

Effect of Educational Guidelines on Mothers' Knowledge and Practice regarding Using of Screen Viewing Time on their Children Developmental Health

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Abstract

Abstract: With the technological advancement, excessive screen times among young children are becoming a widespread issue and had an adverse effect on health. Therefore, it's crucial to raise mothers' knowledge regarding safe screen time. **Aim:** The study aimed to evaluate the effect of educational guidelines on mothers' knowledge and practice regarding using of screen viewing time on their children developmental health. **Methods:** A quasi-experimental research (one group pre/post and follow up) design was used to conduct the study. **Setting:** This study carried out in the nursery schools at Fayoum governorate. **Subjects:** A non-probability purposive sampling approach was employed, which specifically selected 120 mothers and their children under six years old. **Tools:** Tool (I) A structured interviewing questionnaire, included three parts: Part (1): Personal characteristics of mothers and their children. Part (2) assessment of the negative effect of screen viewing in children's health. Part (3) assessment of mothers' knowledge that related to screen viewing. Tool (II): Reported practices of mother's checklist, it consisted of two parts: Part (1): practice regarding screen viewing and part (2) practice regarding healthy developmental activities of the children. Tool (III): Developmental checklists, to assess children's developmental health milestones. **Results:** There was a highly significant improvement regarding mothers' knowledge, reported practice and children's developmental health milestones between pre assessment and post implementation of the Educational Guidelines as well as in follow-up assessment with $P=0.000$. **Conclusion:** Implementation of the Educational Guidelines were effective in enhancing mothers' knowledge and practices related to screen viewing time and in mitigating the negative effects of screen viewing on their children's developmental health. **Recommendation:** Continuous health education program for mothers about safety of screen viewing exposure is needed.

Keywords: Children, Developmental Health, Educational Guidelines, Mothers and Screen Viewing Time.

1. Introduction

Screen Viewing (SV) exposure is expanding globally as a result of the technological advancements in the internet-based service environment, developing technology, and younger children's easy access to screen media devices. Children are increasingly exposed to screen time from a very young age, engaging in activities like watching television, using computers, mobile phones, tablets, playing video games, and even multiscreen viewing, where they use two or more electronic devices simultaneously (Cartanya et al., 2021 & National Information Society Agency, 2021). As a result, the vast majority (96.6%) of 6 months

old babies or older are shown music videos or other media on a smart device by their parents (Gumhee and Sungjae, 2022).

Screen watching time refers to the total duration which a child spends in passive engagement with any screen device, as defined by the World Health Organization (WHO) (WHO, 2019). The WHO classified excessive screen media use for children ages from 2-7 years old as being exposed to screens extra one hour daily. Really the children start using media youngly, and their screen time duration frequently exceed the recommended limits. Globally, between 70% and 90% of children under the age of five fail to meet the recommended screen time guidelines, as reported in a study done by (Raj et al., 2022).

The American Academy of Pediatrics performed studies on the possible health and developmental hazards of screen time for kids under 5 years old. They suggest taking a structured approach to managing young children's media use, such as setting limits on duration, content of viewing and promoting parent-child engagement during screen time. Major recommendations include avoiding any electronic media for children under 18-24 months old, choosing high-quality educational content for 18-24 month, discouraging solo media use for this age group, restricting screen time to one hour per day of high-quality shows for children with 2-6 years old, promoting co-viewing with parents, and keeping a one-hour daily cap on screen time for preschool-aged children (AAP, 2016 & American Psychology Association, 2019).

Early childhood is critical to children's development and wellbeing. Based to the evidence, excessive screen media use may have both beneficial and harmful consequences on the health of young children. In spite of the utility of smart technology for child's rearing in modern culture, excessive screen viewing time has a number of negative consequences on the growth and development. Increased screen viewing time is connected with decreased visual acuity, decreased sleep duration, an increased risk of obesity, delayed cognitive and language development, reduced social interaction, and a hazard to physical wellness by creating musculoskeletal abnormalities (Bozhi et al., 2019 & Hu et al., 2019). Excessive screen time viewing could lead to psychological consequences, including emotional and behavioral problems such as sadness, anxiety, somatic complaints, and aggressive behaviors. This is supported by research showing increasing rates of screen viewing worldwide, especially in developing countries like Egypt (Chao et al., 2020).

During childhood period, mothers had an important role in ensuring screen time safety (Hadjipanayis et al., 2019). Mothers had a significant impact on screen-viewing behavior change strategies for children. Nurse should target any time with mothers to emphasize the significance of responsible and safe screen viewing as well as raising children in a digital world (Lesley et al., 2021). Furthermore, the

nurse should promote family time, talks, screen-free meals, safe use of technology and supply mothers with the relevant materials, resources, recommendations, preventative measures and treatment programs (Mansor et al., 2021).

Pediatric and community health nurses had an important role in counseling mothers to reduce their use of electronic devices around children, especially those under the age of three, due to the adverse effects on children's developmental health. It is essential for them to encourage direct interaction between mothers and their children, promote a balanced family lifestyle that includes physical activity, unstructured playtime, and support families to establish guidelines for screen usage. This guidance could contribute to the well-being and healthy development of the young children (Del Rio et al., 2019).

Significance:

Children today are growing up in a society where numerous digital media devices are easily accessible worldwide. Screen time starts at a younger age and has become integrated into children's daily routines, despite the known of the adverse effects on their physical and emotional well-being. Consequently, although excessive screen use could harm young children's development, it remains crucial to exercise caution and moderation in this digital age (Chen et al., 2019 & Lin et al., 2020).

Family is the first social setting for children. Accordingly, the mother had the biggest impact on how a child develops socially. Given that children's screen viewing behaviors formed at an early age, so mothers should consider their roles in limiting the use of technology tools by their children's. Therefore, it's crucial to keep raising awareness of mothers as regard the rules and recommendations that should be used to guide children's screen viewing and ensure healthy alternatives for them, especially for at-risk children who are under-five-year-olds (Gumhee and Sungjae, 2022).

2. Aim of the work:

The study aimed to evaluate the effect of educational guidelines on mothers'

knowledge and practice concerning using of screen viewing time on their children developmental health.

Research Hypotheses:

- 1- The mothers' knowledge regarding screen viewing will be improved after implementation of the educational guidelines than before.
- 2- The mothers' practices regarding screen viewing will be improved after implementation of the educational guidelines than before.
- 3- The children' developmental health will be improved after implementation of the educational guidelines than before.

3. Methodology

(1) Technical design:

Research Design:

The study employed quasi-experimental research design, with one-group pre/post and follow-up test.

Quasi-experimental research design is a type of empirical study used to assess the causal effect of action implementation on a target population without the use of random assignment. In this case, the researchers aimed to measure the impact of the program implementation intervention without randomizing subjects into control and experimental groups, making the subject as the control for himself so all the variables are fixed and the effect only because of the intervention so it a quasi-experimental study (Gopalan et al., 2020 & Siedlecki, 2020).

Research Setting:

The study was conducted at four urban and three rural nursery schools from 70 nursery schools which representing Fayoum Governorate that was selected using cluster sampling design. A list of the 6 sectors of Fayoum governorate included (Faoum, Sennores, Itsa, Ibshway, Yousef Ele sediq and Tameia) all had been clustered, then according to the number of nursery schools in each cluster the researchers selected 10 % of them randomly. The urban nursery schools were from Faoum, Sennores, Itsa and Tameia sectors,

whereas the rural nursery schools were from Ibshway and Yousef Ele sediq sectors. One nursery school was selected randomly from each sector except two nursery schools from Fayoum sector. The total number of children was selected from rural and urban regions according to their population density.

Research Subjects:

A purposive sample involved (120) mothers and their children from both sex and from 1 to 6 years old, who attended to the previously mentioned settings during the study period. Children who less than six years old are more sensitive for rapid changes in growth and development. During this period, the brain had great flexibility in which children experienced significant impact on social, cognitive, and emotional development. While children with other physical, mental, neurological diseases and other congenital problems were excluded.

Sample size:

The sample size for the study was calculated through a statistical power analysis equation, considering the total number of children in all earlier mentioned setting. The estimated sample size was 120 children, selected from a pool of 455 child who attend the same setting. This sample size was chosen with a confidence level of 80%, indicating the level of certainty in the study's findings (Thompson, 2012).

$$n = \frac{N \times p(1 - p)}{\left[\left(\frac{d^2}{z^2} + p(1 - p) \right) \right]}$$

$$n = \frac{455 \times (0.5 \times 0.5) = 113.75}{454 \times (.0025 / 1.6384) = 454 \times 0.001526 = 0.6928 + 0.25 = 0.9428} = 120$$

Tools of the study; (pre / post and follow up):

Tool I: A structured interviewing questionnaire:

It includes 3 parts.

Part I: Characteristics of the study subjects. The questions were multiple response questions (Q1-Q15), as follows:

- a. Characteristics of the studied children included: Age, gender, order between their siblings, number of siblings in family, child nature including non- social or active, and time spent on screen viewing.
- b. Characteristics of studied mothers included: age, education level, working, social status, residence, family type and monthly income.

Part II: The study focused on evaluating the negative effect of screen viewing on children's health. This assessment was divided into four distinct categories (Q16-Q34), each comprising 19 questions. The response options for these questions included "Always," "Sometimes," or "Never," except for question Q16, which was a binary "Yes or No" question., as the following:

- **Physical effect** namely, eye problems, hearing problems, headaches, neck and back pain, sleep disturbance, nightmares, and low level of physical activity.
- **Psychological effect** namely, anxiety, fear, increased aggression, nervousness, unhealthy eating habits, distorted attitudes, excessive digital technology dependency, and increased rates of children 'self-harm
- **Neurodevelopmental effect** namely, hyperactivity disorder, attention deficit, and autism spectrum disorder.

Scoring system:

In the assessment of the actual negative effects of screen viewing time on children's health based on mothers' responses, a total score of 26 degrees was used, representing 100%. This total categorized as the following.

- High effect ($\geq 75\%$ equal 19.5 grades).
- Moderate effect ($50\% < 75\%$ from 13 grades to less than 19.5 grades).
- Low effect ($< 50\%$ less than 13 grades).

Part III: Mothers' knowledge about screen viewing and it included 8 open ended questions (Q35-Q42) namely, meaning, types, benefits of screen viewing, recommended healthy screen

time use for children under 2 years old, and for children with 2-6 years old, the types of developmentally healthy activities which could occur, causes of screen viewing for children, types of programs which should be viewed by the children.

Scoring system:

Each question was given a score between 0 and 2, with the correct and complete answer had 2 grads and the incomplete correct answer had 1 grad. The overall scores were 16 grades, which were then divided into the following categories:

- Satisfactory ($\geq 75\%$ more than 12 grades).
- Average ($60\% < 75\%$ from 9.5 to 12 grades).
- Unsatisfactory ($< 60\%$ less than 9.5 grades).

Tool II: Mothers Reported Practices, it included mother's reported practices regarding screen viewing used by their children and included two parts:

Part I: Mothers 'reported practices regarding children screen viewing:

It was adapted from AAP, (2022) and WHO, (2019) to assess mothers 'practices regarding their children screen viewing and involved three parts namely; **monitoring screen viewing time and content (2 items), implementing screen viewing rules (9 items), and strategies to limit screen viewing (2 strategies) including** (offering other activities such as drawing, playing outside the home or playing with toys, set a daily time to spend with the family, develop programs to monitor the child's electronic devices and providing other educational materials instead of screening). This part consisted of 13 questions (Q43-Q55). The question's Q43-Q54 answered by choices included "Always", "Sometimes", "Never", while Q55 was multiple responses answer. One mark awarded for each correct answer based on model key answer sheet.

Part II: Reported practice of mothers: It was adopted from Bowden and Greenberg (2012) to assess mothers 'practices regarding the healthy developmental activities namely; Range of motion exercise (14 items),

Relaxation techniques including (13 items) for deep breathing exercise (7 items), muscle relaxation (6 items) as flower, candle exercise and stress ball), Eye exercises (12 items) including (Pencil exercise, Eye rotation exercise, Eye blinking exercise, and Eye exercise with a ball) and Eye care (11 items). This part consisted of 50 items, the response answer was "Done or Not Done". One mark awarded for correct done and zero for not done or done incorrect.

Scoring System:

The mother's response for practices regarding children screen viewing, each question was made on 3 points (never = 0, sometimes= 1, and always = 2). The total score for the first part included 26 grades. Regarding **the observational checklist in the second part** each item was graded as done (one grade) or not done (zero grade). The observation checklist had 63 steps in all. The overall score for the two parts (76 grads) classified into:

- **Improper done:** < 75% (less than 66 grads)
- **Proper done:** ≥ 75 % (66 grads and more)

Tool III: Developmental Checklist:

It adapted from AAP, (2022) and CDC, (2022) to assess children's developmental health milestones. All the items answered by "Yes or No"; it included three parts as the following:

- **Part I: Social-Emotional development (27 items)**
- **Part II: Language/Communication development (30 items)**
- **Part III: Cognitive development (32 items)**

Scoring system:

Each question will be assessed and scored as (1grade) for "Yes" and (zero grade) for "No".

Developmental milestones considered of:

- **Normative development:** when the child achievement ≥75% (more than 66 grades).
- **Delayed development:** when the child achievement <75% (less than 66 grades).

II. Operational Design:

1. Preparatory phase

The researchers developed the tools based on their literature review, with input from experts in pediatric nursing. They put together an educational booklet in simple Arabic language to achieve the needs of the study participants. The study tools and guidance booklet were assessed for content validity and clarity by professional experts in the nursing field. This process helped to ensure the study instruments and materials all were appropriate, understandable, addressed the knowledge gaps and mothers needs identified from the literature review and pre assessment.

Validity and Reliability:

To ensure face and content validity, the researchers sought the input of seven experts. These experts included five from the pediatric nursing department and two from the community health nursing department, in Ain Shams University in Egypt. Through their expertise, the necessary adjustments were made to various statements within the tools. This included the removal of unnecessary phrases, as well as rephrasing. The goal was to enhance the relevance and clarity of the content, ensuring that it effectively covered all aspects of mothers' knowledge and practices concerning their children's screen viewing, as well as promoting healthy developmental activities for the children.

The reliability of the developed tools was evaluated by using Cronbach's alpha, test and the results were as follows:

Tools	Cronbach's Alpha
Assessment of negative effect of screen viewing in children health	0.937
Knowledge of the mothers about screen viewing	0.834
Reported practices of mothers	0.912
Developmental Checklist	0.850

Ethical considerations:

Ethical approval for the study was secured from the Scientific and Ethical Committee of the Faculty of Medicine at Fayoum University. Mothers were given information about the study's goals and anticipated results during the initial appointment. Participants were assured of the study's safety and their ability to discontinue participation at any time without providing a justification. Each mother provided an informal verbal consent before starting the data collection. The researchers assured participants that their involvement in the study was completely voluntarily, and the collected data treated confidentially.

Administrative design:

The research team took the necessary step of submitting an official letter to request a permission to conduct the study. This letter was jointly issued by the Dean of the Faculty of Nursing at Fayoum University and the Vice Dean for Higher Graduate Studies. The recipients of this letter were the Directorate of Education in Fayoum City, asking permission to collect the required data, after explained the purpose and scope of the study to the relevant authorities.

Pilot study:

A pilot study was conducted with 12 participants, which representing (10%) of the total study sample. The goal of the pilot study was to evaluate the feasibility, clarity and applicability of the study tools as well to estimate time needed to fill in the study tools. Necessary modifications were done. The mothers participated in the pilot study and their children were excluded from the main study sample.

Field Work:

The data collection period spanned a total of 6 months, commencing in April 2023, and concluding in September 2023. During this time frame, the researchers were present at the study setting 4 days a week. Their availability was from 9 o'clock in the morning to 1 o'clock in the afternoon. The researchers conducted the pre assessments of mothers' knowledge and practices that related to screen viewing, as well as the impact of screen viewing time on children's developmental health. These assessments were carried out in various phases throughout the data collection period.

Assessment phase:

The process started by meeting with the mothers. At the start of the interview, the researchers introduced themselves and explained the purpose, nature, and content of the study educational guidelines. They highlighted that the goal was to improve mothers' knowledge and practices about children's screen time in order to reduce negative impacts on health and development of the children. Each mother was questioned individually to assess their pre-intervention knowledge and practices regarding screen viewing and its effects on the children's developmental areas like emotional, social, cognitive, language and communication (the pre assessment). Completing the questionnaire took from 20-30 minutes per mother.

Implémentation phase:

After assessing the mothers, the researchers held individual training sessions to educate them. The educational guidelines were implemented over 4-5 weeks through 7 sessions (3 theoretical and 4 for practical). Each session included from 45-60 minutes aimed to improve mothers' knowledge and practices about children's screen time and ensure healthy screen use. Mothers learned about the hazards of excessive screen time on child development.

The educational guidelines were tailored based on the mothers needs identifying during the pre-assessment stage. Mothers were split into 6 groups, each of 20 mothers to receive the guidelines. This ensured that all mothers got the content and could engage with

researchers. Various teaching methods were used like case studies, demonstrations, lectures, presentations, handouts, and videos. The researchers' instructional materials guided the training. Appropriate media like data displays, actual tools, posters, and images were utilized.

Evaluation phase:

Mothers and their children were evaluated pre-intervention to get a baseline assessment before development of the educational guidelines and immediately post implementation of the intervention then after 3 months for follow up by using the same tools.

Educational guidelines booklet covered the following parts:

I): Theoretical part; that pertaining to equip mothers with the adequate knowledge about their children's screen viewing time and reinforcing the necessity of proper usage of their children's screen time through the following points: Zones with no screen time including (set house rules, encourage screen-free activities, limit video games and define screen limits), schedules without screen time, electronic devices limitations, choosing the media that the child consumes, maintaining a balance when the child is not online, and paying attention to ethical considerations during screen time using, recommended healthy screen time use for children less than 2 years old, as well as children from 2-5 years old. Also, provide mothers by the adequate knowledge about hazards of screen viewing on children's development which including; attitude problems, social problems, eye problems, physical problems, sleep problems, educational problems, social problems and obesity **AAP (2022), Mohamed et al., (2021), WHO (2019).**

II): Practical part;

It is aimed to enhance the mothers 'skills regarding screen viewing used by their children including (monitoring screen viewing time and content, implementing screen viewing rules focused on whether mothers set rules on the time (duration per day) and the program (content) of their child's screen viewing, and strategies to limit screen viewing) **(AAP, 2022 & WHO, 2019).**

As well as mothers 'practices regarding healthy developmental activities which including range of motion exercise, relaxation techniques as (Deep breathing exercise, and muscle relaxation as flower and candle exercise and stress ball), as well as eye exercises which including (pencil exercise, eye rotation exercise, eye blinking exercise, and eye exercise with a ball) and eye care **(Bowden and Greenberg, 2012).**

IV- Statistical design:

The study data were subjected to analysis using SPSS version 21. When examining nominal data, such as demographic information concerning the participating mothers and their children, descriptive statistics were employed. These included calculations of frequency distributions and percentages to provide an overview of the data. To assess differences between variables at different evaluation points in time, the study utilized the T-test as a statistical tool. This allowed for the examination of variations and comparisons across various time intervals. The arithmetic means, standard deviation (SD), chi square test, and Anova test were used to compare the groups (pre-post and follow-up) in order to determine the statistical significance and relations. The tests Pearson's and Spearman's were employed to investigate correlation between the variables.

4. Results

Table (1): Distribution of the studied mothers according to their characteristics (n=120).

The studied mothers Characteristics	No.	%
Mother's age (Year)		
< 20	12	10.0
20-<30	42	35.0
30-<40	60	50.0
≥ 40	6	5.0
Mean ± SD	30.10±6.80	
Mother's occupation		
Working	28	23.3
Not working	92	76.7
Mother's educational level		
Illiterate	8	6.7
Basic education	12	10.0
Preparatory education	20	16.7
Secondary education	68	56.6
High education	12	10.0
Family income		
Enough	35	29.2
Not enough	85	70.8
Family type		
Nuclear	92	76.7
Extended	28	23.3
Marital status		
Married	114	95.0
Separated	2	1.7
Divorced	0	0.0
Widowed	4	3.3
Residence		
Urban	56	46.7
Rural	64	53.3

Table (1): Showed that 50% of the studied mothers' age were between 30 < 40 years old with Mean ±SD =30.10±6.80. Also, 76.7 % of them not working and life with nuclear family. It was observed that, 56.6% of the mothers hold secondary education. As regards residence, 53.3 % of them were living in rural areas and 70.8% of them hadn't enough monthly income. Concerning marital status, the majority (95%) of the studied mothers were married.

Table (2): Distribution of the studied children according to their characteristics (n=120).

Characteristics of the studied children	No.	%
Gender		
Male	72	60.0
Female	48	40.0
Ranking among sibling		
First	28	23.3
Second	42	35.0
Third	38	31.7
Fourth and more	12	10.0
Current age (Year)		
1<3	28	23.3
3≤ 6	92	76.7

\bar{x} S.D	3.36 ± 1.29	
Childs age/ year while using electronic devices:		
1 < 2	35	29.2
2 < 3	48	40.0
3 < 4	17	14.2
4 < 5	5	4.1
5 ≤ 6	15	12.5
\bar{x} S.D	2.33 ± 1.34	
The nature of the child within the family:		
Unsociable: (Quiet, awkward)	72	60.0
Active: (Curious, impulsive)	48	40.0

Table (2): Showed that more than half (60%) of the studied children were male. Regarding their age 76.7% of them age ranged from 3 ≤ 6 years old, with Mean ±SD = 3.36 ±1.29 years and 35% of them were the second child within their families. Concerning age while using electronic devices, it was observed that, less than half (40%) of them using devices with age ranged from 2 < 3 years old. As regard child behavior, 60% of them were unsociable.

Table (3): Distribution of the studied children according to their time spent on screen viewing per day at pre, post and follow-up stages (n=120).

Age group	Time spent on screen viewing per day	Pre-intervention		Post intervention		Follow-up		(p1)	(p2)	(p3)
		No.	%	No.	%	No.	%			
1-3 years (n=28)	None	0	0.0	16	57.2	24	85.7	X ² =31.71 P=0.000**	X ² =6.523 P=0.038*	X ² =59.57 P=0.000**
	<2 hour	6	21.4	9	32.1	4	14.3			
	2-4 hours	14	50.0	3	10.7	0	0.0			
	> 4 hours	8	28.6	0	0.0	0	0.0			
3-6 years (n=92)	None	0	0.0	44	47.8	76	82.6	X ² =38.99 P=0.000**	X ² =14.88 P=0.000**	X ² =72.63 P=0.000**
	<2 hour	6	6.5	31	33.7	16	17.4			
	2-4 hours	18	19.6	17	18.5	0	0.0			
	> 4 hours	68	73.9	0	0.0	0	0.0			
Total	None	0	0.0	60	50.0	100	83.3	X ² =28.74 P=0.000**	X ² =15.96 P=0.000**	X ² =62.31 P=0.000**
	<2 hour	12	10.0	40	33.3	20	16.7			
	2-4 hours	32	26.7	20	16.7	0.0	0.0			
	> 4 hours	76	63.3	0	0.0	0.0	0.0			

P1: p value for comparing between **pre and post** intervention.

P2: p value for comparing between the in **post and Follow-up** phases.

P3: p value for comparing between the **three sessions**.

Table (3): Revealed that there was a statistically significant difference regarding time spent on screen viewing used by studied children per day at pre, post and follow-up stages with (p < 0.000**).

Table (4): Mothers' description regarding the actual negative effect of screen viewing time on their children health at pre, post and follow-up stages (n=120).

Items	Pre-intervention						Post intervention						Follow-up						(p ₁)	(p ₂)	(p ₃)
	High		Moderate		Low		High		Moderate		Low		High		Moderate		Low				
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%			
Physical effect	78	65.0	30	25.0	12	10.0	20	16.7	40	33.3	60	50.0	6	5.0	16	13.3	98	81.7	X ² =67.75 P=.000**	X ² =26.96 P=.000**	X ² =159.7 P=.000**
Psychological effect	34	28.3	60	50.0	26	21.7	5	2.5	28	23.3	87	72.5	0	0.0	15	12.5	105	87.5	X ² =66.13 P=.000**	X ² =10.61 P=.005**	X ² =130.2 P=.000**
Neurodevelopmental effect	28	23.3	65	54.2	27	22.5	4	3.3	22	18.3	94	78.3	0	0.0	12	10.0	108	90.0	X ² =76.35 P=.000**	X ² =7.911 P=0.019*	X ² =140.1 P=.000**

P₁: pre vs post intervention.

P₂: post vs Follow-up phases.

P₃: comparing between 3 sessions.

Table (4): Showed that there was a statistically significant difference regarding actual negative effect of screen viewing on children health including (physical, psychological & neurodevelopmental effect) at pre, post and follow-up stages (p< 0.000).

Table (5): Distribution of the studied mothers according to their total knowledge regarding screen viewing time used by their children at pre, post and follow-up stages (n=120).

Level of total knowledge	Pre-intervention		Post intervention		Follow-up		(p ₁)	(p ₂)	(p ₃)
	No.	%	No.	%	No.	%			
Satisfactory	9	7.5	98	81.7	96	80.0	X ² =138.7 P=0.000**	X ² =0.082 P=0.960	X ² =194.8 P=0.000**
Average	32	26.7	16	13.3	17	14.2			
Unsatisfactory	79	65.8	6	5.0	7	5.8			
$\bar{x} \pm S. D$	13.81 ± 4.79		22.67 ± 3.01		20.35 ± 3.80		t=15.50 P=0.000**	t=0.980 P=0.350	F=139.4 P=0.000**

P₁: pre vs post intervention.

P₂: post vs Follow-up phases.

P₃: comparing between 3 sessions.

Table (5): Illustrated that there was statistically significant improvement between total mothers' knowledge regarding screen viewing time at pre, post and follow-up stages with P=0.000.

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Table (6): Distribution of the studied mothers according to their total reported practices regarding screen viewing and healthy developmental activities at pre, post and follow-up stages (n=120).

Items	Pre-intervention				Post intervention				Follow-up				(p1)	(p2)	(p3)
	Proper Done		Improper Done		Proper Done		Improper Done		Proper done		Improper Done				
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%			
Mothers' screen viewing practices															
Monitoring screen viewing time and content	15	12.5	105	87.5	115	95.8	5	4.2	112	93.3	8	6.7	X ² =167.8 P=0.000**	X ² =0.732 P=0.392	X ² =244.7 P=0.000**
Implementing screen viewing rules	12	10.0	108	90.0	110	91.7	10	8.3	106	88.3	14	11.7	X ² =160.1 P=0.000**	X ² =0.741 P=0.389	X ² =220.7 P=0.000**
Strategies to limit screen viewing	12	10.0	108	90.0	110	91.7	10	8.3	106	88.3	14	11.7	X ² =160.1 P=0.000**	X ² =0.741 P=0.389	X ² =220.7 P=0.000**
Mothers' practices regarding healthy developmental activities															
Range of motion exercise	5	4.2	115	95.8	100	83.3	20	16.7	96	80.0	24	20.0	X ² =152.8 P=0.000**	X ² =0.445 P=0.505	X ² =195.1 P=0.000**
Relaxation techniques	2	1.7	118	98.3	98	81.7	2	18.3	94	78.3	26	21.7	X ² =157.9 P=0.000**	X ² =0.417 P=0.519	X ² =197.8 P=0.000**
Eye exercises	0	0.0	120	100.0	101	84.2	19	15.8	99	82.5	21	17.5	X ² =174.3 P=0.000**	X ² =0.120 P=0.729	X ² =225.1 P=0.000**
Eye care	7	5.8	113	94.2	108	90.0	12	10.0	105	87.5	15	12.5	X ² =170.3 P=0.000**	X ² =0.647 P=0.421	X ² =231.5 P=0.000**
Total reported practices score	9	7.5	111	92.5	107	89.2	13	10.8	104	86.7	16	13.3	X ² =228.8 P=0.000**	X ² =0.647 P=0.421	X ² =228.8 P=0.000**
x̄ S. D	31.57 ± 10.74				59.31 ± 4.87				57.90 ± 5.01				t=7.989 P=0.000**	t=0.377 P=0.714	F=38.89 P=0.000**

P₁: pre vs post intervention.

P₂: post vs Follow-up phases.

P₃: comparing between 3 sessions.

Original Article

Table (6): showed statistically significant improvement between total mothers reported practices regarding screen viewing and healthy developmental activities at pre/ post and follow-up stages with $P=0.000$.

Table (7): Distribution of the studied children regarding effect of screen viewing time on their developmental health milestones at pre, post and follow-up stages (n=120).

Items	Age group	Pre-intervention				Post intervention				Follow-up				(p ₁)	(p ₂)	(p ₃)
		Normal		Delayed		Normal		Delayed		Normal		Delayed				
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%			
Social-Emotional development	1<3 years (n=28)	10	35.7	18	64.3	16	57.1	12	42.9	22	78.6	6	21.4	X ² =2.585 P=0.108	X ² =2.947 P=0.086	X ² =10.50 P=0.005**
	3-6 years (n=92)	30	32.6	62	67.4	48	52.2	44	47.8	80	87.0	12	13.0	X ² =7.210 P=0.007**	X ² =26.28 P=0.000**	X ² =45.89 P=0.000**
Language/ Communication development	1<3 years (n=28)	12	42.9	16	57.1	16	57.1	12	42.9	24	85.7	4	14.3	X ² =1.143 P=0.285	X ² =5.600 P=0.018*	X ² =11.30 P=0.004**
	3-6 years (n=92)	35	38.0	57	62.0	51	55.4	41	44.6	80	87.0	12	13.0	X ² =5.589 P=0.018*	X ² =22.28 P=0.000**	X ² =46.77 P=0.000**
Cognitive development	1<3 years (n=28)	13	46.4	15	53.6	16	57.1	12	42.9	22	78.6	6	21.4	X ² =0.644 P=0.422	X ² =2.947 P=0.086	X ² =6.289 P=0.042*
	3-6 years (n=92)	38	41.3	54	58.7	56	60.9	36	39.1	82	89.1	10	10.9	X ² =7.047 P=0.008**	X ² =19.59 P=0.000**	X ² =46.37 P=0.000**
Total children's developmental health milestones	1<3 years (n=28)	12	42.9	16	57.1	16	57.1	12	42.9	23	82.1	5	17.9	X ² =1.143 P=0.285	X ² =4.139 P=0.042*	X ² =9.83 P=0.010*
	3-6 years (n=92)	34	37.0	56	63.0	52	56.5	40	43.5	80	87.0	12	13.0	X ² =7.047 P=0.008**	X ² =21.01 P=0.000**	X ² =47.21 P=0.000**

P₁: pre vs post intervention.

P₂: post vs Follow-up phases.

P₃: comparing between 3 sessions.

Original Article

Table (7): showed statistically significant improvement between total children's developmental health milestones from 3-6 years old in social-emotional, language/communication and cognitive development at pre, post and follow-up stages with $P=0.000^{**}$.

Table (8): Correlation between total mothers' knowledge, practices, children's screen viewing time and their children's developmental health milestones at pre and post follow up stages (n=120).

Variables		Children's developmental health milestones					
		Children aged 12-36 months (n=28)			Children aged 36-72 months (n=92)		
		Pre-intervention	Post intervention	Follow-up	Pre-intervention	Post intervention	Follow-up
Total time spent on screen viewing per day	r	-0.575	-0.408	-0.525	-0.599	-0.419	-0.622
	p	0.000**	0.005**	0.000**	0.000**	0.003**	0.000**
Total knowledge	r	0.427	0.501	0.513	0.486	0.513	0.528
	p	0.001**	0.000**	0.000**	0.000**	0.000**	0.000**
Total reported practices	r	0.450	0.480	0.547	0.467	0.521	0.537
	p	0.000**	0.000**	0.000**	0.000**	0.000**	0.000**

r= Pearson correlation (-) negative correlation.

Table (8): There was a positive correlation between the studied mother's total knowledge, reported practices and time spent on screen viewing per day with their children's developmental health milestones at pre/post and follow-up stages with $P=0.000^{**}$, while there was a negative correlation between the studied children's screen viewing time and their developmental health milestones with $p=0.000^{**}$.

5. Discussion

Screen media represents a major public health concern and decreasing it should be a priority for children's health. Although some screen time could benefit preschoolers, excessive or inappropriate exposure carries health and developmental risks. Studies showed that early screen usage could negatively impact cognitive, language, literacy, and socioemotional development among children. Mothers have a critical role in controlling children's screen time. Screen use should be handled as a serious issue and limiting it prioritized for children's wellbeing, although balanced screen time could provide some benefits. Mothers are the key in managing appropriate media usage for preschoolers **Canadian Pediatric Society, (2017)**. Meanwhile, this study was carried out to evaluate the effect of educational guidelines on mothers' knowledge and practice regarding using of screen viewing time on their children developmental health.

The current study found that half of the mothers were between 30 to 40 years old (mean 30.10 ± 6.80 years). Over half had secondary education and lived in rural areas (**Table 1**). These results align with an Australian study done by **Xu et al., (2014) who reported that** over half of mothers graduated from technical schools. The findings also concur with a Slovenian study done by **Rek and Kovačič, (2018)** as well with an Egyptian study done by **Mohamed et al., (2021)**, who found around half of parents were between 30-40 years old with secondary education and living in rural environments. The demographics of the current study sample mirror those in other research, as mothers in their 30s, with high school education, and rural residence. From the researchers' point of view, the higher parents' level of education, the stronger is the awareness of the parents regarding the rules about media exposed time for their children. Also, more than three quarter of the children in the present study living on nuclear family this makes the children isolated from the relations with other children within the extended family, which give the greater opportunity to spend more time with media. According to mothers'

work, more than three quarters of the current studied mothers don't work.

In the current study, over three-quarters of children lived in nuclear families, which could isolate them from interactions with extended family and lead to more screen time. Aligning with American study done by **Thompson et al., (2018)** who reported that, over three-quarters of the mothers were unemployed, contrasting with the finding of Australian study done by **Xu et al., (2014)** who reported that over half of the mothers were worked. In the current study sample over half had insufficient monthly income, which in agreement with the finding of a study done by **Lindsay et al., (2019)** who reported that around half of the study sample had low incomes. The researchers believe that low socioeconomic status push the mothers to use screen time as affordable entertainment for the children despite risks of excessive exposure. The nuclear family structure, high maternal unemployment, and insufficient income reflect the low socioeconomic status that may motivate mothers to utilize screens regardless of its potential harms.

Regarding the studied children's characteristics in the current study, over half were male with under half aged from 2 to <4 years old (mean 3.36 ± 1.29 years) (**Table 2**). This aligns with Mexico and Argentina studies which was done by **Matarma et al., (2016)** and **Waisman et al., (2018)** who reported that mostly of their sample were male children of ages 2-5 years old. However, in Egyptian study done by **Mater and Bayoumy, (2019)** who reported that their sample were younger with mean age of 2.05 years (1-6 years). Over one-third of the current sample were second-born, differing from Egyptian and British studies done by **Mohamed et al., (2021)** and **Barber et al., (2017)** who found that one-third of their sample were first-born. The child demographics data in the current study showed that the majority were preschool-aged boys, which contrasting with other studies which reported younger mean ages and more first-born children.

Slightly less than two-thirds of the current studied children were characterized as unsociable. This observation aligns with the

findings of an Australian study done by **Axelsson et al., (2022)**, who suggesting that children with excessive media exposure might exhibit social isolation, communication difficulties, and reduced attentiveness. However, this contrasts with results from Egyptian and American studies done by **Mohamed et al., (2021)** and **Nabi and Krcmar (2016)**, who indicated that the majority of studied children were energetic.

Considering these findings, from the researchers believe, it is crucial to enhance mothers' knowledge and practices regarding safe media exposure for children. Regarding the age at which children start using the electronic devices, the current study found that more than half of them began using these devices between the ages of 3 and less than 4 years old.

In the lights of this result, the finding of a study done by **AAP, (2016)** & **Canadian Pediatric Society, (2017)** they recommended based on the APP advises to avoid digital media use among children less than 2 years old and limiting screen time to 1 hour per day for children between the ages of 2 and 5 years. However, from the researchers' perspective they reported that the mothers in the study were not well-informed about these safety recommendations regarding screen time exposure. This highlights the need for regular and comprehensive educational programs aimed at increasing mothers' knowledge and promoting better practices concerning their children's screen time.

The current findings showed a statistically significant difference between children's total screen viewing time pre/post and at follow-up after implementation of the educational guidelines with ($p < 0.001$) (**Table 3**). This aligns with the finding of a study done in Thailand by **Boonmun et al., (2023)** who reported that children's screen time significantly decreased immediately after the intervention and continued decreasing for two months at the follow-up stage among the experimental group versus the control group. The significant reductions in the total screen time pre/post and at follow-up concur with other studies showing sustained decreases among the children's screen viewing after

implementing the educational intervention for the mothers.

Furthermore, the current study findings were consistent with the finding of a study done in North Dakota by **Panjeti-Madan's and Ranganathan, (2023)** who recommended that, Children's screen time per day should ideally be limited to zero minutes for the children between (0–2 years old), less than 60 minutes for the children between (3–5 years old) and capped at 60 minutes for (6–8 years old) children in order to facilitate, sustained and enhanced progress across various developmental domains. This underscores the significance of improving mothers' knowledge and practices in reducing screen media exposure time. So, the research findings align with and support the research hypotheses.

The current study found statistically significant differences regarding mothers' knowledge about negative screen viewings of the physical, psychological, mental, and neurodevelopmental effects on children during pre, post, and at follow-up stages with ($p < 0.001$) (**Table 4**). This finding aligns with a finding of a study done in Canada by **Neophytou and Eikelboom, (2019)** who reported that excessive screen time impacts children's neurodevelopment, cognition, learning, memory, and a risk for early neurodegeneration. Similarly, a finding of a study done in India by **Utkarsh and Lakshmi, (2021)** who found that excess early childhood screen time negatively affects cognitive, language, literacy, and socio-emotional development of the children. Significant improvements were showed among mothers' understanding of various health and developmental harms regarding the excessive screen time concur with other studies demonstrating awareness of impacts on child wellbeing.

From the researchers' point of view, mothers did not aware about the negative effects of excessive time spent on screen used by children on their developmental health. These confirm the importance of conducting an educational program to provide mothers by the adequate information that improve their awareness and protect their children from risks of excessive screen viewing time.

The current study found a statistically significant improvement among mothers' total knowledge about screen viewing between pre, post, and at follow-up stages after implementation of the intervention program with ($p=0.000$) (**Table 5**). This aligns with the finding of a study done in China by **Hong and Luo, (2022)**, who reported that educational programs are needed to improve parental level of about knowledge screen viewing. Furthermore, it concurs with a finding of a study done in Egypt by **Mater and Bayoumy, (2019)**, who found a statistically significant difference between parents' total knowledge score pre and post implementation of the educational program on safe children's screen exposure. The significant enhancements in mothers' overall knowledge after implementing the educational guidelines agrees with other studies highlighting the improved of parental understanding about the screen time after implementation of the intervention.

From the researcher point of view, the implementation of educational guidelines had a positive effect on improving mother's knowledge regarding screen viewing time spent by their children. This result supports the study hypothesis that the educational guidelines affected positively on improving mother's knowledge after implementing the program than before.

Regarding the mothers' reported practices, the study noted a statistically significant improvement in the overall reported practices related to screen viewing at, post-intervention, and follow-up stages than the pre-intervention assessment points, with a significance level with $P=0.000$ (**Table 6**). This finding aligns with a study conducted in Egypt by **Ali et al., (2019)**, who reported similar observations that many mothers had difficulty establishing rules for their children's screen time. However, it's important to note that this result contrasts with the findings of a study done in the United States by **Thompson et al., (2018)**, who reported that the majority of parents reported employing various alternative activities as part of their management of screen viewing. These alternatives included playing with toys, engaging in physical exercise, reading, cooking, playing board games, arts and crafts, setting specific screen time periods,

avoiding mealtime screen use, and ensuring homework completion before screen time.

From the researcher's perspective, the educational guidelines implemented in this study proved its effectiveness in enhancing mothers' practices and equipping them with different strategies and skills for managing their children's safe media exposure. These efforts aimed to mitigate the negative effects of screen time on children's development. This outcome supports the research hypothesis, which indicating that the educational guidelines program had a positive impact on improving mothers' practices after implemented the program compared to before it.

The findings of the current study, (**Table 7**), indicating a statistically significant improvement regarding the total children's developmental health milestones at the post-intervention, and follow-up assessment stages, with $P=0.000$. This result is consistent with research conducted in Canada by **Rachel et al., (2022)** and **Madigan et al., (2020)**, who reported a significant correlation between increased screen use quantity and various adverse outcomes among the children, including aggression, symptoms of attention deficit/hyperactivity disorder, anxiety, depression, and decreased language skills.

The researchers suggest that increased screen time for children could negatively impact real interactions between children and their mothers, which are vital for learning, development, and a sense of security. The implementation of the educational guidelines in this study played a role in improving children's developmental milestones, reflecting the importance of responsible screen time management for children's well-being.

The results of the current investigation, (**Table 8**), demonstrated a negative association between the amount of time children spent viewing screens and their developmental health milestones. In contrast, a positive connection was observed between the knowledge and practices of the mothers under examination and the developmental health milestones of their children, and this association was statistically significant with ($p=0.000$).

The findings of this study make parallel with a previous study conducted in India by **Jijo et al., (2021)**, who indicated that a higher percentage of parents reported deficits in communication, self-care, and play activities among children who excessively used screens compared to those who used screens within normal limits, although the differences were not statistically significant. Similarly, the current study is consistent with the finding of a study conducted in Philippines by **Christopher et al., (2022)**, who revealed a broad correlation between screen time and poorer socio-emotional functions, executive functions, cognitive development, and motor development.

However, our findings contradict the results of a study conducted in Malaysia by **Wei et al., (2021)** who found no significant correlation between children's daily screen time and their developmental quotient for speech and language, as well as other developmental skills.

From the researcher's perspective, it is crucial to emphasize the significance of educating the mothers about the potential adverse impact of screen viewing on children's daytime functioning, health behaviors, and long-term health risks. Furthermore, targeting screen viewing at a young age, ideally within the first six months of life, so it is essential to establish healthy behaviors and habits.

6. Conclusion

The findings of the present study concluding that, educational guidelines were effective in improving mothers' knowledge and reported practice regarding screen viewing time and reducing the negative effect of screen viewing on their children's developmental health. The research findings supported the research hypotheses.

7. Recommendations

- Continuous health education program for mothers about safety screen viewing time exposure
- Conduct orientation programs through major mass media outlets like television to enhance public awareness regarding the safe use of screen media.

- Additional studies to assess the lasting effects of educational initiatives aimed at children of various age groups concerning the safe consumption of screen media.
- Further research is warranted to raise parental awareness of screen media safety for children across various settings.
- Replication of this study using large sample size in different nursery school over all Egypt for generalization of the results.

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