

Study of impact of the use of electronic media on developmental milestones in children

Neha Naik*, Roshni Dholkawala**, Sanjay Natu***

*Assistant Professor, **Student, ***Professor, Department of Surgery, Smt. Kashibai Nawale Medical College, Narhe, Pune, INDIA.

Email: firoz10555@yahoo.com

Abstract

Objectives: To study the changes, if any, in the appearance of certain developmental milestones due to increased use of technology in children below the age of 5 years. **Design:** cross sectional study. **Setting:** tertiary care hospital **Methods:** This was a proforma based study, carried out on 105 patients between 6 months to 5 years on both IPD as well as OPD basis. The patient information sheet containing the salient points of study was distributed. A record of developmental milestones in all domains was recorded. Additional information regarding the electronic development milestones (like mobiles, TV Remote, Remote control operated toys) was elicited from history. **Results:** The cross sectional study was carried out on 105 patients between 6 months to 5 years of age. Out of 105 patients, 51 were females and 54 were males. The Sample contained mainly Upper Middle class subjects (54), followed by Upper class (33), Middle class (18), Lower Middle class (3) and none from the Lower class according to the modified B.G. Prasad classification. Out of 105 subjects, 7 subjects did not have a Television at home. Of the remaining 98 subjects, 51 subjects were unable to use a TV remote while, 47 subjects were able to effectively use the remote **Conclusions:** There was no observed change in the time of appearance of the normal developmental milestones in this study due to the impact of exposure to electronic gadgets. These parameters of operability of gadgets can serve as a tool for assessment of a child's growth and development, after a further in-depth study and extensive research. These parameters may prove useful to both the paediatrician and the parents as "electronic" developmental milestones in the future.

Key Word: electronic media.

*** Address for Correspondence:

Dr. Sanjay Natu, Professor, Department of Surgery, Smt. Kashibai Nawale Medical College, Narhe, Pune, INDIA.

Email: firoz10555@yahoo.com

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INTRODUCTION

One of the notable changes in our social environment in 21st century has been the saturation of our culture and daily lives by the mass media. A study carried out by Kaiser Family Foundation found that 25% of all children between the age 4-6years use personal computer for at least 50 min every day. Unfortunately use of such media has detrimental effects on children well being. Many Indians now possess smart phone and other gadget which

the child is well versed with. So history of use and playing of such gadget can be easily noticed and assessed by parental report which could be easily correlated between all domains of milestones. The project was carried out in tertiary care hospital with the most accessible and widely used gadget by children like mobile phones and TV Remote.

AIMS AND OBJECTIVES

1. To study the changes, if any, in the appearance of certain developmental milestones due to increased use of technology in children below the age of 5 years.
2. To identify any additional electronic milestones that may be achieved by children below the age of 5 years.

MATERIALS AND METHODS

This was a proforma-based, cross-sectional study carried out on 105 subjects between 6 months and 5 years of age on both, IPD as well as OPD basis over the months of

August and September 2016. A Patient Information Sheet containing the salient points of the study was distributed in English and Marathi after which a Written Informed Consent of the guardian/parent of the child was taken.

Inclusion Criteria

1. The subject has to be between 6 months and 5 years of age at the time of the study.
2. The informant should be a source close to the subject i.e. a family member who lives with the subject
3. The subject should have atleast 2 of the following 3 electronic gadgets at home, namely, television with remote, Smartphone and remote control car.

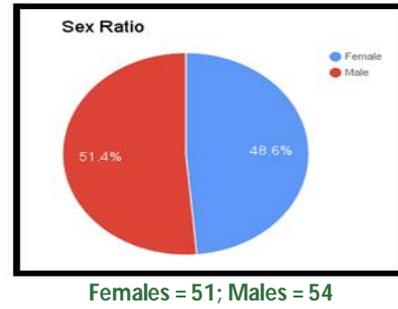
Exclusion Criteria

1. Patients suffering from any condition causing failure to thrive.
2. Patients suffering from any disorder affecting the central nervous system.

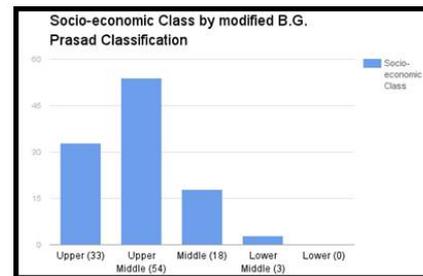
A record of the current motor, sensory, social and cognitive developmental milestones was recorded from the informant present. The parameters for these developmental milestones was taken from the standard textbook of O.P. Ghai Essential Paediatrics 8th Edition. Additional information regarding the electronic developmental milestones was elicited from the history and corroborated at the place of research with the use of daily household items like a mobile phone, a TV remote and remote controlled toys, used regularly by the subject for entertainment and education. As the hospital is based on the outskirts of Pune city and the patients come from semi-urban as well as a rural setting, the socio-economic class was calculated on the basis of modified B.G. Prasad classification. The data was analyzed by the help of Microsoft Excel. The inclusion criteria was expanded to include the point of the subject having exposure to the use of at least 2 out of the 3 electronic gadgets included in the study, namely, Television with remote, smartphone and remote control car. This was to bring about some standardization into the study to prevent discrepancies in data collection. The sample size was decreased from 120 subjects to 105 subjects due to constraints with regards to time as also due to the failures to meet the inclusion criteria.

OBSERVATIONS

1. The sex ratio in the project was as follows

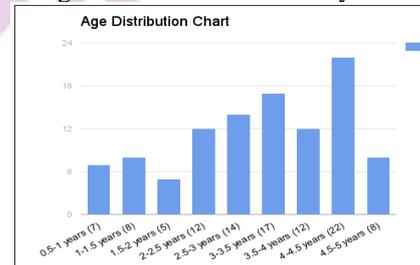


2. The socio-economic make-up of our sample size was as follows

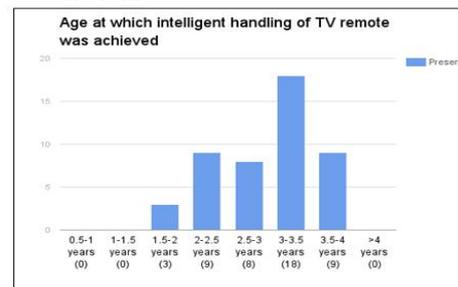


The Sample contained mainly Upper Middle class subjects (54), followed by Upper class (33), Middle class (18), Lower Middle class (3) and none from the Lower class according to the modified B.G. Prasad classification.

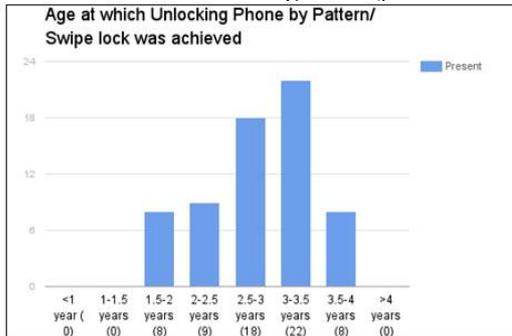
3. The age distribution in the study was



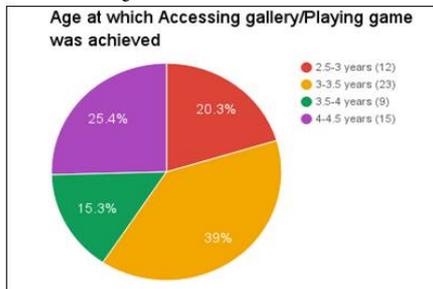
4. The Developmental History was found to be normal in all the 105 subjects.
5. Out of 105 subjects, 7 subjects did not have a Television at home. Of the remaining 98 subjects, 51 subjects were unable to use a TV remote while, 47 subjects were able to effectively use the remote at:



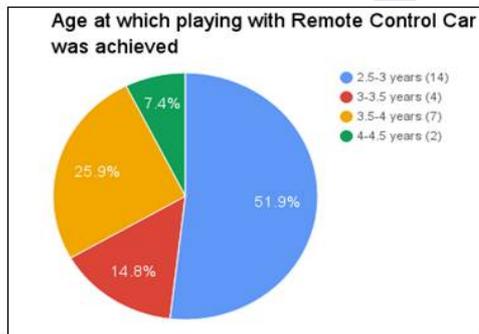
6. All 105 subjects had a mobile phone at home. 40 subjects were unable to unlock the phone while the data for the remaining 65 subjects was:



7. 46 subjects were unable to access the gallery of the mobile phone/play games on the mobile phone while the rest of the data for 59 subjects was



8. 78 subjects did not have access to a remote control car while 27 subjects had a remote control car and the data was



DISCUSSION

The aim of the study was to find out the impact of electronic media on developmental milestones. All the subjects in the study had normal developmental milestones despite being exposed to one or more than one electronic gadgets⁴. This could be due to reduced duration and variety of exposure of an Indian child to electronic gadgets as compared to a child from the developed countries. Handheld electronic devices such as tablets and portable electronic toys are not as prevalent in Indian

households as in the study written by Cris Rowan. Hence, the developmental milestones may not have been affected. A shortcoming of this study was that no information as to the duration of exposure per day and frequency of exposure per week was taken in the proforma. Since the majority of our subjects in the sample belonged to the Upper middle class or the Upper class, they had access to at least one of the three gadgets considered for the study i.e. Television remote, Mobile phone and Remote Control Car. The mobile phone was found to be present in every household in our study. This helped to maintain some uniformity in our questionnaire as the other two gadgets were not available to all the subjects. The theory behind asking for the ability to operate a TV remote was to assess the achievement of appropriate motor milestones. Of the 47 subjects who were able to operate the TV remote, 38.3% were able to do it at the age between 3 years and 3.5 years which was found to be the peak. The ability to operate a TV remote with understanding was seen at 1.5 to 2 years of age (6.3%), which increased to 19.1% at the age of 2 to 2.5 years of age. No subject was able to operate it before 1.5 years of age. This shows that a child exhibits motor co-ordination and dexterity to operate the TV remote from 2 years onwards and almost 81% are able to achieve this by 3.5 years. The mobile phone was found to be a ubiquitous gadget amongst all the households included in our sample study. Unlocking of a phone was considered to be a parameter for assessing a child's development of fine motor milestones and was standardized by the ability of unlocking an Android smartphone locked by pattern lock/swipe lock. The study shows that 65 subjects could unlock the phone with a peak value of 61% observed at ages between 2 and 3.5 years. The discrepancy between all subjects having normal developmental milestones but only 61% being able to unlock the smartphone could be attributed to the duration of exposure to the gadget as well as the presence/absence of locking pattern of that smartphone. This corresponds to the age at which a child can draw vertical/horizontal strokes(2years), copy a circle(3 years) and copy a cross(4 years)³. This may help to explain why this skill is achieved in this age group. Accessing the phone Gallery or playing a game on the mobile phone requires cognition as well as fine motor skill. These activities require a mature pincer grasp(12 months) as well as the ability to draw vertical and horizontal strokes(2 years) in the handling and navigation of mobile phones. The peak value of 39% was observed at 3 to 3.5 years of age. The second highest value of 25.4% was observed at 4 to 4.5 years of age. The dip in value between 3.5 to 4 years of age (15.3%) could be due to the relatively small size of the sample. A larger sample size could result in more accurate findings. I was of the

opinion that a remote control car would be the most popular battery operated toy in this age group. However, only 27 out of 105 subjects had access to this toy. A remote control car tests the fine motor development, visual development and co-ordination of the child. The skills required for the smooth operation of this toy were found to be at 2 to 2.5 years of age(52%) which was earlier than expected. This could be attributed to a small sample size of just 27 subjects. It could also signify that children learn to operate a gadget that does not require an interface sooner than gadgets which do require an interface as is the case in smartphones and TV remotes. The interface could be the need of language and labels or the sheer plethora of buttons/options present on a smartphone screen or a TV remote.

Limitations to the Study

1. The sample size of 105 subjects in a single set-up is inadequate to generalize the findings of the study.
2. This is a proforma-based study and hence the information about age of appearance of certain milestones is dependent upon the recall of parents
3. No standardization was enforced for the duration of exposure per day and frequency per week to electronic gadgets on the subjects involved.
4. This was a cross-sectional study and hence, no follow-up was done in the patients to see the appearance of further milestones in a subjects below 2.5 years of age.

CONCLUSION

There was no observed change in the time of appearance of the normal developmental milestones in this study due to the impact of exposure to electronic gadgets. There is a definite correlation between the age at which a child achieves fine motor milestones and unlock a mobile phone and also between the age at which a child develops fine motor milestones and cognition and the age at which that child starts playing games and accesses the gallery on the mobile phone or operating a remote control car. These parameters of operability of gadgets can serve as a tool for assessment of a child's growth and development, after a further in-depth study and extensive research. These parameters may prove useful to both the paediatrician and the parents as "electronic" developmental milestones in the future. A larger study with more accurate parameters for these "electronic milestones" with a sample which

comprises of varied socio-economic classes will help in the standardization of these milestones.

SUMMARY

The world that we live in is influenced by technology at every step. It must be accepted that with the growing research to achieve further advances in this field, technology is here to stay. The children of today are being exposed to it in far greater amounts than the older generations were and the children of the future are likely to head down a similar path. It is thus imperative that we embrace this technology and recognise its potential to facilitate a child's growth and development when used correctly and work towards using it to better evaluate a child visiting the Paediatrician's OPD. There was a correlation between the existing developmental milestones, the age at which they appear and these newfound "electronic" milestones. These could be in locking/unlocking of a smartphone, accessing the gallery or playing a game on a smartphone and the ability to intelligently use a TV remote. I did not find a correlation between the exposure to electronic media and the change in the time of appearance of existing developmental milestones. This study was limited by its sample size, lack of standardization of the gadgets used and the lack of information collected on the amount of time spent by the child in using electronic gadgets. There is definite potential to carry out extensive research in this field.

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