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Touch-screen technology usage in toddlers

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ABSTRACT

Objective To establish the prevalence and patterns of use of touch-screen technologies in the toddler population.

Design Parental questionnaires were completed for children aged 12 months to 3 years examining access to touch-screen devices and ability to perform common forms of interaction with touch-screen technologies.

Results The 82 questionnaires completed on typically developing children revealed 71% of toddlers had access to touch-screen devices for a median of 15 min (IQR: 9.375–26.25) per day. By parental report, 24 months was the median age of ability to swipe (IQR: 19.5–30.5), unlock (IQR: 20.5–31.5) and active looking for touch-screen features (IQR: 22–30.5), while 25 months (IQR: 21–31.25) was the median age of ability to identify and use specific touch-screen features. Overall, 32.8% of toddlers could perform all four skills.

Conclusions From 2 years of age toddlers have the ability to interact purposefully with touch-screen devices and demonstrate a variety of common skills required to utilise touch-screen technology.

What is already known on this topic

- Current American Academy of Pediatrics (AAP) guidelines discourage use of media in children under 2 years of age.
- Numerous touch-screen applications designed for toddlers are available.
- Use of touch-screen devices by children is prevalent and functional.

What this study adds

- Regular touch-screen device usage among children as young as 12 months of age is widespread.
- The majority of parents who have touch-screen devices allow access to their toddlers and download applications specifically for their use.
- By 2 years of age many toddlers have specific skills to interact purposefully with touch-screen technology.

INTRODUCTION

Touch-screen phones and tablets are increasingly available to children, but little is known about how this technology is being used by children and what effect it might have.[1] In 1999 the American Academy of Pediatrics (AAP) made recommendations discouraging the use of media in those under 2 years of age.[2] This was based on increasing awareness of the risks posed to children by violence, sexual content and advertising in media. More specifically, in the toddler age group, concerns centred around displacing other developmentally crucial interpersonal interactions and play.[3] Early television watching has been associated with later attentional problems, sleep disruption and even an immediate impact on executive functioning linked with the pacing of viewed media.[4–6] Therefore in 2011 a policy statement reaffirming the AAP's guidelines was released[3] which repeated existing health concerns and also highlighted that, despite parental beliefs, toddlers do not gain much educational value from watching television, no matter what the content.

However, all of these apprehensions were based on passive forms of technology prior to the widespread introduction of touch-screen formats.[1] The interactivity of touch-screen media could provide a different experience to the developing brain of the toddler. In a recent report, Cristia and Seidl addressed touch-screen usage, preferred activities on such devices and types of interactive gestures used in a French cohort of 5–40-month-old children and found widespread usage (approximately 76%) and purposeful interaction, particularly tapping, in this age group.[7] To provide further information on this issue, our aim was to ascertain the current usage prevalence in our cohort and to quantify the types of interactions toddlers have on a day-to-day basis with currently available portable touch-screen devices.

METHODS

The parents of children aged 12 months to 3 years were asked to complete a parental questionnaire over a 5-month period from May to September 2014. The survey method selected was chosen to give an indication of touch-screen usage in the child's typical daily environment. Recruitment took place in a university hospital in both inpatient and outpatient settings where a sample of parents of toddlers were approached by medical staff and asked to participate. Sample size was calculated based on national census data for this age group and was estimated at 96 children.[8] Ethics approval was received from the Clinical Research Ethics Committee of the Cork Teaching Hospitals. Informed consent was obtained from each parent or guardian. The novel parental questionnaire examined the exposure and access the child had to touch-screen technology, length of usage per day and types of interactions with the screen, that is,

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ability to unlock the screen, swipe through pages or images and recognise and interact with specific touch-screen features such as application icons for games (see online supplementary file). Parents were also asked if they had downloaded any games or applications specifically for the child's use. They were not asked to specify type. Parental occupations were used to determine socio-economic status (SES) using the UK National Statistics Socio-economic Classification (NS-SEC), three-category version.[9]

Toddlers at high risk of or under investigation for developmental delay were excluded.

Responses were analysed using frequency analysis and are presented as median (IQR) and n/n (%) as appropriate. Spearman's correlation coefficient (r) was used to examine if time spent on touch-screen devices differed with age. Mann–Whitney testing was used to examine if ability to interact with the screen changed with age. All data analysis was carried out using IBM SPSS statistics V.22.

RESULTS

Questionnaires were completed for 91 infants; the parents of five further infants were approached but declined participation as these children were due for imminent discharge from hospital or were felt by their parents to be too unwell (response rate 95%). Nine were excluded due to existing developmental concerns.

Of the 82 remaining children, 47 (57%) were male. SES was reported for only 46/82 (56%), of whom 11/46 (24%) were NS-SEC 1, 17/46 (37%) NS-NEC 2 and 18/46 (39%) NS-NEC 3. The median (IQR) age of toddlers at the time of the questionnaire was 24 (20–30) months.

Overall, 67 (82%) of the 82 parents reported owning a touch-screen device. Of the 67 who owned a touch-screen device, 58 (87%) gave their child the device to play with for a median (IQR) of 15 (9–26) min per day. Usage time did not correlate significantly with age (r=0.079, p=0.572). Of the 58 parents, 36 (62%) had downloaded applications specifically for their child's use, 53 (91%) reported that their child could swipe across the screen, 29 reported their child was able to unlock a touch screen, and 37 (64%) felt their child actively looked for touch-screen features. The median age of performing these three skills was 24 months (IQR of individual items are displayed in table 1). While ability to swipe and active looking for touch-screen features varied significantly with age (p=0.03 and p=0.04, respectively), ability to unlock the screen did not (p=0.106). Forty-two (72%) of the 58 parents felt their child was able to specifically identify and use touch-screen features at a median (IQR) age of 25 (21–31) months and this skill significantly improved with age (p=0.002). Of note, 19/58 (33%) of the toddlers could perform all four skills at a median (IQR) age of 29 (24–32) months.

Table 1 Ability to interact with a touch screen: ability to swipe across screen, ability to unlock screen, ability to actively look for touch-screen features and ability to identify and use specific touch-screen features

Skill	Median age (months)	IQR (months)	p Value
Swipe			
Yes	24	19.5–30.5	
No	20	14.5–22	0.03
Unlock			
Yes	24	20.5–31.5	
No	23	18–28.5	0.106
Active looking			
Yes	24	22–30.5	
No	21	15–26.5	0.04
Identify and use			
Yes	25	21–31.25	
No	18	13.5–24	0. 002

Difference in age of skill attainment calculated by Mann-Whitney U test; p values are displayed.

DISCUSSION

We have shown that touch-screen technology usage in this population is widespread, although based on subjective parental report, with inherent recall and response bias. Children as young as 12 months of age are able to use such devices and by 24 months have developed an array of skills allowing them to interact purposefully with a touch screen. The findings presented here are limited by a preponderance of male infants and insufficient numbers to explore the effects of gender, socio-economic status and neurodevelopment on touch-screen interaction. Also inpatient/outpatient status and reason for admission or attendance of the child at the hospital were not recorded. There is the possibility that a hospital-based sample of toddlers, even if typically developing, could differ in their touch-screen usage from a wider community sample.

The content of what children are interacting with is a bigger question. Touch-screen devices can be used as portable media players, making them no different from television and, worryingly, Cristia and Seidl[7] found photo and video viewing to be the most common activities performed on touch-screen devices. Many applications designed for infants and toddlers already exist, but there is no regulation of their quality, educational value or even safety. Some of the issues that arise with passive watching of television still apply: exposure to unsuitable material and visually fast-paced content, and displacement of other developmentally important activities. Touch-screen platforms, when used to their strengths, present many features which differentiate them from other forms of media and offer the potential for more positive effects.[1] Interactive touch-screen applications offer a level of engagement not previously experienced with other forms of media and more akin to traditional play. They can also adapt to an individual child's level, allowing increasing complexity and providing positive feedback for a task achieved.

This opens up the potential application of these devices for both assessment of development and early intervention in high-risk children. As shown here, a touch-screen testing platform could be feasible and acceptable for these purposes in the toddler age group. However, further prospective testing is required in a variety of populations both typically developing and at risk of developmental delay to explore the trajectory of the development of touch-screen skills and the effects of pathology on this process.

Contributors CA wrote the main body of text and performed initial statistical analysis. SD was involved in data collection and manuscript preparation and editing. RR was involved in data collection and text editing. VL contributed to statistical analysis and final approval. DM was responsible for the conception and design of the study, supervised data collection and analysis, and contributed to manuscript preparation, text editing and final approval.

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Competing interests None declared.

Ethics approval The Clinical Research Ethics Committee of Cork Teaching Hospitals approved this study.

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