

# A STUDY TO ASSESS THE EFFECTIVENESS OF BEHAVIOR CHANGE TECHNIQUES ON SCREEN TIME DURATION AMONG PRESCHOOLERS AND PARENT SATISFACTION LEVELS AT A SELECTED SCHOOL IN KANNIYAKUMARI DISTRICT, TAMIL NADU

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## ABSTRACT

The digital landscape is evolving rapidly, with people spending an average of 7 hours per day on internet-connected screens. For children under five, screen time ranges from 0.9 to 3.5 hours per day, with potential negative effects on health and development. The World Health Organization recommends that children under five should not spend more than one hour per day on digital devices. This study aims to evaluate the effectiveness of behavior-changing techniques on the duration of screen time among preschoolers and the level of satisfaction among their parents at a selected school in Kanniyakumari District, Tamil Nadu, India. A quasi-experimental one-group pre-test post-test design was used, involving 60 preschool children and their parents recruited through convenience sampling. This study found the pretest mean screen time score was 32.31 ( $\pm 3.63$ ), indicating 2 hours of screen time per day, while the post-test mean score was 23.73 ( $\pm 2.82$ ), reflecting 1 hour per day. This demonstrates a significant reduction in screen time among preschoolers following the intervention ( $P < 0.01$ ). The behavior-changing techniques effectively reduced preschoolers' screen time by approximately 1 hour. Therefore, limiting screen time for young children and actively promoting offline experiences is imperative.

**Keywords:** Effectiveness, Behavior Changing Techniques, Duration of Screen Time, Preschoolers, Level of Satisfaction, Parents, School.

## INTRODUCTION

Children are not born with an understanding of the rules of accepted behavior. The world has seen an explosion in the use of digital technology. The children can't imagine a world without smartphones and the internet. Though these devices can provide endless entertainment and

educational content, unlimited screen time can be harmful. Studies stated that screen time is the total time spent per day viewing screens such as mobile phones, televisions, computers, tablets, or any hand-held visual device (IAP, 2021).

Globally, an average person spends 6 hours and 58 minutes per day on screens connected to the internet (Tabrizi et al., 2022). But it varies between countries, and the overall screen time in under five children ranges from 0.9 to 3.5 hours per day (Kaur et al., 2022). The World Health Organization (WHO) recommends children under



This paper has objectives related to SDG



age 5 spend one hour or less on digital devices daily, and those under age 1 spend no time at all.

This study investigates the impact of behavior-changing techniques on reducing screen time among preschool children and assesses the level of satisfaction among their parents following the intervention. Focusing on a selected school in Kanniyakumari District, Tamil Nadu, India, this study seeks to provide evidence-based insights into how behavior modification strategies can promote healthier digital habits among young children, thereby supporting their overall development and aligning with global health guidelines on screen use.

## 1. Background of the Study

Children are engaging with media at increasingly younger ages, some as young as four months (Muppalla et al., 2023). Excessive screen time can harm their eyes, lead to vision issues, and is associated with obesity, cognitive impairments, and disrupted sleep, all of which affect brain development (LaMotte, 2019). Studies showed that too much screen time correlates with lower test scores and thinner brain cortices in children (Munsam et al., 2022). Additionally, excessive screen exposure can diminish interactions with parents, disrupt sleep, and increase exposure to violent content, which may lead to behavioral issues like ADHD and antisocial behavior.

Children need to have a mix of online and offline experiences to foster imagination and motivation. Educating parents and caregivers about screen time limits is vital, starting at the primary healthcare level. Behavior change interventions are effective in reducing recreational screen time, and parents play a key role in managing this by setting limits and raising awareness. This study aims to demonstrate the effectiveness of specific behavior change techniques in reducing screen time for children aged 3 to 5 years.

## 2. Need for the Study

Globally, only 35.6% of children aged 5 and younger are adhering to the recommended screen time of 1 hour/day (McArthur et al., 2022). Because children's social and intellectual development is highly adaptable, it's crucial to promote healthy digital habits from an early age. India

is home to over 444 million (13% of the total population) children, and almost 26 million children are born every year. Despite being one of the world's largest child populations, there is a lack of clear information on the screen time of children in India.

This study focuses on the digital well-being of preschool children in light of the growing prevalence of lifestyle-related disorders and childhood obesity.

## 3. Objectives of the Study

- To assess the pre-test duration of screen time among preschoolers and the level of satisfaction among their parents.
- To evaluate the effect of behavior-changing techniques on the duration of screen time among preschoolers and the level of satisfaction among their parents.
- To determine the correlation between the duration of screen time among preschoolers and the level of satisfaction among their parents.
- To associate the pre-test duration of screen time among preschoolers and the level of satisfaction among their parents with selected demographic variables.

## 4. Hypotheses of the Study

*H1:* There will be a significant difference between the pre-test and post-test duration of screen time among preschoolers and the level of satisfaction among their parents.

*H2:* There will be a significant association between the pre-test duration of screen time among preschoolers and the selected demographic variables.

## 5. Research Methodology

A quasi-experimental one-group pre-test post-test design was utilized for this study, conducted at St. Joseph's Nursery and Primary School in Kalkurichy, Thucklay, Kanniyakumari, Tamil Nadu, India. A total of 60 preschool children and their parents were recruited using a non-probability convenience sampling technique. Data were collected through a self-structured questionnaire and a checklist administered to the parents of preschoolers

(Children & Screens, 2024). Figure 1 shows the schematic diagram of the one-group pre-test and post-test design.

The variables in this study include the independent variable, behavior-changing techniques, and the dependent variables, duration of screen time and level of satisfaction among parents.

## 6. Data Analysis and Interpretation

### 6.1 Frequency and Percentage Distribution of Demographic Variables of Preschoolers and Their Parents

There were 60 preschoolers and their parents involved in this study. The majority of the children were between 4 and 5 years old, with an almost equal distribution of boys and

girls. More than half of the parents held degrees, while one-third had diplomas. The lowest educational qualification among the parents was high school graduation.

In most households, only the fathers were employed, while in one-fifth of the families, both parents worked. All the study participants lived in rural areas, with two-thirds from nuclear families and one-third from joint families. Almost all the preschoolers were either first or second-born, and 80% had one sibling. Approximately 75% of households had 2 or 3 screen-based devices, and their monthly income ranged from Rs. 10,000 to Rs. 20,000. Figure 2 shows the frequency and percentage distribution of demographic variables.

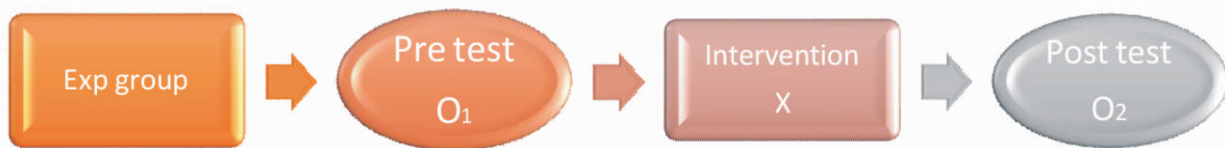


Figure 1. Schematic Diagram of One-Group Pre-Test and Post-Test Design

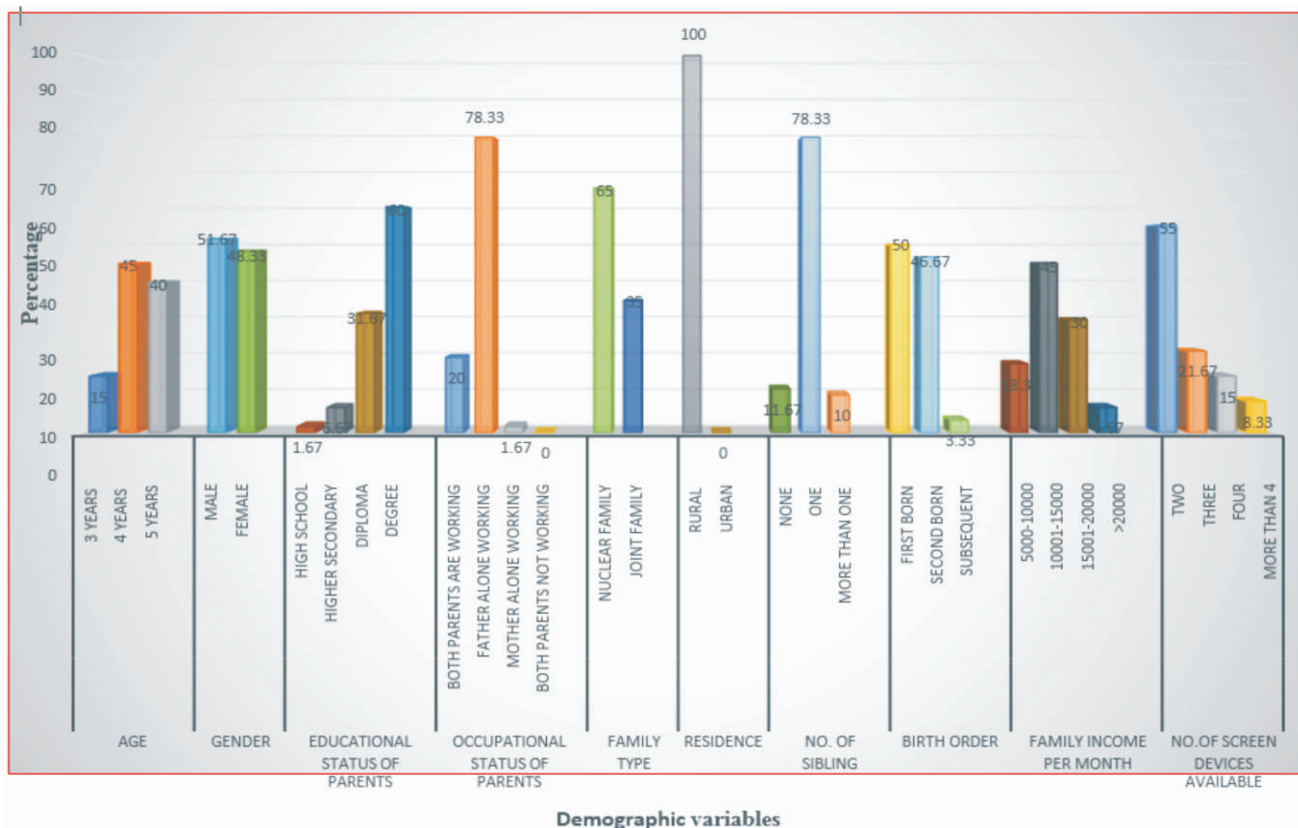


Figure 2. Frequency and Percentage Distribution of Demographic Variables

## 6.2 Pre and Post-Test Duration of Screen Time Among Preschoolers and Level of Satisfaction among Their Parents

Figure 3 shows the pre- and post-test duration of screen time among preschoolers and the level of satisfaction among their parents. On the pretest, 55% of preschoolers spent an average of 1-2 hours in front of a screen daily, while 45% spent more than 2 hours a day. None of the preschoolers followed the recommended screen time of less than 1 hour per day. However, after the intervention, 56.67% of preschoolers followed the recommended screen time duration of less than 1 hour per day, and the remaining 43.33% spent 1-2 hours per day. It's also worth noting that none of them exceeded 2 hours a day.

Considering the level of satisfaction among parents, during the pretest 46.67% of the parents of preschoolers were not satisfied with the screen time duration of their children, while 53.33% were moderately satisfied. None of the parents were highly satisfied with the time that their

children spend in front of screen-based devices. However, on the post-test, all the parents of preschoolers were satisfied with the duration of screen time. Among these, 48.33% of them were highly satisfied, while others were moderately satisfied.

## 6.3 Effectiveness of Behavior-Changing Techniques on Duration of Screen Time among Preschoolers and Level of Satisfaction among Their Parents

Table 1 shows that the pre-test mean screen time score was  $32.31 \pm 3.63$  and the post-test mean screen time score was  $23.73 \pm 2.82$ . The mean difference between the pre and post-test scores was 8.58. This means both the test scores were distinct and highly significant statistically.

On the level of satisfaction among parents, the pre-test mean score was  $23.2 \pm 05.09$ , while the post-test mean score was  $32.80 \pm 4.15$ . The mean difference between the pre- and post-test was 9.6. This means both the test scores were distinct and highly significant statistically.

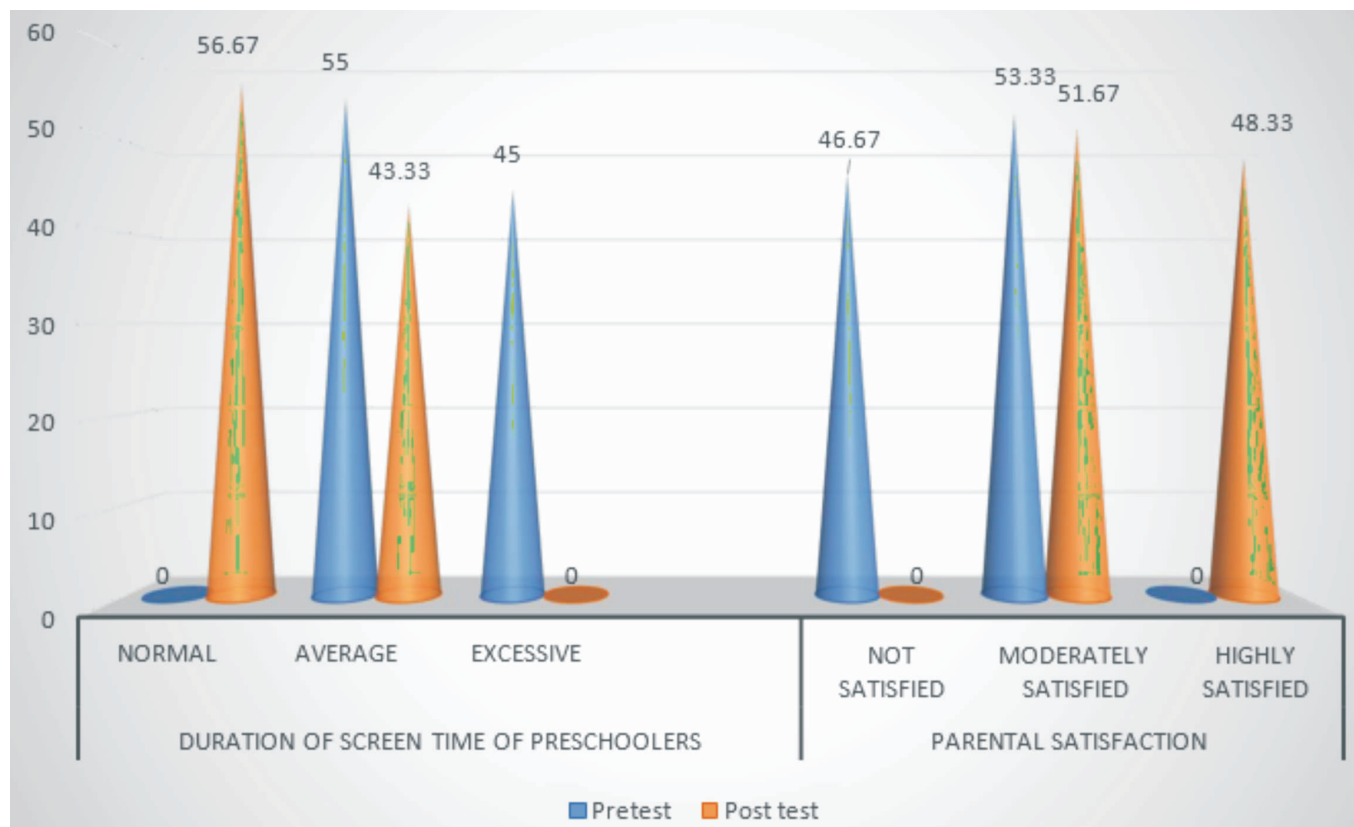


Figure 3. Pre and Post-Test Duration of Screen Time among Preschoolers and Level of Satisfaction among Their Parents

	Score	Mean	SD	Mean Difference	Paired t- Test	Level of Significance	Table Value @5% Level
Duration of Screen Time (Preschoolers)	Pre-Test	32.31	3.63	8.58	23.59	0.000 (S)	2.000 for DF 59
	Post-Test	23.73	2.82				
Level of Satisfaction (Parents)	Pre-Test	23.2	5.09	9.6	20.68	0.000 (S)	2.000 for DF 59
	Post-Test	32.80	4.15				

N = 60

(S)- Significant at 0.01% Level

**Table 1. Effectiveness of Behavior-Changing Techniques on Duration of Screen Time among Preschoolers and Level of Satisfaction among Their Parents**

## 6.4 Correlation Between Duration of Screen Time Among Preschoolers and Level of Satisfaction among Their Parents

Table 2 shows that the pre-test mean scores for the duration of screen time among preschoolers were  $32.31 \pm 3.63$  and the level of satisfaction among parents was  $23.2 \pm 5.09$ . Similarly, the post-test mean score for the duration of screen time was  $23.73 \pm 2.82$  and the level of satisfaction was  $32.8 \pm 4.15$ . The correlation between these two variables was calculated using the Karl Pearson correlation coefficient, and the resulting 'r' values of -0.849 and -0.742 indicate a high degree of negative correlation between the two variables. This means that as the duration of screen time decreases, the level of satisfaction increases.

## 6.5 Pre-Test Duration of Screen Time among Preschoolers with Selected Demographic Variables

This study found that factors like age of the child, educational status of parents, occupational status of parents, number of siblings, and number of screen devices available at home were associated with the screen time duration of preschoolers. Likewise, parental satisfaction is also associated with the age of the child, occupational status of parents, number of siblings, and number of screen devices available at home.

## 7. Results and Discussion

### 7.1 First Objective: Pre-Test Duration of Screen Time among Preschoolers and Level of Satisfaction among Their Parents

Based on the results, during the pretest, none of the preschoolers reported having followed the recommended screen time duration of less than 1 hour per day (score 15-24), which indicates that all were exceeding the daily limit on screens. Considering the level of satisfaction, in the pre-test, almost half of the parents (46.67%) reported having no satisfaction regarding the screen time of their preschoolers, whilst the remaining (53.33%) showed a moderate level of satisfaction, which could easily be attributed to the lack of knowledge about the ill effects of excessive screen time. Thus, it can be concluded that the pre-test mean duration of screen time among preschoolers was 2 hours a day with low to moderate satisfaction among their parents.

According to this study's findings, the most preferred device was television, and it was mainly used for entertainment purposes. A higher duration of screen use was observed on weekends compared to weekdays. According to the CDC (Centers for Disease Control and Prevention), children ages 3 through 5 years need to be active throughout the day for optimal growth and

Variable	Test	Mean	SD	'r' Value	Interpretation	Level of Significance
Duration of Screen Time (Preschoolers)	Pre-Test	32.31	3.63	-0.849	High Degree Negative Correlation	0.000
Level of Satisfaction (Parents)	Post-Test	23.2	5.09			
Duration of Screen Time (Preschoolers)	Pre-Test	23.73	2.82	-0.742	High Degree Negative Correlation	0.000
Level of Satisfaction (Parents)	Post-Test	32.80	4.15			

N = 60

**Table 2. Correlation Between Duration of Screen Time Among Preschoolers and Level of Satisfaction among Their Parents**

development. However, most children spend 1-2 hours in front of screens daily, which in turn reduces the amount of time spent on outdoor activities. While most of the children (86.6%) preferred screen use while eating, 50% of them refused food without screens. It is also observed that the absence of screen time rules at home and excessive screen time of primary caregivers accounted for 33.33% and 38.33%, respectively. This study also observed that preschoolers tend to spend more time in front of screens due to various factors, including inconsistencies in adult supervision during screen time, lack of parental permission for screen use, and inadequate use of parental control features on electronic devices such as televisions and smartphones.

## ***7.2 Second Objective: Effect of Behavior-Changing Techniques on Duration of Screen Time among Preschoolers and Level of Satisfaction among Their Parents***

According to the findings, the pretest mean screen time score was  $32.31 (\pm 3.63)$ , which corresponds to 2 hours of screen time per day (score 25-34) and the post-test mean screen time score was  $23.73 (\pm 2.82)$ , corresponding with screen time of 1 hour per day. This means the intervention provided (behavior-changing techniques) shows a significant reduction in the duration of screen time among preschoolers ( $P < 0.01$ ). About the level of satisfaction among parents, the pre-test mean score was  $23.2 (\pm 5.09)$ , while the post-test mean score was  $32.80 (\pm 4.15)$ . The mean difference between the pre and post-test was 9.6. This means the reduction in the duration of screen time among preschoolers has increased the satisfaction among their parents significantly ( $P < 0.01$ ).

This study incorporated four behavior-changing techniques, which include goal-setting behavior, information about health consequences, environmental modification, and demonstration of behavior.

## ***7.3 Third Objective: Correlation between Duration of Screen Time among Preschoolers and Level of Satisfaction among Their Parents***

The pre-test mean score of screen time duration among preschoolers in this study was  $32.31 \pm$  of 3.63, and the

mean score for satisfaction level among parents was  $23.2 \pm 5.09$ .

Similarly, the post-test mean score of screen time duration was  $23.73 \pm 2.82$  and the mean score for satisfaction was  $32.80 \pm 4.15$ . The correlation between these two variables was calculated using the Karl Pearson correlation coefficient, and the resulting 'r' values of -0.849 and -0.745 indicate a high degree of negative correlation between the two variables. That is, when the duration of screen time of preschoolers decreases, the level of satisfaction among their parents increases.

## ***7.4 Fourth Objective: Pre-Test Duration of Screen Time among Preschoolers and Level of Satisfaction among Their Parents***

In this study, the variables such as age of the child ( $\chi^2 = 9.42$ ,  $p = 0.009$ ), educational status of parents ( $\chi^2 = 16.14$ ,  $p = 0.001$ ), occupational status of parents ( $\chi^2 = 7.06$ ,  $p = 0.029$ ), number of siblings ( $\chi^2 = 6.23$ ,  $p = 0.004$ ) and number of screen devices available for use at home ( $\chi^2 = 8.43$ ,  $p = 0.03$ ) were associated with the screen time duration of preschoolers ( $P < 0.05$ ). The findings show that children between the ages of 4 and 5 are more engaged with screen-based devices compared to 3 years old with no gender differences. Higher parental education is associated with higher screen time. Excessive screen use is observed in families where the father alone is the working member. Children who had one sibling were engaged more in screen time activities than those without a sibling or had more than one sibling, and homes with the availability of only 2 screen devices recorded higher screen time compared to those with more than 2 devices.

Similarly, the variables such as the age of the child ( $\chi^2 = 8.80$ ,  $p = 0.012$ ), occupational status of parents ( $\chi^2 = 6.33$ ,  $p = 0.042$ ), number of siblings ( $\chi^2 = 6.19$ ,  $p = 0.04$ ) and the number of screen devices available for use at home ( $\chi^2 = 11.38$ ,  $p = 0.009$ ) were associated with the level of satisfaction of parents.

## **8. Implications In Nursing**

### ***8.1 Nursing Practice***

- This study helps practicing nurses understand their role

in educating parents about healthy brain development and the importance of unstructured hands-on play to build language, literacy, and social-emotional competence.

- Health assessment should include the history of screen time in children including the type of screen use and content being watched.
- Pediatric nurses must share the Indian Academy of Pediatrics (IAP) recommendations on screen time limits and the importance of finding high-quality programming with parents and significant others.
- Clinical nurses must encourage parents to view all media with their children to enhance learning, and interaction and limit setting.
- Clinical nurses should help parents develop a family media use plan.
- Clinical nurses can teach parents and significant others to use behavior-changing techniques to reduce the time spent on screens.
- School nurses must spread awareness about the physical and behavioral consequences of excessive screen time on young children and involve school teachers in imparting knowledge about healthy screen time activities.

## 8.2 Nursing Education

- Nurse educators must address the issue of excessive screen time among children and the potential physical and behavioral consequences of such practices.
- Nurse educators should develop standard tools for assessing the screen time of children.
- Nurse educators must work towards finding effective ways to prevent excessive screen time in children and replace it with healthy behaviors.
- Workshops and conferences may be conducted to spread awareness about the physical and behavioral consequences of excessive screen time on young children.

## 8.3 Nursing Administration

- Nurse administrators must encourage their staff nurses to obtain a history of screen time in children,

and advise limiting the screen exposure according to the child's age.

- Inservice education may be given to pediatric nurses on the ill effects of excessive screen time and IAP recommendations on screen time for different age groups.
- Inpatient areas of pediatric units must be equipped with unstructured hands-on play areas.
- Nurse administrators should participate in research related to screen time in children.

## 8.4 Nursing Research

- This study's findings can be utilized in future research related to the screen time of children.
- This study can be conducted on a large scale in different age groups of children.
- Studies can find more interventions to lower the duration of time spent on screens by young children.
- Funding should be available for large-scale studies as it is concerned with the development of young children who are the future of India (Basavanthappa, 2014).

## 9. Limitations of the Study

- Data collection was limited to 6 weeks.
- This study utilized a self-structured questionnaire.
- This study was limited to 60 samples, hence, generalization of the findings is limited.

## 10. Recommendations of the Study

- This study can be replicated on a larger scale in the same or different age groups across various settings.
- Similar studies can be conducted with different research approaches.

## Conclusion

Screen devices play a critical role in people's daily lives, and their importance and prevalence are expected to rise in the years. However, excessive screen time can lead to poor health and adverse developmental outcomes, indicating the urgent need to include education on screen time limits at the primary health care level. Healthcare providers and those involved in the care of

young children must support parents and significant others to keep their children's screen time within recommended levels and encourage offline experiences.

This study demonstrates that implementing behavior-changing techniques can significantly reduce screen time among preschool-aged children, with results showing a decrease from an average of two hours per day to one hour following intervention. These findings highlight the efficacy of targeted behavioral interventions in modifying screen time habits among young children, aligning with the World Health Organization's recommendations for screen exposure. Additionally, the parents expressed a high level of satisfaction with the intervention, underscoring the practical relevance and acceptability of these techniques in a real-world setting. This study underscores the importance of addressing screen time at an early age and encourages parents and educators to adopt strategies that promote healthier, offline activities for preschoolers. Further studies could explore long-term impacts and broader applications of these techniques to foster sustainable behavioral changes in children's media consumption.

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