
Male	92 (13.3)	81 (88.0)	9 (9.8)	2 (2.2)	
Female	599 (86.7)	515 (86.0)	59 (9.8)	25 (4.2)	0.652a
Age of Father (mean±SD)	34.6 ± 6.34	35.7 ± 6.11	34.0 ± 6.42	32.7 ± 4.57	0.006d
Age of Mother (mean±SD)	31.0 ± 5.62	32.0 ± 5.19	30.8 ± 6.04	30.0 ± 4.05	0.047d
Nationality					0.171a
Kuwaiti	631 (91.3)	549 (87.0)	59 (9.4)	23 (3.6)	
Non-Kuwaiti	60 (8.7)	47 (78.3)	9 (15.0)	4 (6.7)	
Marital Status					1.000b
Married	675 (97.7)	581 (86.1)	67 (9.9)	27 (4.0)	
Divorced/Separated/Widow	16 (2.3)	15 (93.7)	1 (6.3)	0 (0.0)	
Education level of Fathers					0.418c
High school or less	86 (13.0)	79 (91.9)	5 (5.8)	2 (2.3)	
Diploma	156 (23.5)	133 (85.3)	18 (11.5)	5 (3.2)	
Bachelor's Degree	325 (48.9)	274 (84.3)	36 (11.1)	15 (4.6)	
Higher education	97 (14.6)	87 (89.7)	6 (6.2)	4 (4.1)	
Education levels of Mothers					0.081c
High school or less	33 (4.9)	27 (81.8)	3 (9.1)	3 (9.1)	
Diploma	126 (18.7)	103 (81.7)	19 (15.1)	4 (3.2)	
Bachelor's Degree	403 (59.8)	351 (87.1)	35 (8.7)	17 (4.2)	
Higher education	112 (16.6)	100 (89.3)	9 (8.0)	3 (2.7)	
Family income/month					0.131c
1000 KD or Less	111 (16.1)	92 (82.9)	15 (13.5)	4 (3.6)	

1001 – 2000 KD	226 (32.7)	190 (84.0)	25 (11.1)	11 (4.9)	
More than 2000 KD	354 (51.2)	314 (88.7)	28 (7.9)	12 (3.4)	
Governorate					0.291b
Farwaniya	51 (7.4)	42 (82.3)	6 (11.8)	3 (5.9)	
Hawalli	265 (38.4)	235 (88.7)	23 (8.7)	7 (2.6)	
Capital	175 (25.3)	152 (86.8)	12 (6.9)	11 (6.3)	
Jahra	13 (1.9)	11 (84.6)	2 (15.4)	0 (0.0)	
Mubarak Al-Kabeer	128 (18.5)	108 (84.4)	15 (11.7)	5 (3.9)	
Ahmadi	59 (8.5)	48 (81.4)	10 (16.9)	1 (1.7)	
Number of Children [M(IQR)]	2 (2)	3 (2)	2 (1)	3 (3)	0.423e

aPearson Chi-Square; bFisher's Exact Test; cChi-Square for trend,Linear-by-Linear Association; dANOVA table test; eKruskal-Wallis test

Table 3.1: Socio-demographic factors and use of smart devices in 2-5 years old children.

Variables	**All n (%)**	**Yes (n=596)**	**Used to (n=68)**	**No (n=27)**
Do you have child aged 2-5 years with special needs?				
Yes	20 (3.0)	14 (2.3)	6 (8.8)	0 (0.0)
No	653 (97.0)	565 (94.7)	61 (89.7)	27 (100)
Does your 2-5 years old child use smart device on daily basis?				
Yes	351 (52.6)	344 (57.7)	6 (8.8)	0 (0.0)
No	316 (47.4)	250 (41.9)	61 (89.7)	0 (0.0)
Hour/s on average does your 2-5 years old child spend using smart device?				
1 hour or less per day	366 (55.8)	312 (52.3)	49 (72.0)	0 (0.0)
More than one hour per day	290 (44.2)	277 (46.4)	13 (19.1)	0 (0.0)
When does your 2-5 years old child use smart device?				
Before bed (yes)	155 (28.4)	148 (24.8)	6 (8.8)	0 (0.0)
During meal time (yes)	260 (46.1)	246 (41.2)	13 (19.1)	0 (0.0)
During transportation (yes)	316 (56.2)	291 (48.8)	25 (36.7)	0 (0.0)
During free time (yes)	500 (82.1)	457 (76.6)	41 (60.2)	0 (0.0)
Why do you give your 2-5 years old child smart device?				
Because you are busy (yes)	221 (40.9)	211 (35.4)	9 (13.2)	0 (0.0)
Because your child asks for it	390 (67.1)	363 (60.9)	26 (38.2)	0 (0.0)
To calm him down (yes)	282 (50.4)	261 (43.7)	18 (26.4)	0 (0.0)
Other reasons (yes)	285 (53.3)	254 (42.6)	30 (44.1)	0 (0.0)
What activity does your 2-5 years old child do on the smart device?				

Videos (yes)	566 (88.9)	517 (86.7)	44 (64.7)	0 (0.0)
Photographs and use camera	285 (53.3)	263 (44.1)	21 (30.8)	0 (0.0)
Games (yes)	437 (73.6)	409 (68.6)	28 (41.1)	0 (0.0)
Educational programs (yes)	456 (78.6)	413 (69.2)	43 (63.2)	0 (0.0)
Video calling (yes)	131 (25.4)	118 (19.7)	11 (16.1)	0 (0.0)
Do you restrict your 2-5 years child use of smart device according to				
Time and content	540 (81.6)	484 (81.2)	53 (77.9)	0 (0.0)
Content only	93 (14.0)	82 (13.7)	11 (16.1)	0 (0.0)
Time only	6 (0.9)	4 (0.6)	0 (0.0)	0 (0.0)
None	23 (3.5)	22 (3.6)	1 (1.4)	0 (0.0)

Table 3.2: Parent use of smart devices in age group 2-5 years.

Variables	**All n (%)**	**Yes (n=596)**	**Used to (n=68)**	**No (n=27)**
Do you have a smart device?				
Yes	680 (98.6)	587 (98.4)	67 (98.59)	26 (96.2)
No	10 (1.4)	8 (1.3)	1 (1.4)	1 (3.7)
How many hours on average do you spend on smart device/s per day?				
Less than 2 hours	107 (15.8)	90 (15.1)	15 (22)	2 (7.4)
2-4 hours	256 (37.8)	217 (36.4)	30 (44)	9 (33.3)
More than 4 hours	314 (46.4)	278 (46.6)	21 (30.8)	15 (55.5)
Do you use your smart device around your children?				
Always	211 (31.2)	188 (31.5)	14 (20.5)	9 (33.3)
Sometimes	458 (67.8)	391 (65.6)	51 (75)	16 (59.2)
Never	7 (1.0)	5 (0.8)	1 (1.4)	1 (3.7)
Do you know that smart devices use at early age might harm your child?				
Yes	628 (91.9)	538 (90.2)	66 (97)	24 (88.8)
No	55 (8.1)	50 (8.3)	2 (3)	3 (11.2)

Table 3.3: Parent use of smart devices in age group 2-5 years (n = 691) column %.

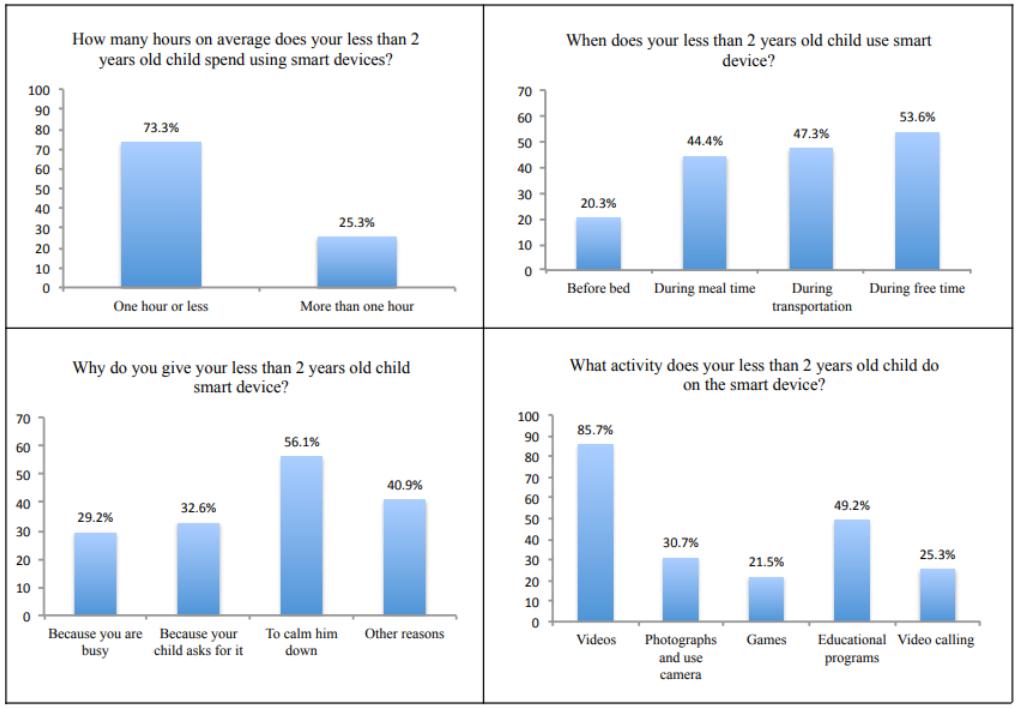

Figure 1: Characteristics of smart devices use in children aged less than 2 years.

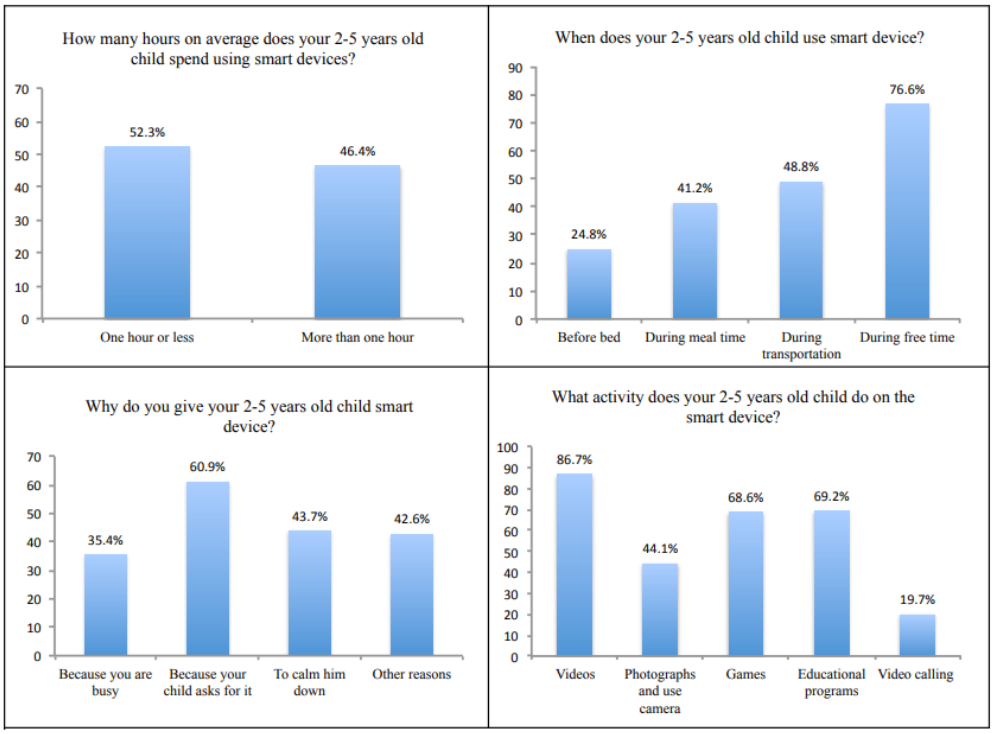

Figure 2: Characteristics of smart devices use in children aged 2-5 years.

4. Discussion

To the best of our knowledge, this study is the first to evaluate prevalence of smart devices use in children aged 5 years or less and associated factors in Kuwait. Our population was divided into two age groups based on the AAP recommendations for smart devices use; children less than 2 years old and children 2-5 years old. Although we did not find a study with our exact age group division, other studies targeted the use of smart devices in somehow similar age groups. Our results showed high prevalence of smart devices use (53.2%) in children less than 2 years of age. In contrast, a study done in turkey showed only 7.5% of children less than 2 years used iPad/tablet at home [7]. In our sample, three-quarters of children in this age group used smart devices for one hour or less per day, while a quarter used it for more than one hour. Almost half of these children used it on a daily basis. Similarly, Kabali et al. found in his study that nearly half (43.5%) of children less than 1 year old used a mobile device on a daily basis; this percentage increased to 76.6% in 2-year-olds [8]. We also found a high prevalence of smart devices use (86.3%) in the older age group (2-5 years old). Less use was seen in a study done in Sweden; where 50% of 3-4 years old children used tablets whereas one in four children used smartphones [9]. Our results also showed that 52.3% of children aged 2-5 years used smart devices for an hour or less per day. A US-based study found around one third of toddlers were using mobile phones for 30 min every day [1]. In another study, 21.8% of preschool children aged more than 3 years used devices less than 1 hour per day [10].

The AAP recommends avoiding digital media use (except video-chatting) in children younger than 18 to 24 months. However, if parents of children in this age group want to introduce digital media, the AAP advises these parents to choose high-quality programming/apps, and to use them together with their children. This is because children less than 2 years old have immature symbolic memory and attention skills, so they cannot learn from media as they do from interactions with their caregivers [4]. In our study, of the less than 2 years old children who used smart devices, only 25.3% used video-chatting. Video-chatting is the only allowed activity in this age group because it enhances interpersonal connections by allowing children to maintain face-to-face interactions with distant family members [2]. For children 2 to 5 years of age, the AAP advises to limit screen time to 1 hour or less per day of high-quality programming and recommends shared use between parents and children to promote enhanced learning and greater interaction [4]. In spite of the high prevalence of smart devices use in our population, 8 out of 10 parents reported restricting use by both time and content. Restricting and monitoring media content is essential as the content especially that with violence might affect children's behavior. It is well established that aggressive behavior in childhood is linked to violence in later youth and adolescence. Christakis et al., demonstrated that an intervention to modify the viewing habits of preschool-aged children with educational and prosocial content can significantly enhance their overall social and emotional competence [11].

Our data revealed that most children used smart devices during their free time regardless of age. In both age groups nearly half of children used smart devices during mealtime and approximately a quarter of them used it before bed. The AAP recommends no screen usage during meals and one hour before bed [4]. Use of screen media in the evening hours significantly shortens nighttime sleep duration [4]. This may be due to the fact that the blue light emitted

from screens has arousing content and causes suppression of melatonin secretion [4]. Moreover, exposure to media during mealtime diminishes attention to satiety cues and may lead to weight gain later [4]. Most parents declared giving smart devices to calm down their less than 2 years old children. While parents of children aged 2-5 years gave their children smart devices mostly when they asked for it and secondly to calm them down. In a survey done in the US among children aged 6 months to 4 years, majority of parents let their children play with mobile devices while they did chores (70%), to keep the child calm in public places (65%), while running errands (58%), or to put their child to sleep (28%) [8]. It has been observed that parents are increasingly using smart devices to pacify their children during daily activities [1]. This is becoming a common behavioral regulation tool preventing children from developing internal mechanism of self-regulation and potentially putting the children at risk of behavioral or socio-emotional problems [12].

In our sample, half of parents reporting children use of smart devices in both age groups used smart devices themselves for more than 4 hours a day. Also, one third of these parents always used their smart devices around their children, and two thirds of them sometimes used it around their children. Heavy parent use of mobile devices is associated with fewer verbal and nonverbal interactions between parents and children and may be associated with more parent-child conflict [4]. Children mostly learn by observational experiences, where behaviors are observed and then imitated [13]. Therefore; children may potentially model their own technology-related behaviors upon those around them [13]. In our study, the majority of parents who reported the use of smart devices in their children were aware that smart devices use at early age might harm the child. A similar observation was found by Genc, who stated that 46.8% of parents letting their children use smartphones displayed negative thoughts about it [14]. They were worried that smartphone usage can cause physical or mental problems in the future and feared that their children will be introverted or have an isolated life [14].

Most parents participating in our study had high education and income. Our data revealed that use of smart devices in children less than 2 years was significantly proportionally associated with family income. Similar to our findings, a study conducted in Korea found that when parents' education/income is higher, children tend to have higher possibility to be addicted to smart phones [15]. In contrast, one study conducted in America showed that children from higher-income families or with more highly educated parents spend less time with media than other children do [16]. According to our study results, a significantly higher mean age of fathers was seen in children who used smart devices compared to those who did not in both age groups. Park and Park, found a resembling association between parents age and children addiction to smart phones. In their study, when parents' age is higher, children tend to have higher possibility to be addicted to smart phones [15].

4.1 Limitations

1. The population was not equally distributed across all the governorates of Kuwait.
2. The survey was self-administered by parents and subject to recall bias.
3. The questionnaire was distributed through social media and this may overestimate use of smart devices. Consequently, the study group may not represent the entire population.

4.2 Strengths

1. Our study is the first of its kind in Kuwait.
2. Large sample size.
3. Studying the pattern of use in two age groups based on the AAP recommendations.

5. Conclusion

Children worldwide began to use smart devices at younger age and this use is increasing. Different researches highlighted the possible negative effects of smart devices use on children's brains and development. According to our study, the prevalence of use of smart devices in children aged five years or less in Kuwait is high despite a high parent's knowledge that use of smart devices might harm their children. This finding raises concern and suggests that further actions should be taken in our society to tackle the reasons of such behavior. Suggested actions include campaigns to insure a better understanding of the effects of smart devices on children and promote alternative activities that allow children engagement with parents and peers. Moreover, it is important to educate personnel working in professions involving interactions with parents and children (e.g., family doctors, pediatricians, teachers and nannies) and include them in these actions. In addition, interventions should target parents use of smart devices and educate them about the influence it has on their children.

Declarations

Abbreviations

AAP: American academy of pediatrics, SPSS: Statistical Package for Social Sciences, KD: Kuwait Dinnar.

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Author contribution statement

- Drs Basma Al-Tawari, Fatemah Jamal, Latifa Al-Farhan and Madawi Al-Mass conceptualized and designed the study, designed the questionnaire, collected data, reviewed and revised the manuscript, and wrote the main manuscript.
- Mr. Abdullah A. Al-Majran reviewed the questionnaire and carried out the statistical analyses.
- Dr. Sara Shamsah prepared the tables and figures and contributes in writing the manuscript.
- Dr Abdullah Shamsah is the principal investigator who supervised and critically reviewed the manuscript.
- All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

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Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Ethics approval and consent to participate

All procedures performed in this study were in accordance with the ethical standards of the Research Ethics Committee at the Kuwait Ministry of Health, Asst. undersecretary for planning and quality department (reference number: 1667, 2018). Written informed consent was obtained from a parent for the

participants included in the study.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

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