



**Prolong Screen Time Effect among School-going Children in Bangladesh
during the Covid-19 Pandemic School-closure**

Thesis submitted by

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Abstract

The availability of devices with display screens is increasing rapidly, even in developing countries like Bangladesh. During Covid -19 lockdown, this trend increased alarmingly due to various reasons. Little or no concern is usually given to regulating a healthy guideline for children's device use. Parents are the first instructors of their children, and they play a primary role in regulating their day-to-day life. A perception analysis from parents' observation provides the proper visualisation regarding the behaviour patterns of device use by their children during and post covid period. This study commenced to find out the device use pattern by the children of Dhaka and Chattagram, two big metropolitan cities of Bangladesh, and how this prolonged screen time affects the children physically and mentally. Quantitative and qualitative methods were used, and data were collected through questionnaires from randomly selected parents with children aged five to fifteen years.

In this study, almost all the participants have internet devices in their households. Several studies show a significant link between excessive device use and related health issues during the Covid lockdown. This study's behavioural pattern shows children use devices for more than two hours during and even after lockdown with a near viewing distance. This study also showed children faced several physical and behavioural issues due to excessive device use. So, parents need to be aware of the problems children could face due to prolonged screen exposure. Based on their willingness, interventions must be created to create a substantial awareness program.

Keywords: Awareness, Device, Parent's perception, School going children, Screen Time

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Chapter One: Introduction

Since 2020 The world is struggling with the outbreak of a pandemic caused by SARS-COV-2 virus commonly known as coronavirus (COVID-19). The virus was first detected in Wuhan, China and spread worldwide rapidly. Till today there have been 547,901,157 confirmed cases of COVID-19, including 6,339,899 deaths, reported to WHO (World Health Organization, 2022). After declaring COVID-19 as global pandemic by the World Health Organization (WHO) in March 2020, Governments from different countries implemented various strategies to prevent the spread of this deadly virus and protect their citizens (1). Like other countries, the Bangladesh government also implemented strategies to reduce the health risk of this virus. This physical distancing measure and Nationwide lockdown strategy to make the people remain at home placed unprecedented control on the school going children to be active both physically and mentally. This increased time spent indoors leads to increased digital device uses in children (2).

Even Before and after the pandemic electronic gadgets were widely used by the children but little consideration is usually given to the developmental risks they pose. According to a study performed in Melbourne, the majority of young children are not participating in adequate amounts of physical activity and in excessive amounts in screen-based entertainments (3). Similarly, children of Bangladesh have higher potential to be exposed to digital screens.

1.1 Background of the Study

School going children aged between 5 and 15 years are in a stage of life which is crucial for the foundation of development of healthy behaviours in children, such as physical activity and engagement in screen-based entertainment. This behavioural participation is associated with health and social outcomes of children, such as children's physical status, behavioural difficulties, educational achievement in adulthood, social competence (4,5). Parent's awareness at adequate levels of suitable screen-based device practice is very important as they are the key observant and important guide for their children. This study investigates the health hazard of School going children of two big metropolitan cities of Bangladesh (Dhaka, Chattagram) during and after lockdown due to spending more time on devices.

With the declaration of the pandemic named Coronavirus Disease (COVID-19) by the World Health Organization (WHO) in March 2020, governments from different countries implemented strategies to prevent the spread of the virus and protect their citizens. In most nations, to establish physical distancing measures people declared to remain at home placed unprecedented control on children's ability to be active. Like other countries Bangladesh also imposed restrictions on its nation. School was closed and online classes started nationwide. While these trials were essential to protect the public's health, some unintended consequences may have resulted from these restrictions (1).

Physical activity can be defined as “any bodily movement produced by skeletal muscles that results in energy expenditure” (6). Normally in a typical day young children's movement includes going to school, sleep, sedentary time and mild to moderate movements in the form of play. But during lockdown due to closure of the school and restriction on outdoor activity most children's daily routines changed and they became dependent on the device. During and before lockdown electronic gadgets are widely used worldwide particularly by the children but little consideration is usually given to the developmental risks they carry. According to a study the majority of young children are not participating in adequate amounts of physical activity and in excessive amounts in screen-based entertainments (3). They said it is likely that physical activity may reduce and that screen-based entertainment may increase with age (3). Similarly, children of Bangladesh have higher potential to be exposed to digital screens. Particularly in urban centre of the country such as in Dhaka and Chattagram metropolitan cities children have the potential to be exposed to digital screens for long hours due to increased social factors such as increased number of nucleus family, working of both partners, increased use of digital instruments in educational institutes, and inadequate opportunities of outdoor sports.

Screen time means a child is always sitting or lying around while using the device. If a child uses the device for a long time it causes weight gain, poor muscular development, back pain and other physical problems. Eye problems are one of the common problems children face due to long-term viewing of screens. A study shows due to lack of outdoor activities during lockdown Increased digital screen time among children. This prolonged screen time is associated with the onset and progression of myopia, and could potentially be aggravated during and after the COVID-19 pandemic outbreak period (2). Another study shows within three weeks of lockdown sleep, eating and activity behaviour have changed among children and adolescents. Which leads to weight gain and sleeping disorder (7).

A clinical psychologist also stated concern about mental health problems among children due to long screen time (8). So, an important question arises: how many parents are aware about the adverse effects of digital screen exposure and what necessary preventive steps they are taking to mitigate this problem. In this context, the present study investigated these issues like to what extent prolonged screen time is affecting the children during and post covid time both physically and mentally.

1.2 Rationale

World is struggling with the outbreak of covid -19 since 2020. Like the government from different countries, the Bangladesh government also imposed a nationwide lockdown which includes closure of academic institutions. This placed unprecedented control on children's daily life routines (28). They became dependent on electronic devices in their leisure times. Nowadays electronic gadgets (Smartphone /tablets /television /computer monitor) are widely used particularly by children but little consideration is usually given to the developmental risks they pose.

During Lockdown to continue regular educational work, the school became online. So, children started using gadgets more than before to perform online classes. In addition, they use gadgets for playing games, watching videos, listening to songs, chatting with their friends, and browsing different websites. A recent study on children between age 6 to 13 years found that the screen exposure among the age group increased by 4 hrs/day during COVID-19 lockdown in Italy (3). They started spending most of their day time in these activities and hardly focused on their posture, screen brightness, and screen distance from their eyes which eventually affected their vision and health. Moreover, due to being involved with this virtual world they lack interaction with surrounding real-life people that triggers the socio behavioural issues for them. A Dutch study during COVID-19 lockdown showed a significant decrease in physical activity among school going children. They also showed screen time increased by 1 hour per day in Dutch school children compared to pre-COVID period and sedentary time also increased by 45 min/d (30). Therefore, in this study we are going to investigate the situation in Bangladeshi school going children among the age group 2 to 10 years from the perception of parents of the children during COVID-19 lockdown. This study is particularly helpful for understanding the issue as well as to find out possible remedy measures from parents'

perspective. This study investigated to what extent it can affect the physical and mental health of young children during the Covid-19 lockdown.

1.3 Research Questions

What are the effects of prolonged digital screen exposure on school going children during pandemic school closure time?

1.4 Research Objective

General Objective: This study was conducted to explore the effect of prolonged screen time on physical and mental health of school going children during pandemic.

1.5 Specific Objective

- To identify the possible health hazards of digital screen exposure on school going children.
- To understand parents' awareness regarding the health and developmental hazard of prolonged digital screen time.
- To explore preventive measures parents are taking to minimise the screen time and consequence of these measures on children.

Chapter Two: Literature Review

2.1 Children's Exposure to Device and its Impact on Them

The Covid -19 outbreak resulted in various restrictions in our day-to-day life. The Governments of several countries imposed nationwide lockdowns. This made the education of school going children come to an unexpected cessation. Children of Bangladesh also faced the same restrictions. So to continue studies almost all governments and private schools established online education. This made the children stick to digital devices. . In addition, to avoid boredom and to get rid of covid related stress children became more addicted to digital screens. This excessive screen time started showing its consequences and adversely affected the child's physical and mental health. in digital eye strain and adverse effects on children's mental health (9,10,11). Even before lockdown, the digital screen was a health concern. According to a study sixty 68 percent of children are exposed to devices such as TV, Smartphone and video games etc (12). The study also mentioned about the increased use of devices with age and their study pointed that there is a need for appropriate intervention in order to reduce young children's screen time. According to American Academy of Paediatrics newborns aged less than two (2) years should not have any exposure to technology, toddlers ageing between two(2) to five (5) years should be regulated to one (1) hour per day, and six (6) to eighteen (18) years olds are to be controlled to two (2) hours per day. But during Covid -19 lockdown to continue studies and to compensate for the academic loss, Schools started online classes. These online classes forced the children to spend around 2–5 h, depending on their age, connected digitally through tablets, laptops, and smartphones. While there have been guidelines about the optimal hours that a child should be given access to these devices (13,14).

2.2 Impact on Physical Health

2.2.1 Obesity

Several studies depicted that device usage adds to the gaining of weight in children and teenagers. Research shows that increased screen time can lead to a wide variety of serious health problems including insulin resistance, obesity, increased abdominal fat, and higher risk of Type 2 Diabetes(8). Another study shows that screen-time prompts weight gain in kids and teenagers by over eating while viewing habits, elevated calories intake, small-supplemental food intakes that impact kids' sleep cycle along with their eating practice and preferences.

Video games and television viewing have links with increased obesity (15,16). Several studies checked the physical activity and sedentary behaviour of school going children during covid lockdown. According to the parents' student's physical activity decreased due to the closure of public parks and playgrounds, whereas children's sedentary behaviour increased during the period. So, they conclude that this lifestyle change of children may lead to public health concern and may increase the risk of child obesity, diabetes and cardiovascular disease (17,18).

2.2.2 Eyesight

Various physical health problems can happen to kids, teenagers, and young adults when they invest excessive time in devices with display screens and small amounts of time engaging in physical activities. There are abundant health issues and functions that can be adversely affected and parents should know about these issues with the aim of setting expectations and boundaries that support children to grow healthy device practices. Due to school closure during covid lockdown children need to attend online classes. That means they are sitting extra time In Front of the screen. Even due to closure of the other outdoor activities they started spending more time playing video games, watching Tv, movies and engaging them more with online media. Spending long hours in front of these devices can lead to many ocular problems in children (10). The most common effect of prolonged screen use in our eyes is Digital eye strain (DES) , this syndrome is characterised by symptoms like dry eyes, itching, foreign body sensation, watering, blurring of vision, and headaches (19). Different studies show the prevalence of digital eye strain is estimated to range from 25% to 93% (20-22). The stress of continuously using near point vision on electronic gadgets is particularly harmful for children's vision, considerably a lot of whom are becoming myopic/nearsighted as a consequence. A study shows, Increased digital screen time, near work during online classes, and limited outdoor activities found to be associated with the onset and progression of myopia, and this could be aggravated during and after the COVID-19 pandemic outbreak period (2).

2.3 Impact on Mental Health

2.3.1 Irritability

Electronic devices have been associated with boundless health concerns. During lockdown increased screen time started showing its adverse effect after several months. It was not only affecting a child physically but mental health was also affected adversely (10,23,24). Even before lockdown health related issues were documented due to prolonged screen time. Study shows brain health, behavioural problems, stress, depression, sleep disorders and children's

developmental delay are the common outcome of excessive exposures to devices (25). Nowadays Behavioural problems are one of the concerns in young children. Children spending excessive duration of time with electronic devices are found to be disposed to this condition. Without any reason these children remain irritated with their friends and family (25).

2.3.2 Language delay

Developmental language disorders are one of the concerns nowadays. These are characterised by serious difficulties in language acquisition without a recognizable reason, for example physical disability, general mental retardation or overall communicative disorder. At the age of 2 years language delay can be identified. Early childhood screen addiction might be one of the main causes of language delay among children under 3 years. (26).

2.3.3 Sleep Disorder

Several studies showed the sleep patterns of school going children have changed due to lockdown and excessive device use (27,28). Previous study also found that Screen time (e.g., TV, video games, computer and mobile phones) and sleep outcomes (primarily shortened duration and delayed timing) among school-aged children and adolescents is adversely linked (29). A Japanese study during Covid lockdown shows the temporal pattern of sleep and eating behaviour among school aged children have changed due to school closure (27).

2.3.4 Social Behaviour

The majority of young school going children nowadays are not participating in adequate amounts of physical activity and they spend most of their time in excessive amounts of screen-based entertainment. It is likely that physical activity may decline and that screen-based entertainment may increase with age. This adversely affects the children's social and physical wellbeing. This includes their weight, social behaviour, educational attainment in adulthood. Compliance with recommendations may be further reduced. Strategies to promote physical activity and reduce screen-based entertainment in young children are required (3).

Chapter Three: Methodology

3.1 Study design

This study has been conducted by using a mixed method. Both qualitative and quantitative methods have been used. Quantitative survey was done prior to qualitative survey.

3.1.1 Source of data

Primary data was collected through interviews.

3.1.2 Study site

Two big metropolitan city corporations of Bangladesh, Dhaka and Chattogram are selected purposely.

3.1.3 Target population

Parents and guardians' and school teachers of school going children (age 5-15 years) from both English and Bangla medium. Child specialists, early childhood development specialists and psychologists were also interviewed.

3.1.4 Study period

This study was completed between December 2022 to May 2023.

3.2 Data Collection Tools and Pretest

For quantitative method survey questionnaires was the data collection tool. The questionnaire is formulated based on a previous study (6,9,10). Based on the studies, the questionnaire addresses the socio demographic status of the parents of the students, available devices for children to use as entertainment purpose and academic purpose during and before covid-19, duration of time the children are exposed to the devices during and before covid-19. Both open and close ended questions were prepared. Self-administered questionnaires and an online survey was also introduced to meet the sample number.

For qualitative method Focus group discussion, in depth interview and key informant interview were the tools used. Before, a pretest for these tools were also undertaken.

3.3 Sample size and sampling technique for Quantitative method

Sample size: for quantitative survey approximately 424 sample were used which is obtained by the formula

$$n = \frac{z^2 \times p \times (1 - p)}{d^2}$$

Z=1.96, d=0.05, P=50%

$$= \frac{1.96^2 \times 50 \times 50}{0.05^2}$$
$$= 384$$

(We added 10% non-respondent error with the total sample)

So, 40 was the non-respondent number.

$$= 384 + 40$$

$$= 424$$

Age group was 5-15 years (So for 5 to 15 years age, the group was 8 as we calculated age 2 and 3 in the same group). Total sample number was 424. So, for 8 groups the sample for each group was $424/8 = 53$. So, on an average 53 parents/guardians was interviewed for each age group.

3.4 Qualitative Sampling and Sampling Technique

For qualitative study the target population was the parents, guardians of the preschool and school going children. For the KII target population the teachers and child specialists were interviewed.

By using data saturation two focus groups for each school group (preschool and school going children) was formulated. Each group contained 6 persons.

For an in-depth interview six parents were interviewed from each group. For KII two teachers from preschool, two teachers from the school going group and two child specialists was interviewed.

For qualitative study the guideline for data collection was confirmed after several team meetings. Respective school authorities also played the role of a gatekeeper.

Table of sample size for Qualitative method

Target group	Number for Focus group discussion, In depth interview and KII
Parents	Focus group discussion: 24 In depth interview: 12
Teachers	Key informant interview: 4
Child specialist	Key informant interview: 2

3.5 Training

For data collection a team of 3 members were formed. Then training on data collection were organised with the advice of the supervisor.

3.6 Data collection procedure

For the quantitative survey, data was collected face to face. As the sample size is big and the interview was time consuming, for the convenience of the parents, the phone number or email address were taken. Even self-administered questionnaires were also provide as the sample size is large and were to be collected the next day.

Schools were selected prior to the interview. After selecting a school, we approached the administration of the particular school for the consent to take an interview from the parents of a particular age group of students. Then during school time, we interviewed the parents.

For qualitative data collection focus group discussion, IDI and KII were done. For focus group discussion 6 parents for each group were selected. We selected these parents during the data collection procedure and the venue was a room from the particular school which was selected by the administration. Then the parents were given a date for the interview. For in depth interview school premises was the venue. The inclusion criteria for selecting the participant was the parents and teachers of preschool and school children between the age of 5-15 years. The parents and teachers were approached voluntarily with full consent to give an interview. For KII we visited the teacher and the doctors with their consent in their designated place. A meeting time and date was fixed. School authority played the role of gatekeeper.

3.7 Data Management

Data was analysed by SPSS statistics for quantitative survey. For qualitative study, data was recorded during the interview. Then the audio recording was transcribed for data management.

3.8 Data Analysis plan

Following variables were be analysed for quantitative method:

- Socio demographic condition of the parents
- Screen time
- Mental health status (irritability, depression, sleep disorder)
- Physical health status (spectacle, weight growth chart, food habit and eating habit related to screen time)
- Awareness of parents regarding physical and mental impacts of prolonged use of a device on children
- Practices of precautionary measure

For qualitative method thematic analysis was done. The following themes were analysed:

- Screen time practice
- Physical health status
- Mental health status
- Parents awareness
- Practice of precautionary measure

3.9 Ethical consideration

Ethical clearance was be obtained from IUB ethical board and verbal consent were taken from the participant before interview

Chapter Four: Analysis & Findings

4.1 Respondent Profile

In this study basic information of the subject was collected to get a general form of demographics from the responses. Out of the total 59 respondent's 62.1 percent (n=36) responders were mother and 34.5 percent (n=20) were father, others were grandparents and siblings (Table. 1.1).

Table:1.1 Respondent Profile

Relation with the respondent	
Mother	36(62.1%)
Father	20(34.5%)
Grandmother	1(1.7%)
Sister	1(1.7%)

Furthermore, approximately 65.64 percent (n=38) respondents were from Dhaka metropolitan city and the remaining 35.6 percent (n=21) from Chattagram (Table 1.2). As our study area was both metropolitan cities of Bangladesh.

Table: 1.2 Respondent Profile

City	Respondent Percentage
Dhaka	38(65.4%)
Chittagong	21(35.6%)

Table 1.3 and Figure 1.1, 1.2 describes different age groups of the parents and their educational and employment background.

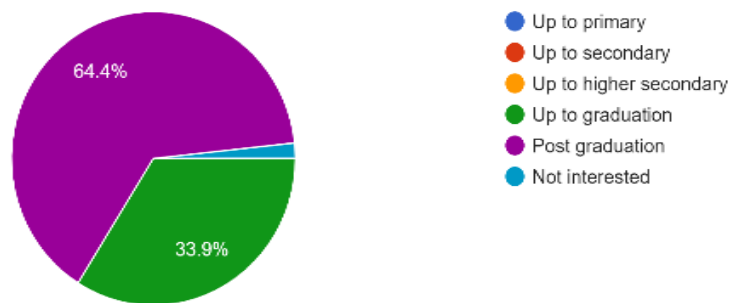
Table 1.3: Age group of the parents

Age of the Parents	Father	Mother
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25-29	0	2
30-34	7	11
35-39	12	25
40-44	18	21
45-49	13	0
50-54	9	0

Father's education

59 responses



Father's employment sector

59 responses

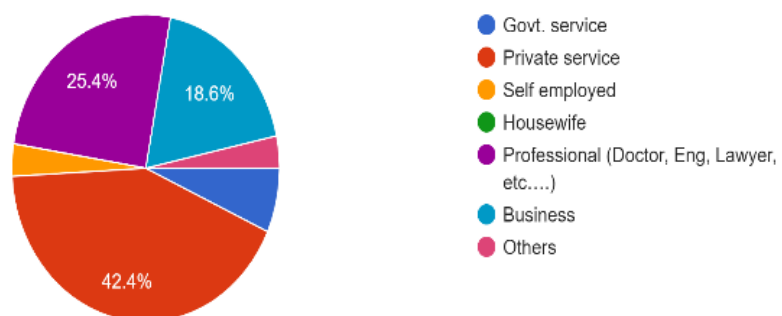
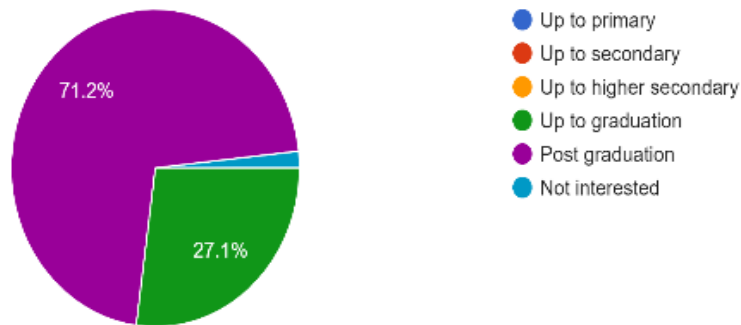


Figure 1.1: Education and Employment of Father

Mother's education

59 responses



Mother's employment sector

59 responses

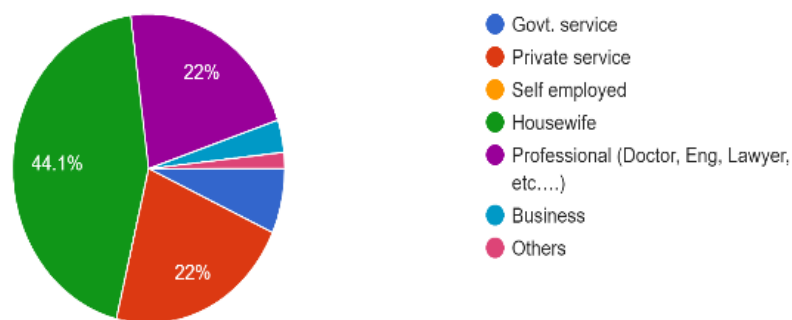


Figure 1.2: Education and Employment of Mother

Approximately 64.4 percent of fathers and 71.2 percent of mothers had completed postgraduate degrees, followed by 33.9 percent of fathers and 27.1 percent of mothers having graduate degrees (Figure 1.1,1.2). In addition, among the parents' 25.4 percent father and 22 percent mother are professional job holders and 42.4 percent father and 22 percent mother are private job holders. Among the mother's 44.1 percent are housewives. (Figure 1.1,1.2). About the age of the parents, the highest age group for father is 40-44 (n=18) and for mother highest is 35-39 (n=25) (Table 1.3).

4.2 Age group of School going Children

As this study targeted children aged five (5) to fifteen (15) years of school going kids. Respondents of this study were asked to answer about their children and their device habit. The surveyed parents' responses (sample=59) were grouped into several categories (Table 2). The

five to ten years age group is a high percentage approximately 66.2 percent (n=39) while the eleven to fifteen years age group was 34 percent(n=20). Approximately 49.1 percent(n=29) students were from class 1 to 4 while 30.6 percent (n=18) and 20.4 percent(n=12) were from class five to eight and playgroup to kindergarten respectively (Table 2). Approximately 54.2 percent(n=32) children were female and 45.8 percent (n=27) were male children among the participants.

Table 2: Age group of the Children

Age group		Class		Gender	
5-10 years	39(66.2%)	Play- KG2	12(20.4%)	Female	32(54.2%)
11-15 years	20(34%)	Class 1-4	29(49.1%)	Male	27(45.8%)
		Class 5-8	18(30.6%)		

4.3 Social status of the children:

All the Participants were asked about their occupational status. Approximately 63.2 percent(n=36) respondents were from upper middle-class families whereas 31.6 percent (n=18) were from middle class families (Figure 2.1). They also asked whether they were living in a nuclear family or a joint family. Approximately 69 percent(n=40) were living in a nuclear family whereas 31 percent (n=18) were from a joint family (figure 2.2). The respondent also asked whether they have other children of the same age group (5 to 15 years). Approximately 55.9 percent (n=33) answered yes whereas 44.1 percent (n=26) respondents said they are having single children of this group (figure 2.3).

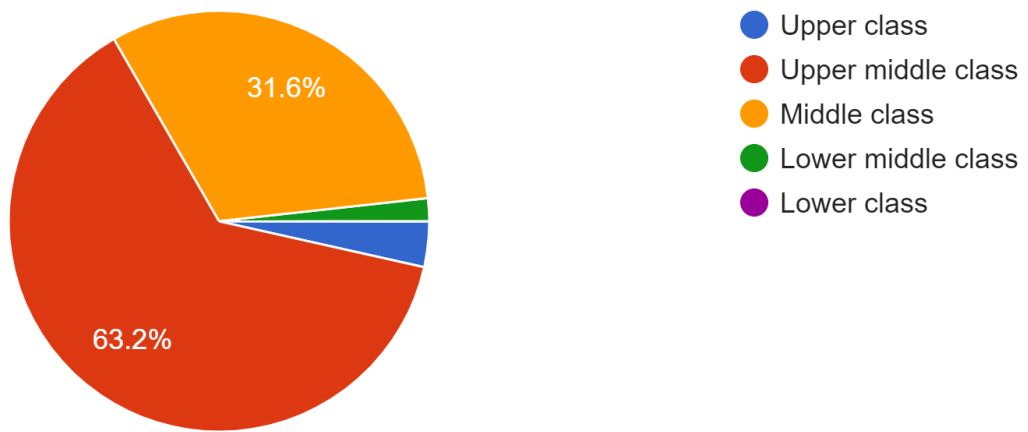


Figure 2.1: Occupational status

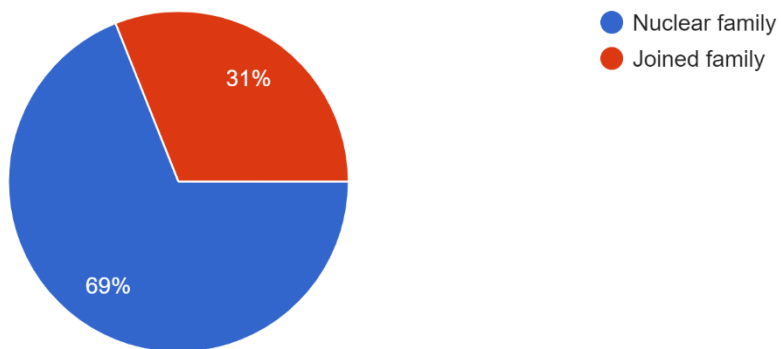


Figure 2.2: Family Background

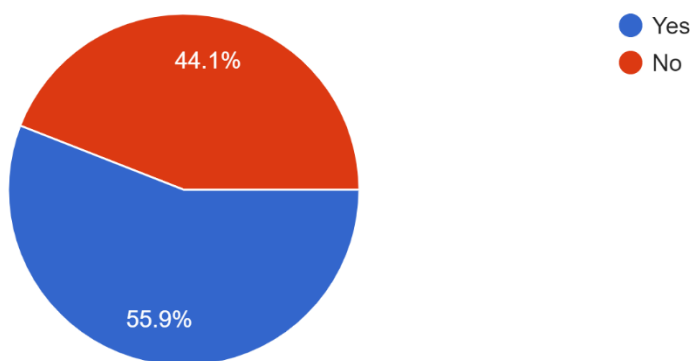


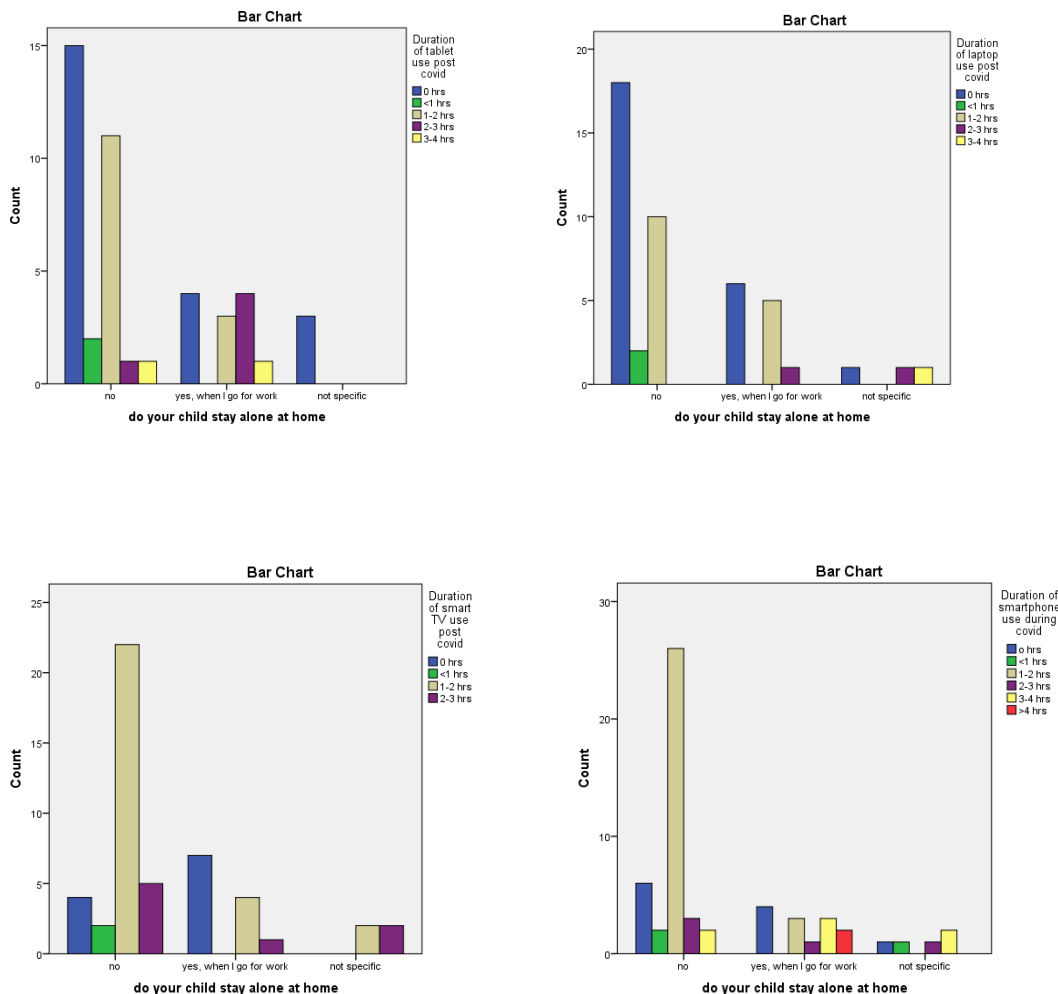
Figure 2.3: Having Sibling

The participant asked about their children living alone at home any time of the day. Approximately 20.3 percent (n=12) replied that their children live alone when they go out for work (Table 3). Then we checked if there is any change in children's device behaviour when they stay alone at home. Interestingly, the duration of device use is more than 2 hours increased incase of tablet and laptop (Figure 3).

Table 3: Children living alone at home

Does your child stay alone at any time	
No	74.6% (44)
Yes, when I go for work	20.3% (12)
Not specific	5.1% (3)

Figure 3: Children device behaviour when alone at home



4.4 Working status During Lockdown

The Covid working environment has been changed all over the world. To maintain physical distance work from home was the first priority except emergency service. The parents were asked about their working environment during lockdown. Approximately 50.9 percent (n=29) parents answered they worked from home, 19.3 percent (n=11) parents needed to go to the office and 29.8 percent (n=17) parents replied that both were working during the lockdown (Table 4). Then the parents were asked who used to take care of the children at home. Approximately 67.8 percent (n=40) parents answered they took care of their children alone during lockdown while post covid time 50.8 percent (n=30) parents were taking care of their children. Approximately 13.6 percent (n=8) mothers were taking care of their children during lockdown but it reduced to 6.8 percent (n=4) after lockdown. Sharing with grandparents and with a paid caregiver ratio was almost the same during and after lockdown. Approximately 27.1 percent (n=16) grandparents shared responsibility for the children during and after lockdown (Table 5).

Table 4: Working Environment During Lockdown

Working environment during lockdown	
Work from home	50.9% (29)
Need to go to office	19.3% (11)
Both	29.8% (17)

Table 5: Sharing Responsibility

	Sharing responsibility of the Child	
	During Covid	Post Covid
Parents are taking care	40(67.8%)	30(50.8%)
Only mother is taking care	8(13.6%)	4(6.8%)
Only father is taking care	0(0%)	0(0%)
Sharing with grandparents	16(27.1%)	16(27.1%)

Sharing with paid caregiver	9(15.3%)	10(16.9%)
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4.5 Availability of devices in household and purpose of their use

Next we asked the parents the number of devices (at least one or more) with internet connections that are available in their (sample=59) houses and purposes of their use. It is observed that Smartphones and televisions are available in almost all of the respondents' houses. And this indicates that the children are most exposed to these two types of devices. Laptops and Tablets are also in 3rd and 4th place in terms of exposure. Table 6 shows the children's usage of these devices for entertainment purpose during and post covid time. Approximately 78.9 percent (n=45) children used smartphones and 64.9 percent (n=37) used SmartTv are the most used devices during covid for entertainment purposes. While 40.4 percent (n=23) respondents answered that their children used laptops and 29.8 percent (n=17) used tablets for entertainment purposes during lockdown (Table 6) .

Table 6 : Available Devices in Household

Using device for Entertainment		
	During Covid	Post Covid
Smartphone+internet	45(78.9%)	38(66.7%)
Tablet+internet	17(29.8%)	16(28.1%)
SmartTv+internet	37(64.9%)	35(61.4%)
Desktop+internet	2(3.5%)	0(0%)
Laptop+internet	23(40.4%)	19(33.3%)
Gaming console+internet	5(8.8%)	1(1.8%)

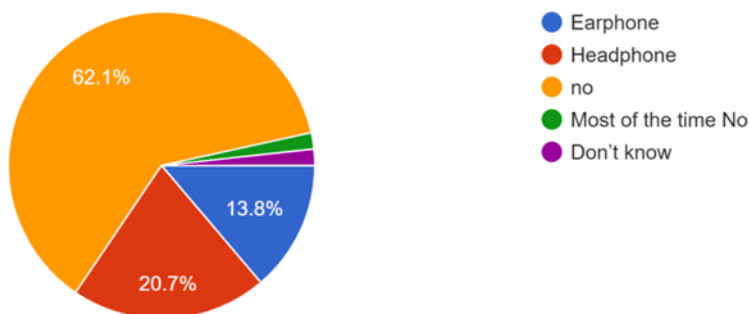
Table 7 highlights the use of devices during and after lockdown for education purposes. Approximately 76.3 percent (n=45) children used smartphones for study purpose while it reduced to 69.5 percent (n=41) post covid. Use of laptop and tablet is in second and third position according to their use both during and after lockdown.

Table 7: Available Device for Educational purpose

Using device for Education		
	During Covid	Post Covid
Smartphone+internet	45(76.3%)	41(69.5%)
Tablet+internet	21(35.6%)	16(27.1%)
SmartTV+internet	18(30.5%)	15(25.4%)
Desktop+internet	3(5.1%)	0(0%)
Laptop+internet	29(49.2%)	18(30.5%)
Gaming console+internet	1(1.7%)	1(1.7%)

Figure 4 shows children’s habit of using headphones during device use. Approximately 34.5% of parents answered that their children use either earphones or headphones during device use.

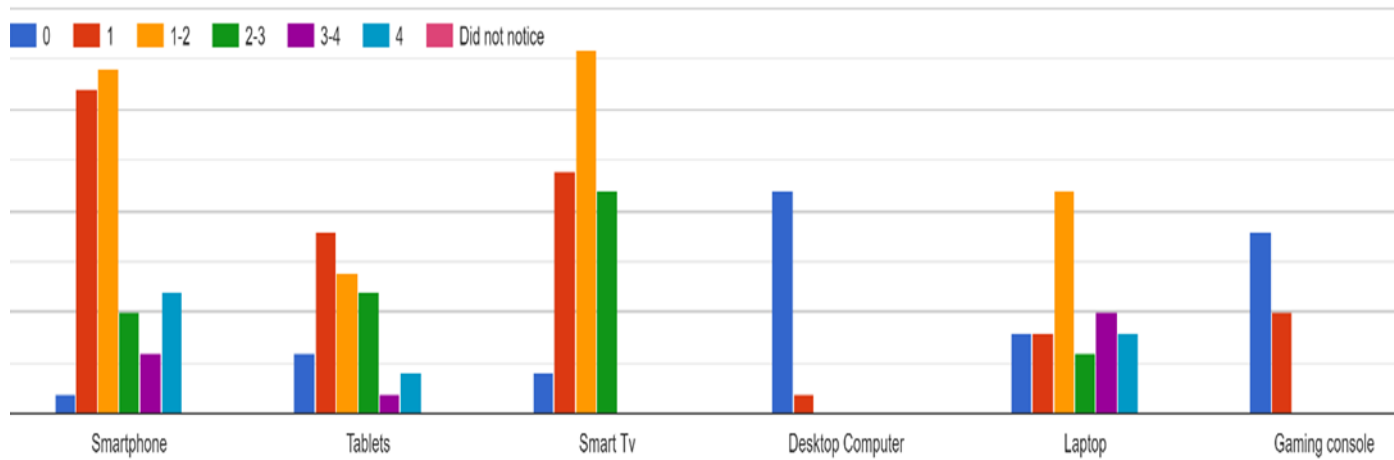
Figure 4: Use of Headphone/Earphone during device use



4.4 Duration of device use by the Children:

While calculating the average duration of device usage by children, according to Figure 5 among the surveyed parents, 18 parents answered that their children used smartphones more than 1 hour (60 minutes) per day during covid time. Conversely, 5 parents said that their children are exposed to smartphones for 1 to 3 hours per day and in the case of 4 respondents, their children used smartphones for more than 4 hours per day during lockdown. For SmartTV 18 parents responded that their children used the device for 1-2 hours per day while 11 parents said it is more than 3 hours for their children. For laptop 11 parents said their children used the device for 1 to 2 hours per day during lockdown.

Figure 5: Duration of device use during Lockdown



Post covid the duration of using smartphone was same among the children. 18 parents responded that their children are now using smartphones for 2 hours while 10 parents replied that it is more than 2 hrs. From Figure 6 we can observe Duration of using smartTv post covid increased. 20 parents responded that their children are using smartTv for 2 hrs while 7 parents said it is more than 2 hrs. Laptop and tablet use also reduced post covid among the children.

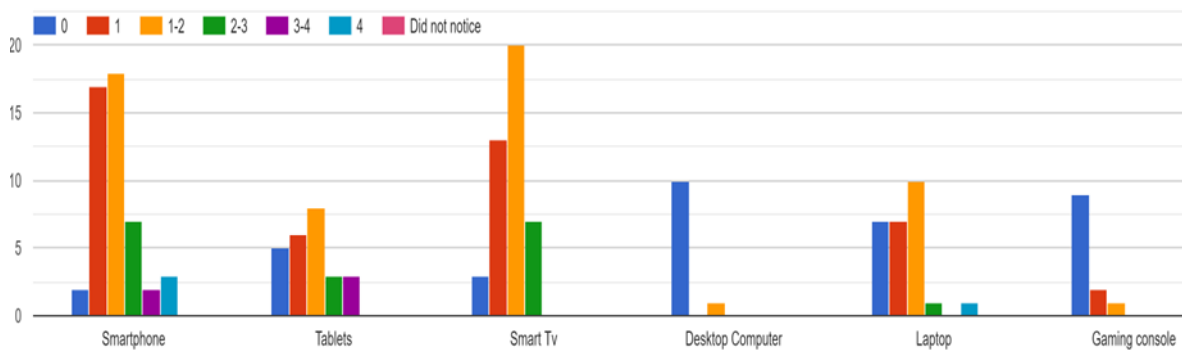


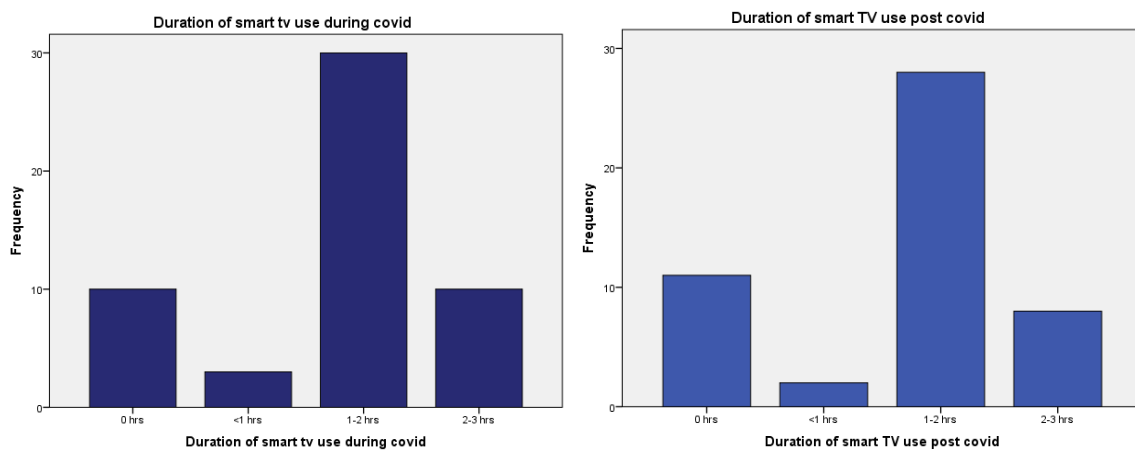
Figure 6: Duration of device use Post Covid

4.5 Frequency of using devices and viewing distance by children

One of the key objectives of this study was to determine what is the duration of device use most practised viewing distance by kids and the following figures helped visualise the current trend of the duration and viewing distances by children of both metropolitan cities.

4.6 Frequency of Use and Viewing Distance for TV

First, we checked Smart Tv use by the children. Figure 7 is for SmartTv duration during and post covid. From the figure it is clear that 81.2 percent of the parents said that their children watch TV everyday where 18.9 percent of parents said their children did not watch TV during lockdown. While the duration of watching Tv reduced to 77.5 percent post covid. For the maintained distance (eye to screen) 53.1% parents reported their children viewed TV from preferred optimum viewing distance and 18.4 % parents said that their children watched TV from close distance. 24.5% of children watched TV from a far viewing distance (more than 2.5 times the diagonal screen size).



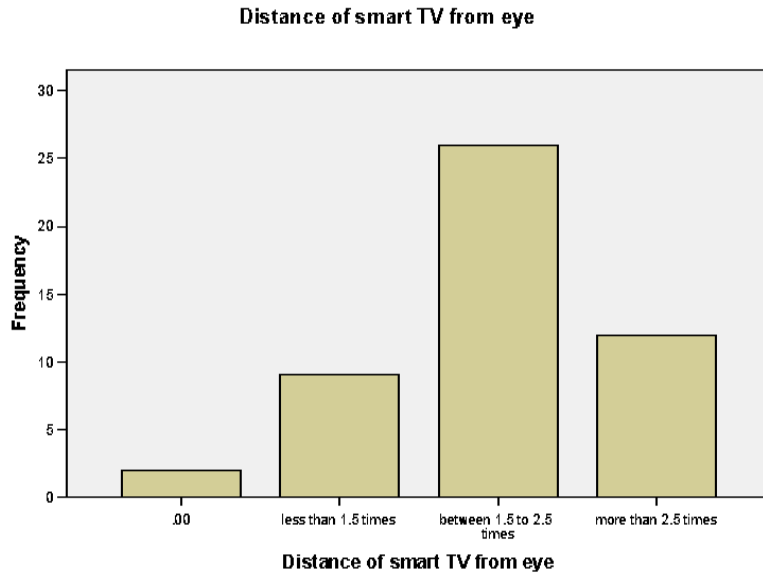
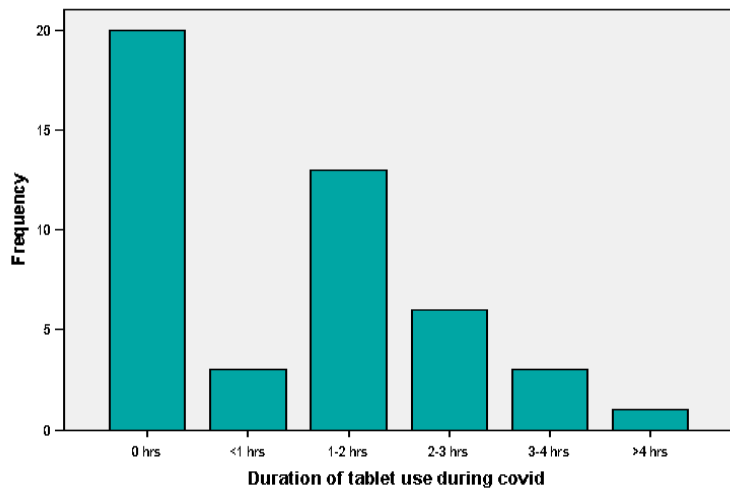


Figure 7: Duration and distance from eye during Smart television Use

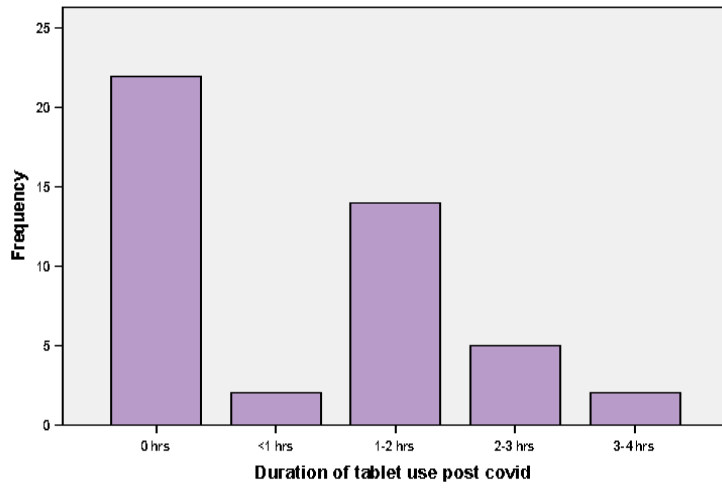
4.7 Frequency of Use and Viewing Distance for Tablets

Figure 8 is for Tablets viewing. From the frequency of Tablet use it can be inferred that according to 56.5 percent of the parents, their children use the Tablets for daily use and 43.5% of parents said their children did not use Tablets during lockdown. Tablet use was reduced to 51 percent by the children post covid. For the maintained distance (eye to screen) 47.1% parents reported their children viewed tablets from near viewing distance (less than 1.5 times the diagonal screen size) and 5.9% parents said that they did notice the viewing distance whilst only 8.8% of children watched tablets from a preferred optimum viewing distance (Figure 8).

Duration of tablet use during covid



Duration of tablet use post covid



Distance of tablet from eye

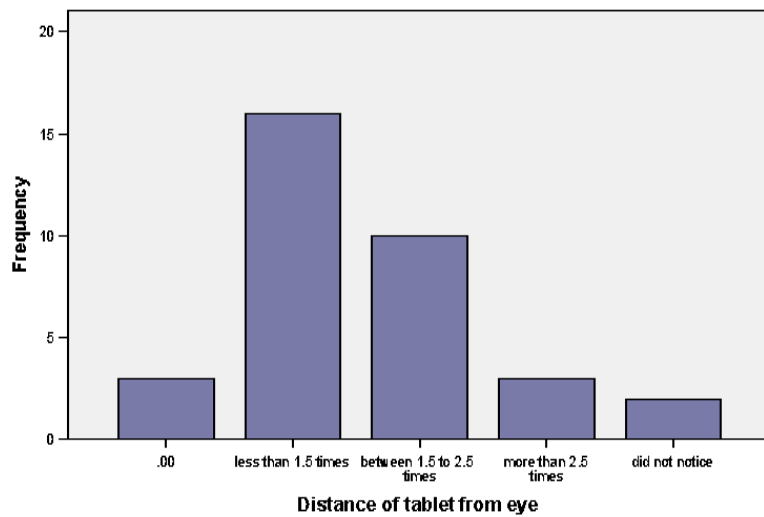
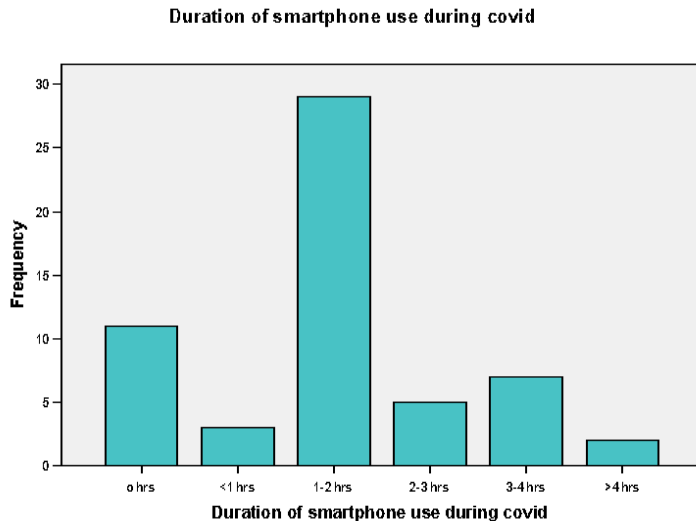


Figure 8: Duration and distance from eye during Tablet Use

4.8 Frequency of Use and Viewing Distance for Smartphone

Smartphone viewing is presented in Figure 9 . According to 80.8 percent of surveyed parents, their children use the smartphone every day and 19.3 percent of parents said their children did not use smartphones during lockdown. Post covid the duration of use did not change much as the percentage is 78.5 percent. But interestingly the children did not use the phone more than 4 hrs post lockdown, as there was no online class. But still the use of smartphones among children is high. For the maintained distance (eye to screen) a substantial 71.4 percent of parents reported their children viewed smartphones from near viewing distance (less than 1.5 times the diagonal screen size) and 3.6 percent of parents said that they did notice the viewing distance.

From the above presentation it is observed that children are watching from a very near viewing distance for Smartphones and tablets. This will expose them long hours to the blue light emitted from the devices that hampers sleep cycle.



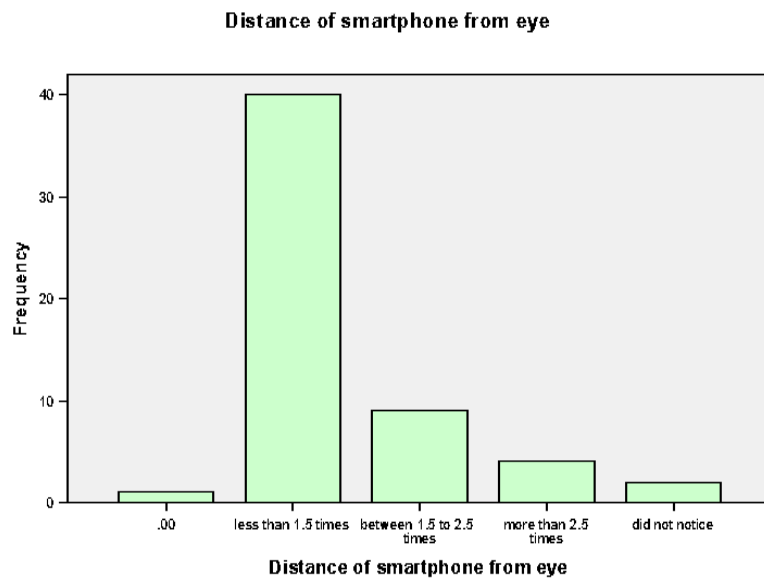
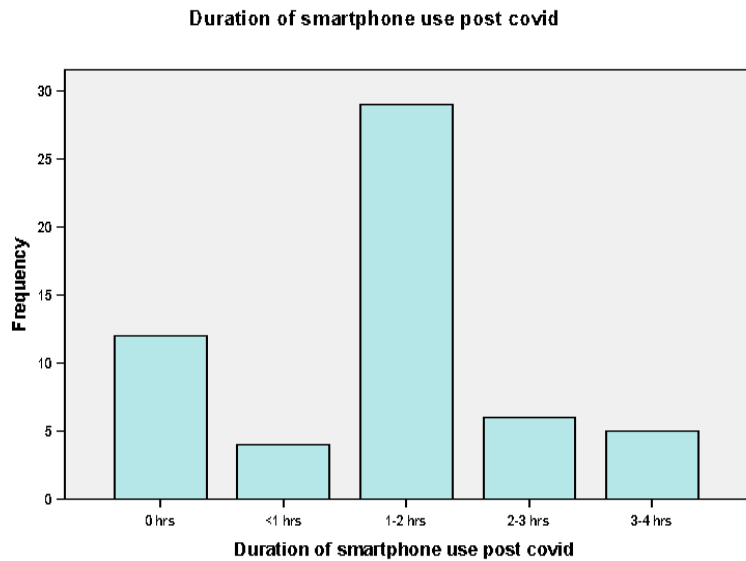
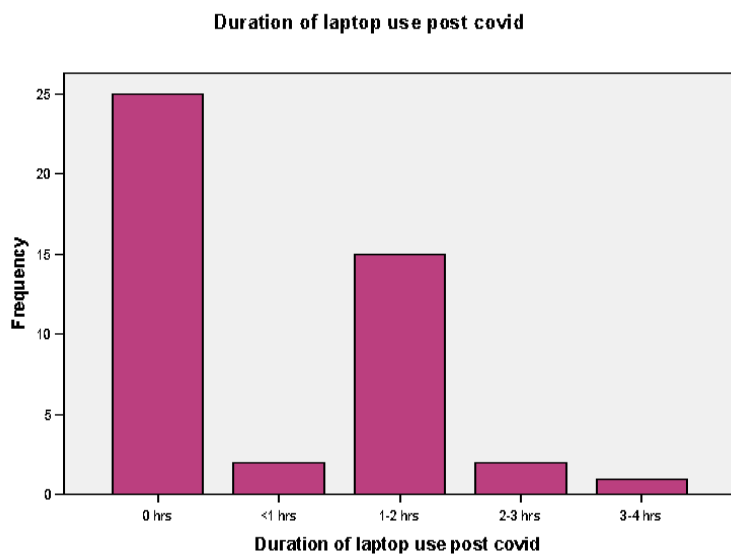
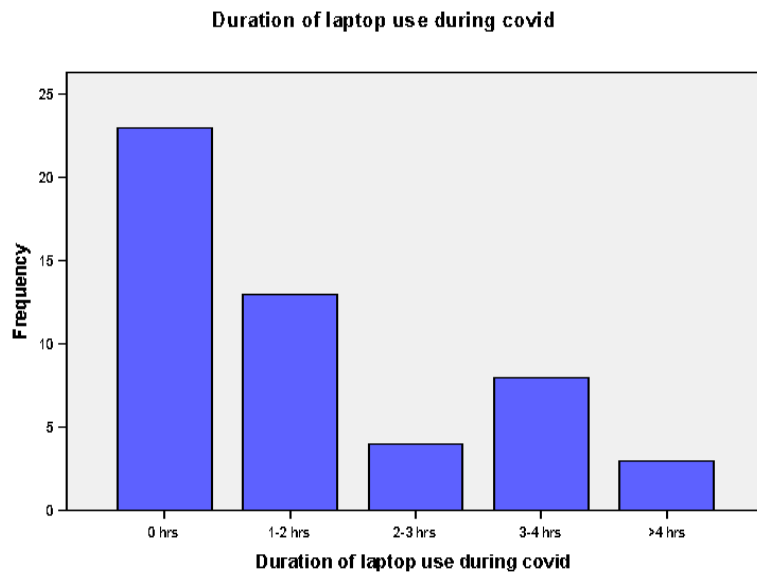


Figure 9: Duration and distance from eye during Smartphone Use

4.9 Frequency of Use and Viewing Distance for Laptop:

Figure 10 is for Laptop viewing. From the frequency of laptop use, it can be inferred that according to 54.9 percent of the parents, during covid their children used laptop regularly while 45.1 percent of parents said their children did not use laptop during lockdown. The highest time for using a laptop is more than 4 hours/day. Post covid the frequency of using laptop reduced to 44.3 percent. Among the children’s 55.6 percent are not using laptops regularly. For the maintained distance (eye to screen) 28.8% parents reported their children viewed laptops from

near viewing distance (less than 1.5 times the diagonal screen size) and 23.7% parents said that their children watched laptops between 1.5 times to 2.5 times the diagonal screen size.



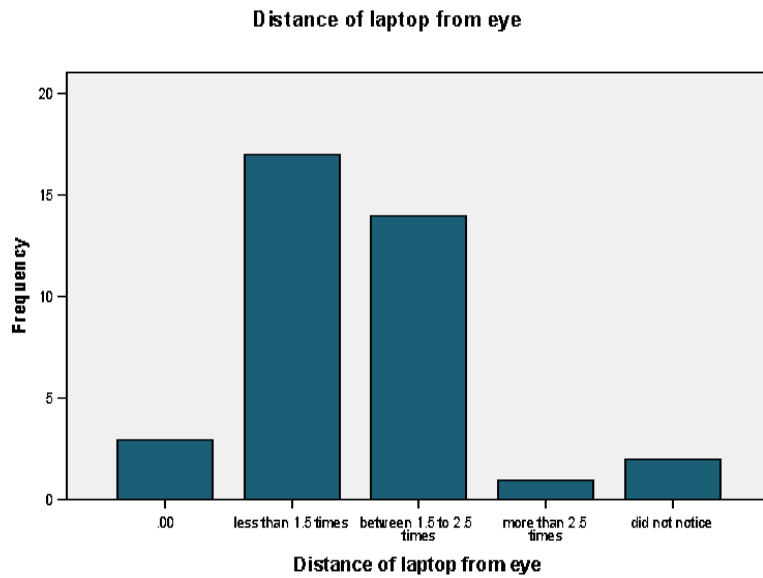


Figure 10: Duration and distance from eye during Laptop Use

4.10 Using spectacle

The respondent asked whether their children used spectacle before and do they need to change their power after lockdown. Approximately 15 (25.4%) children used spectacle and among them 13 had to change their power after lockdown which is statistically significant (p value<0.001). (Figure 11)

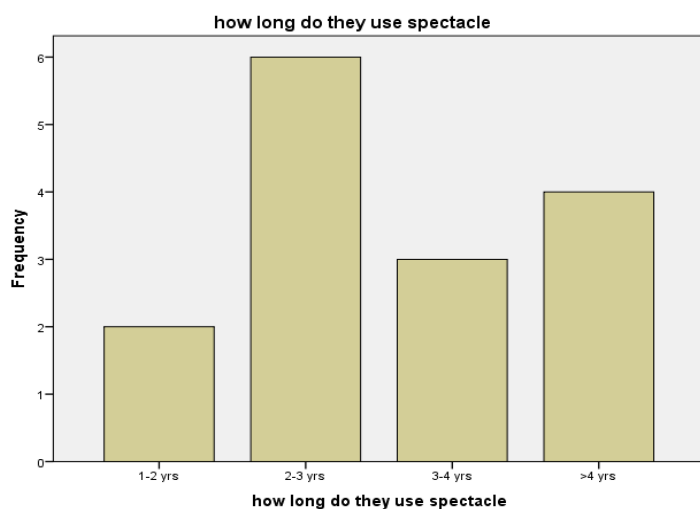
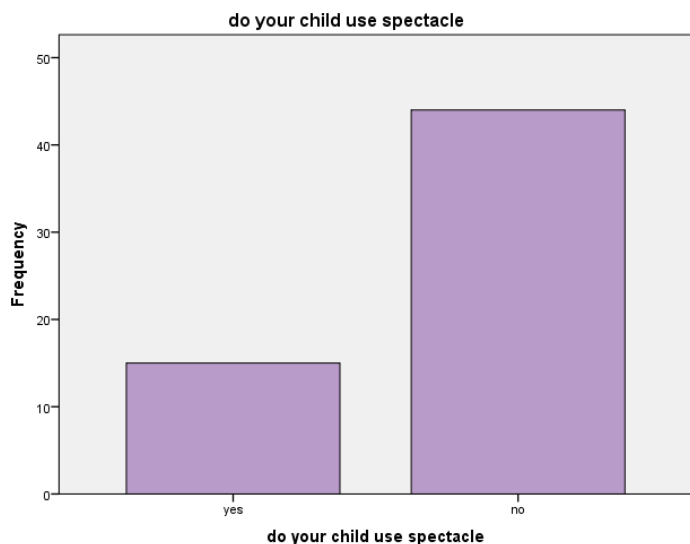


Figure 11: Using Spectacle

Table 8: Use of Spectacle

	Use Spectacle	Spectacle power has changed
Yes	15	13
No	44	2

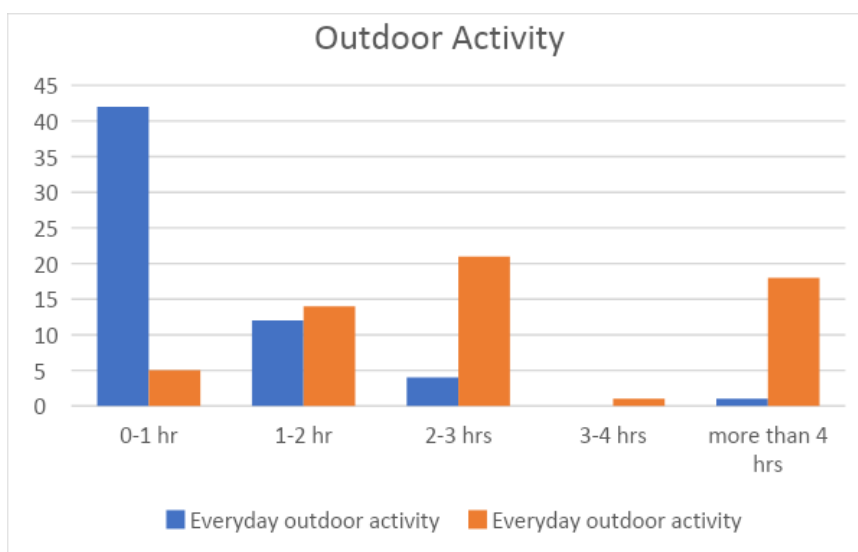
P value <0.001

4.11 Outdoor activity by the Children during and after Lockdown:

Then the respondent asked about the outdoor activity of the children during and after lockdown. According to the parents' 35.6 percent children spent their time outdoors for 2-3 hours post covid whereas the number is only 6.8% during covid (table 9).

Table 9: Outdoor Activity during and post covid

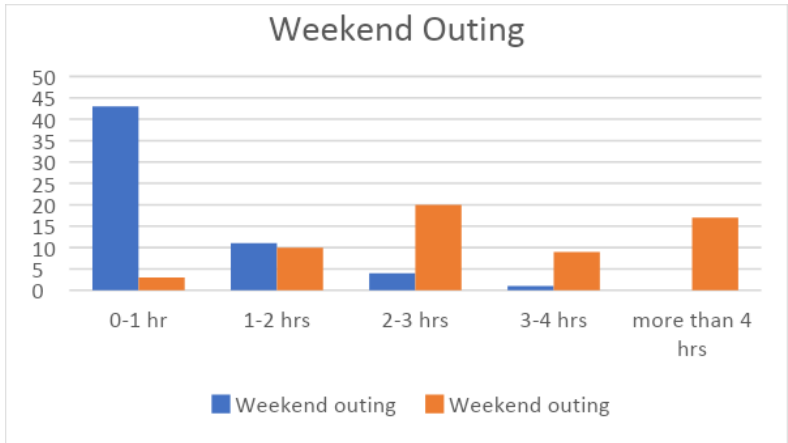
	Everyday outdoor activity	
	During Covid	Post Covid
0-1 hr	42(71.2%)	5(8.5%)
1-2 hr	12(20.3%)	14(23.7%)
2-3 hrs	4(6.8%)	21(35.6%)
3-4 hrs	0(0%)	1(1.7%)
more than 4 hrs	1(1.7%)	18(30.5%)



Weekend activity was also decreased during lockdown. According to the parents approximately 28.6% children played more than 4 hours during weekend post covid whereas the percentage is 0 during lockdown (Table 10).

Table 10: Weekend Activity During and Post Covid

	Weekend outing	
	During Covid	Post Covid
0-1 hr	43(72.9%)	3(5.1%)
1-2 hrs	11(18.6%)	10(16.9%)
2-3 hrs	4(6.8%)	20(33.9%)
3-4 hrs	1(1.75%)	9(15.5%)
more than 4 hrs	0(0%)	17(28.6%)



4.12 Parents perspective regarding impacts on children due to device:

Among all the potential physical health impacts due to excessive device exposure the three important physical impacts that parents observe are Eyesight, obesity and back pain. Approximately 81.80% of parents answered they observed eyesight impact and 58% said obesity is one of the main physical impacts that children are facing due to device addiction. About mental health impact, approximately 63.30% of parents answered they are facing developmental impact and 32.70% of parents said language delay is one of the important impacts of device addiction. The most important impact parents mentioned is mood swing disorder. Approximately 69.20% children developed mood swing disorder due to prolonged device use. It is very imperative to be aware of all the health impacts of prolonged digital screen exposure as parents are the primary actors who play a vital role who can regulate the screen limit measures. Table 11 presents the survey findings regarding physical health impacts and mental health impacts on children.

Table 11: Health Impacts of prolong device use

Impact on Physical Health	
Eyesight	81.80%
Obesity	58%
Back Pain	31.90%
Tiredness	4.40%

did not notice	16.30%
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Impact on mental Health	
Development	63.30%
language delay	32.70%
mood swing	69.20%
stress and depression	47.10%
sleep disorder	69.20%
Others	8.80%
did not notice	13.20%

4.13 Physiological Observation of Children by Parents

The Physiological Observation part was made with observational questions consisting of twelve (12) questions. Table 12 portrayed the result of physiological observations. This helped in measuring the children's usual behaviour in daily life and the consistency of those behaviours. Considering a 66.10% threshold to determine the most usual behaviours which are persistent in children nowadays are the Irritability and anger issue of the children when asked to stop playing on device. Approximately 47.50% of parents observed that their children are facing difficulty in focusing on their work. Then the parents were asked if they observed any change on their children's device using post covid. Approximately 70.9% of parents answered that positive changes were observed by them (Figure 12). As there was limited data available in this study to do a regression study to link these behaviours with the prolonged use, future study on it with sufficient amounts of data can provide a correlation between them.

Table 12: Observation

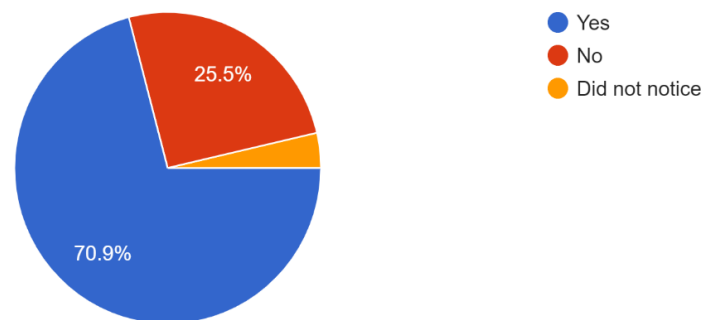
Observation	
1.Does your child have a nervous breakdown?	30.50%
2.Does your child have a sleeping disorder?	28.80%
3.Does your child face developmental disorder?	18.60%
4.Does your child become irritable when asked to stop playing video games?	66.10%

5.Does you notice your child pupil dilated during device use?	20.30%
6.Does your child have a hard time making eye contact?	24.60%
7.Do you ever feel your child is not as happy as he/she should be?	44.10%
8.Does your child have trouble making friends?	25.40%
9.Do you worry that your child interest has narrowed recently?	47.50%
10.Do you feel that his/her thirst for knowledge has been dampened?	39%
11.Do your child develop any physical problem due to screen addiction?	27.10%
12.Do your child seem unmotivated?	40.70%

Figure 12: Post Covid Observation

Did you observe any changes in your children's habit in using devices after they started school?

55 responses



4.1.4 Practice of Precautionary measures

When asked, it seems most of the respondents are interested in taking precautionary measures to limit device usage in order to ensure the good health of their children. After evaluating the existing precautionary measures, it was determined that most of the parents sometimes or always take precautionary measures to limit the screen time. Table 13 shows the most practised measures parents are taking from the sample of 59 respondents. Here, the data shows that 70.40% parents encourage reading books and 44.80% parents setting an example for children in order to limit screen time has a key significance as the children have a tendency to mimic the action of their environments. Then scheduling family activities, restricting children to play video games and encouraging physical activity have an active movement cycle that keeps the children socially aware of their peers as well as reducing the obesity chances which is the main

concern in urban children nowadays. Figure 13 shows if parents are not interested in taking measures, what is the reason behind it? Among them 20% of parents answered that they are not taking measures as their child reacts and 7.3% of parents said they feel exhausted after a long working day.

Table 13: Precautionary measure taken by the parents

Types of Precautionary Measure	Respondents
Play a part as a role model	44.80%
Restrict child playing video game	44.80%
Encourage physical activity	74.10%
Encourage reading books	70.70%
Schedule family activity	51.70%
Disallowing device during meal time	41.40%
Make them justify their use	39.70%

No, I am not interested to limit their screen time because
55 responses

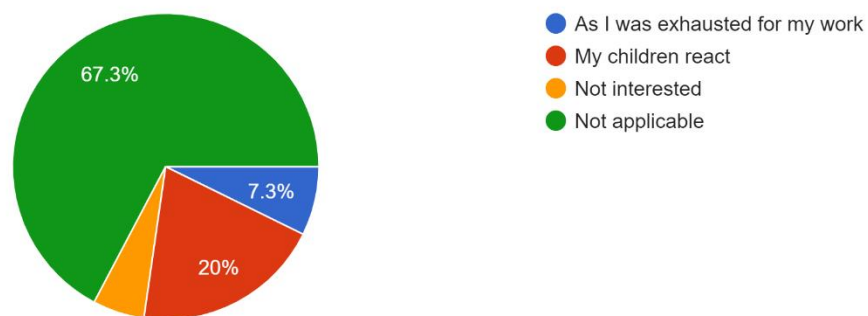


Figure 13: Percentage showing why parents are not interested to take measures

Chapter Five: Summary, Discussion, and Conclusion

The study findings showed significant signs of prolonged device use by the children of Dhaka and Chattagram city during Covid lockdown. This chapter summarises the whole study along with proper guidelines for parents to follow. From existing literature during and before covid, it is clear that the excessive exposure to digital screens causes more harm to the children both physically and mentally. Parents being the only player regulating screen time restrictions must be aware of all the consequences of prolonged screen exposure.

5.1 Summary and Discussion

Several studies on screen exposure of young school going children during Covid lockdown highlighted the enormous health hazards it is creating. So, this study was initiated with the thought of taking specific measures towards the hazards and creating health awareness among the citizens of Bangladesh. It is very difficult to understand all the citizens initially but yet steps should be taken to initiate it. Urban cities like Dhaka and Chattagram with huge burden of population create scarcity of playgrounds. So, children are bound to be restrained in the home. Nowadays with the exponential growth of technology and the easily available cheap electronic devices the children spend a tremendous amount of time with gadgets. This became worse with the national lockdown program by the government during Covid -19 pandemic. From this study we can see that digital device use increased after lockdown.

This might be due to the shift of virtual classes children started spending more time in front of devices. This increased screen time will have grave consequences if proper guidelines are not followed. As there wasn't any significant research done in Bangladesh on this topic, this research began with the aim to find out the existing behaviour pattern, duration of use, distances maintained, health hazards, and precautionary measures taken by parents.

The first vital findings showed that almost all the children had access to the device during lockdown. More than 75 percent of children are using smartphones for entertainment and education purposes during lockdown. This percentage decreased to less than 65 percent post covid. The average duration of smartphone uses which was observed by parents is 2 to 4 hours per day during lockdown. In the case of Smartphones and tablets, kids tend to view it from a very near distance. Outdoor activity by the children was decreased significantly during lockdown. According to the parents whose children were using spectacle, 86 percent of parents

observed power change. More than 80 percent parents said they observed eyesight problems in their children due to overuse of the device and more than 60 percent parents are aware of the consequences of sleep problems and language delay that can be caused due to excessive device use. Playing a role as a role model, encouraging physical activity and reading books, scheduling family time are the most common practices of precautionary measures taken by parents. And more than 70 percent parents believe they sometimes or always observed a reduced screen time post covid. More than 60 parents reported that they sometimes or always argued over screen time limits. Daily behavioural problems by children that are most common and have been observed by parents are sleep deprivation, tiredness, irritability, difficulty in making friends and anger. As study suggests that this behaviour has a positive link with the prolonged use of the device further studies should be performed to find any existence of correlation between these variables.

Therefore, the results indicate that there is a willingness to take measures by the parents. But the inadequacy of their awareness still remains due to lack of knowledge about the prolonged effect. But most of the parents are taking measures that will help better their child's health. The proper guidelines of precautionary measures can help parents to suitable implementations of precautionary measures without facing many difficulties.

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