

*Research Article***The Impact of Screen Media on Children's Cognitive Function****Samira Z. Sayed, Asmaa N. Reyad, Mohammad M. Mohammad and Hager S. Ali Kamel**

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Abstract

The human brain is a complex entity whose development is shaped not only by genetics but also by its environment. **Aim of work:** The aim of this study is to evaluate the effect of screen media (television viewing, video and computer game playing and internet use) on cognitive function of children and to determine their prevalence in that category to help in putting effective treatment strategies. **Subjects and methods:** This study was done on 200 child of different socioeconomic status who were collected from pediatric outpatient clinic at Minia university hospital during period from September 2015 to July 2016. **Results:** This study was done on 200 child (91male- 109female) and was divided according to number of hours watching TV and using computer and internet into 3 groups. **Recommendations:** We should encourage no screens in children's bedrooms. If you put a refrigerator in a child's bedroom they will eat more, if you put a screen in their bedroom they will watch more.

Keywords: human brain, Cognitive Function, environment**Introduction**

The human brain is a complex entity whose development is shaped not only by genetics but also by its environment. (Stiles J, Jernigan TL 2010). It triples in volume in the first 2 years of life, building and pruning the connections that allow humans to perceive the world through their senses, think, make decisions, consider risk, build empathy and relationships, and engage in the whole range of human experience. Babies and children are building these capabilities as they grow. In particular, the pre-frontal cortex is often cited as the epicenter of the brain's higher-level executive functions, which include such tasks as "judgment, decision making and problem solving, as well as emotional control and memory." (Park M-H et al., 2011).

The prefrontal cortex develops throughout childhood and adolescence in response to genetics and external stimuli, and it isn't completely formed until approximately age 26. (Fiorini M.2010).

Children's media targeting very young children has seen a rapid increase in recent years (Wartella, E. et al., 2010) Research has linked increased amounts of television with increased levels of obesity for preschoolers and children (Frolich, K.L. et al., 2010) and has suggested that screen time can have negative effects on children's development, particularly for infants and toddlers (Pagani, L.S. 2010).

As a result, organizations such as the Canadian Pediatric Academy of Pediatrics (2011) have issued recommendations calling for limiting preschooler children's daily screen time to one hour a day. (Canadian Pediatric Society 2003)

Sweetser and her colleagues (2012) hypothesize that passive screen time encourages lower levels of cognitive activity than active screen time and suggest that more empirical studies are necessary to better understand the nuanced impacts of screen time on young children's development. (Sweetser, P. et al., 2012).

Television or any video medium differs from books in several ways that may affect cognitive structures and processes. First, the technology of these media makes both their verbal and visual symbol systems transient rather than stable (Richard C. Clark 2010). Linguistic information can be orthographic (as in captioned films); but more often it is oral and, like the images on the screen, disappears quickly. Because of this transience, and because the two symbol systems are presented simultaneously—learners may process the information in video media very differently from the way they process similar information in books and magazines. It is also possible that the symbol systems and their transient nature affect the mental representations that learners create (Continuity of Television Programs 2009).

Aim of work

The aim of this study is to evaluate the effect of screen media (television viewing, video and computer game playing and internet use) on cognitive function of children and to determine their prevalence in that category to help in putting effective treatment strategies.

Subjects and methods

Subjects:

This study was done on 200 child of different socioeconomic status who were collected from pediatric outpatient clinic at Minia university hospital during period from September 2015 to July 2016

Inclusion Criteria:

- 1- Age range from 6 to 13 years so that WICS test can be applied as it is difficult to be done on children below 6 years.
- 2-Both sexes.
- 3- Child who used to go school.

- 4- Children of different socioeconomic status.

Exclusion Criteria:

- 1- Age below 6 and above 13 years.
- 2- Children with previous central nervous system pathology or multi-systemic disease known to affect central nervous system.
- 3- Children with psychiatric disorders.
- 4- Children suffering from any chronic illness.

Methods:

All enrolled children were subjected to the following:

1. Informed consent was taken from parents of all children participating in this study.
2. History taking

Full history taking, with emphasis on:

- Chronological age.
- Residence.
- Level of education.
- Number of daily hours spending on screen media.
- presence of TV or computer in childbed room or not.
- type of programs they watch on TV and type of video game they play.
- If they watch cartoon or not.

Results

This study was done on 200 child (91male-109female) and was divided according to number of hours watching TV and using computer and internet into 3 groups:

Group (I): watching TV 2-3hs and using computer and internet 1-2hs

Group (II): watching TV 3-5hs and using computer and internet (2-3hs)

Group (III): watching TV >5hs and using computer and internet >3hs (Takeuchi Hikaru, et al., 2013)

We tested their cognitive function by WISC tests and EEG was done for children with the worst cognitive function.

Table 1: Demographic and clinical data of studied cases.

Parameter		Description(200 cases)
Age (ys), mean \pm SD (range)		9.6 \pm 3.1 (6 - 13)
Age	6-8 years	58 (29.0%)
	9 years	52 (26.0%)
	10 years	37 (18.5%)
	11 years	33 (16.5%)
	12-13 years	20 (10.0%)
Weight (kg), mean \pm SD (range)		28.3 \pm 4.9 (19 - 40.0)
Body mass index mean BMI \pm SD		18.2 \pm 2.7
Gender	Male	91 (45.5%)
	Female	109 (55.5%)
Residence	Urban	200 (100.0%)
	Rural	0

Categorical data are presented in the form of frequency and percent. Quantitative data are presented in the form of mean \pm SD (range).

The mean age was 9.6 years with SD \pm 3.1 years (Range: 6 to 13ys). they were 91 males (percentage 45.5%) and 109 females (percentage 55.5%). the mean weight was 28.3kg with SD \pm 4.9kg (Range: 19 to 40kg).the mean body mass index was 18.2 with SD \pm 2.7 all of them were from urban area.

Discussion

Nowadays, young children are using more screen media than ever before. There is a broad debate over the implications of screen media experience on children's cognitive development. By the age of two years, kids have seen enough screen media to realize that it can be a source of information relevant to themselves and are more able to pay attention to and learn from it. Over the course of childhood, children spend more time watching TV than they do in school, (Zimmerman, F.J. et al., 2007a).

The American Academy of Pediatrics (AAP) issued guidelines recommending that children under the age of two years watch no screen entertainment at all because television 'can negatively affect early brain development' (AAP, 1999) In 2006 they issued another statement on 'TV

and Toddlers': 'It may be tempting to put your infant or toddler in front of the television, especially to watch shows created just for children under age two. But the American Academy of Pediatrics says: Don't do it! These early years are crucial in a child's development. The Academy is concerned about the impact of television programming intended for children younger than age two and how it could affect your child's development.' And in late 2011 they've gone further 'media-both foreground and background-have potentially negative effects and no known positive effects for children younger than 2 years.' (AAP, 2011) Despite these recommendations, many studies in the last ten years have shown most of children surpass this recommended exposure time. (Gingold, J. et al., 2014).

Recommendations:

- We should encourage no screens in children's bedrooms. If you put a refrigerator in a child's bedroom they will eat more, if you put a screen in their bedroom they will watch more.
- Parents should be encouraged to monitor and control the time their children spend on hand-held computer games/media.
- Ideal screen time limits are:
3 - 7 years: 0.5 - 1 hour per day
7 - 12 years: 1 hour
12 - 15 years: 1.5 hours

16+ years: 2 hours

Parents must take into consideration how much time their children are spending doing homework on computers before coming to a decision on screen time for their child.

- The potential influence of background or 'passive' media should be explained
- Advice in maternity ward 'birth packs' should be given to mothers about infants and toddlers watching screens.
- Health visitors should be aware of medical evidence and advise new parents.
- Nurseries and day care centers should make parents aware of this issue.
- Schools should adopt a position on the amount of time children spend in front of a screen in and out of school and communicate this to pupils and parents.
- As a guiding principle, children should spend far more time in the real world than they do in the virtual world.

Many believe that we should not make parents feel guilty about the amount of time children spend in front of a screen and the early age at which they start. But we must now make a clear judgment that child health is more important than parental guilt. Fortunately parents, especially mothers, have a guilt 'reflex' when it comes to doing the right thing for their children. The EU should use this. If you tell parents of children under the age of three in particular that their children could be at risk, the maternal guilt reflex is in many cases likely to result in fewer EU children with screens in their bedrooms and a reduction in total child screen time.

In short, there is nothing to be lost by children watching less screen media but potentially a great deal to be lost by allowing children to continue to watch as much as they do. By ignoring the growing body of evidence linking screen time with child health we may ultimately be responsible for the greatest health scandal of our time.

It seems that the best approach to take is to limit children's screen time, and if/when they do watch TV, to carefully examine the shows they watch for how they promote thinking, language development,

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