



# **EFFECT OF SCREEN TIME AMONGST DIFFERENT AGE GROUP OF CHILDREN**

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## **INTRODUCTION**

With the advancement of the digital era, the paper has been replaced by the screen. “The amount of time spent using a device with a screen” is termed as screen-time. The screen might be a computer, smartphone, television, or video game console has been a symbol of modernization. With this modernization, the majority of the population doesn’t care about their health affecting them due to screen time. Easy smartphone accessibility, cheap internet availability, and free content have greatly contributed to the increase in screen time. The emergence of the coronavirus pandemic tends to made work from home and online education a part of life, which has significantly increased screen time give rise to negative consequences on our health. Excessive screen time results in a sedentary lifestyle with little to no physical activity. Artificial light emitting from screens affects our eyes, brain, and sleep.

The International Agency For Research on Cancer of the World Health Organization (2011) said that radio frequency is a possible carcinogen based on heavy usage increases the risk of developing glioma tumors, low-level radiofrequency radiation has also been confirmed as a promoter of tumors in mice.

The study by the scientist from the Karolinska Institute & Uppsala University in Sweden (2017) and from Wayne State University in Michigan concludes that using a cell phone before bed can cause insomnia and radiation from mobile phones delays and reduces sleep, causes headaches and confusion, and also associated with impaired memory & concentration, fatigue & dizziness.

In 2014, 58% of WHO states advised the general population to reduce the radio frequency exposure below heating guidelines which include using hand-free kits and text messages rather than long-time phone call.

This increase in screen time affects our circadian rhythm which results in a negative impact on health in long term. The circadian rhythm also known as “Biological clock” help in regulating every living organism including people, animal, fruit flies, and even bacteria ...which is very necessary and important for proper biological function such as sleep-wake cycle, hormone secretion, blood pressure, and metabolism.

The study of circadian rhythm is known as CHRONOBIOLOGY i.e., the science that deals with the pineal gland and pituitary gland and it is based on the study of biological rhythm and characterized by a rhythmic alteration in levels of chemical component and their homeostasis in the body and adaptation of biological function, these rhythms are exclusively endogenous and they are directly affected by the great adaptability they present from various external sources like heat and sunlight.

Every tissue and organ in the body regulates by biological rhythms, which is a 24-hour cycle that regulate the daily activities such as eating, sleeping, temperature, and gene involve in biological rhythm operate according to feedback loops.

The external exposure to light i.e., either natural sunlight or any artificial indoor light such as mobile, television, or any other light-emitting devices affects the circadian rhythm. The is a master clock in the brain known as superchiasmatic nucleus (SCN) which is comprised of 20000 neurons located in a part of brain called hypothalamus. The retina transmits electrical impulses via optic nerve to SCN which is associated with the light dark cycle.

The adolescents constituting 1.2 billion people worldwide. Nearly 243 million adolescents live in India as per the UNICEF (2011). Some adolescents delay their sleep for using social media and gaming at bedtime which directly affects their circadian rhythm (the internal body clock). This delay in falling asleep causes difficulty in waking up at the desired time leading to adverse an effect on their capacity, concentration & cognitivity. Nowadays children and adolescents are addicted to smartphones and multimedia which may be another major public health problem in future, if it is not prevented by awaring population with the help of the public health worker and government initiation.

The long-time smartphone use especially before bed time leads to delayed sleep-wake phase syndrome which is a disorder when a person's sleep is delayed by their regular sleep time frequently which is mostly found in adolescents.

## **EFFECT OF LIGHT ON SLEEP**

Human beings are diurnal (active during day) and some are nocturnal (active during night). When the human brain and affects the activity of some gene that helps to power up for the day.

Light exposure also reduces the production of melatonin i.e., the hormone that helps in falling asleep. As the day progresses and sunlight diminishes in the afternoon, melatonin production turns back on and it is peak at night after the sunset to help in falling asleep.

But this process is majorly affected due to indoor light exposure such as light from smartphones, tablets computer screens, and television can interfere with melatonin production and disrupt the sleep cycle.

The psychological or behavioral dependence on the smartphone is directly associated with the overuse of digital media such as social media addiction on the internet and gaming addiction.

The increased use and overdependence on smartphone leads to adverse effects on relationships, mental or physical health and encourage anxiety level broke emotional bonding with family and closed ones, and ignore the face to face interaction which help people to prevent from the excessive stress, anxiety, and depression level by sharing their problems and reason of their stress with their family.

Preschooler children and young adults are at the highest risk for the overuse of smartphones. The use of smartphone significantly increased since the late 2000s. In 2019 WHO conducts that the global smartphone users penetrated 41.5% of the total population. Due to prolific technological advances, smartphone overuse continued to be a major threat in Asian countries such as China, with around 700 million users are registered in 2018. Digital media overuse is tangentially linked to ocular problems, especially in young age.

It has been estimated that 49.8% (4.8 billion) of the global population with digital media overuse would be affected with myopia (near eye-sightedness and short-sightedness) is an eye disorder where light focuses in front of instead of on the retina by 2050

The prevalence among British adolescents aged 11-14 was 10%, while in India addiction is stated at 39-44% for the same age group. The prevalence of related problems of internet addiction was 4.9-10.7% in Korea and is now regarded as a serious public health issue.

The study by media regulator ofcom (2019) has shown that 50% of 10 year olds in the UK owned a smartphone. These children who grow with gadgets in their hands are more prone to mobile phone addiction, since their online & offline world merge into a single whole.

## EFFECT OF OVERUSE OF MOBILE

1. **SOCIAL:** - Now the days many of the people replacing face-to-face conversations with the cyber ones. clinical psychologist Lisa Merlo says some patients pretend to talk & spend more time in social media rather than one-to-one interaction with others.

- Furthermore, check their phone in the morning within an hour of getting up.
- 56% people check their phone before sleep.
- 48% check their phones before over the weekend.
- 51% use phone constantly during vacation.
- 44% reported that they feel very irritating & anxious without their phone.

The over-dependence on smartphone affect social interaction amongst teenagers & also makes the youth less likely to talk to adults.

2. **HEALTH:** - Overuse of smartphone associated with headaches, impaired memory & concentration, fatigue, dizziness & disrupted sleep. There are also some evidences that some people may develop electrosensitivity from excessive exposure to electromagnetic fields, although may be a psychological symptom due to nocebo effects. The study by scientists from the Karolinska Institute & Uppsala University (2014-2017) in Sweden and from Wayne state university in Michigan fonded that using a cell phone before bed can cause insomnia.

3. **PSYCHOLOGICAL :-** There is large amount of research on mobile phone use and its positive and negative influence on the human's psychological mind, mental health and social communications. It can start with social disorder, which may lead to stress depression, sleep disturbance and ultimately affect life style habits such as sleep right and eat right.

According to research done by professor of psychology at San Diego State University Jean M. Twenge (2010) stated that there is correlation between mobile phone overuse and depression , also seen a suicidal tendency among adolescents and said that "the more time teens spend looking at screen, the more likely they are to report symptoms of depression because they

spend so much time on these devices that they forgot actual human interaction which is seen as essential to mental health.

While the children used to spend their free time in outdoor games with others but with the advancement of technology, this free time is seemingly now being spent more on mobile devices.

**4. DISTRACTED DRIVING:-** Mobile phone overuse can directly associated with the distracted driving and it is specially dangerous in certain situation i.e., texting/browsing, talking, video calling while driving. Over 8 people are killed & 1161 are injured daily because of overuse of phone while driving. At any given daylight moment across U.S approximately 660000 drivers are using cell phones while driving. Teen drivers are especially at risk, About 1.2 million and 341000 crashes in 2013 involved texting and talking respectively by the distraction such as music, games, GPS, social media etc. Teens who spent more time frequently on phone were less likely to wear seat belt and like to drive inappropriately cell phone use can reduce brain activity as much as 37%, affecting their ability to control vehicle & pay attention to the road way .

**5. INCREASING LONELINESS & DEPRESSION:-** It may seem that overuse of smartphone will temporarily make feelings such as loneliness, depression & high anxiety level. A 2014 study found a correlation between high social media usage & depression, anxiety. Users especially teens tend to compare themselves unfavorably with their peers on social media, promoting feelings of loneliness & depression.

**6. FUELING ANXIETY:-** The heavier a person's phone use, the greater anxiety they experienced. It is observed that the more presence of a phone in a work place tends to make people more anxious & perform poorly on given tasks.

**7. EXACERBATING ATTENTION DEFICIT DISORDERS:-** The constant flashing of messages & information from a smartphone can overwhelm the brain and make the person impossible to focuses on one thing and make difficult to achieve set goal on time. The constantly buzz or beep of smartphone can distract from the task, slowing the work and diminishing the ability to concentration and think creatively.

**8. DISTURBING SLEEP & ENCOURAGING SELF-ABSORPTION:-** excessive smartphone use can disrupt the sleep which can associated with serious mental health problem, memory deficit, ability to think & concentration, reducing the cognitive & learning skills and also shows that who spend more time on social media are more likely tend to display negative personality by posting all thought related to their life & influence their personality by

negativity of social media , create an unhealthy self-centeredness & distancing from real life relationship.

## CAUSES OF OVERUSE OF SMARTPHONE

- **VIRTUAL RELATIONSHIP:-** Addiction to social networking, messaging dating apps, texting & gaming increases virtual relationships trends rather than real life relationships. Compulsive use of smartphone can detach the person from the real-life experiences and cause to neglect other aspect of life.
- **CYBER SEX ADDICTION:-** Compulsive use of internet pornography, nude-swapping or adult messaging services can affect negatively mainly the adolescents life & the internet make these activities more accessible and very convenient.
- **ONLINE COMPULSIONS:-** Such as gaming, gambling, stock trading, online shopping, auction sites. These are the apps under which most of the population like to spent their time constantly. The compulsive stock trading or online shopping & binding to the auction site may lead to financial and social damage of the money & time. On the other hand , during & after covid-19 period , the gaming app is more prevalent specially in children and adolescents which affect the health and behavior of them very badly. Most of the student like to spend their time on gaming app and social media instead of doing study or any other physical activity which help to maintain their health & concentration positively.

The overuse of smartphone or any light emitting device specially at night can disturb the sleep cycle and cause DSPS (delayed sleep phase syndrome) or DSWPD ( delayed sleep wake phase disorder) i.e., it is a type of circadian rhythm sleep disorder where the patient can't fall asleep at a regular bedtime. It can develop at any age , but it mostly affects teenagers & younger adults because of spending most of the time in gaming, texting, video calling, vlogging and trading etc.

## SIGNS OF DELAYED SLEEP PHASE SYNDROME

### DIFFICULTY IN FALLING ASLEEP:-

- Harder to sleep at regular bed time.
- Person feel restlessness activity, may be wanted to sleep but unable to sleep properly at regular time.

- Typically, would not be able to sleep until several hours after midnight , between 2;00am to 6;00am.

### **DIFFICULTY IN WAKING UP:-**

- Because of sleep in late night , it make harder to getup at normal time .
- People may sleep upto late morning or afternoon.
- Person may feel heaviness on eyes, headache, laziness if the patient should have to wake up early before the completion of his sleep cycle.

### **EXCESSIVE DAYTIME SLEEPINESS:-**

- Daytime sleepiness occurs when the person can't sleep at regular time but have to wake up early and can't get adequate amount of sleep.
- During day , there is less attention & concentration occurs, which also leads to an underconfident personality.

### **DEPRESSION & BEHAVIOUR PROBLEMS:-**

- If the person can't get enough sleep may lead to develop depression due to stress, lesser concentration than normal level.
- It also effect social and behavioral health of the patient , person may feel high level anxiety , irritating & aggressive nature.

## **CAUSES OF DSPTS**

Cause of delay in biological clock which is further associated with DSPTS, while the exact cause of DSPTS not known properly but associated with several factors such as.,

**GENETICS:-** if the person have close relative suffering from DSPTS, there is 40% chance of people have suffer from DSPTS in future.

**CHANGES AFTER PUBERTY:-** During adolescence, the sleep cycle become longer which leads to later sleep and wake time. The reason include , may be they spend their most of the time in social networking site mainly at night before bed time which directly affect their sleep cycle.

**PSYCHOLOGICAL & NEUROLOGICAL DISORDER:-** DSPTS leads to the condition like

- Depression
- Anxiety
- Attention deficit hyperactivity disorder
- Obsessive compulsive disorder

**CHRONIC INSOMNIA:-** Chronic insomnia is a condition of long-term pattern of sleeping difficulty. Insomnia is considered as chronic if the person has feel trouble in falling asleep or staying asleep at least three nights per weak for three months or longer. DSPTS affects approx 10% of people with chronic insomnia.

**POOR SLEEPING HABBITS:-** DSPTS symptoms create worse condition, if the patient should not get enough light exposure in the morning. It also affected, when the patient expose to too much light at night by the overuse of smartphone, television or any other light emitting device.

## **DIAGNOSIS**

Because many people with DSPTS face themselves difficult to follow their routine sleep wake time. So, the person constantly fatigued, weak, unactive which may be associated with depression in future. It is primarily for the purpose of rulling out other disorder such as narcolepsy or sleep apnea.

This might be determine by the following:-

### **GATHERING MEDICAL HISTORY-**

- Take clinical interview from the patient by the doctor
- Understand the family history & symptoms of the patient.

### **REQUEST TO MAINTAIN SLEEP DAIRY-**

- Doctor might have told to person to right down sleep & wake time each day.
- In which the patient should note down the log of daily sleep and wake to help in showing sleep pattern.

## **ACTIGRAPHY-**

- In this the should wear a wrist device to track the sleep wake pattern.

## **POLYSOMNOGRAPHY-**

- If the doctor thinks that the patient have a different sleep disorder, they might request an overnight sleep test called polysomnogram.
- As the person sleep, the test will monitor the brain waves & heart rate so the doctor examine the body response during sleep.

## **TREATMENT**

The purpose of the treatment is to normalize the sleep schedule by adjusting your body clock. This include:-

### **ADVANCING THE INTERNAL CLOCK:-**

Each night the person should go to bed about 15 minutes earlier & also wake up a bit earlier each day.

### **DELAYING THE INTERNAL CLOCK:-**

This method involves the delaying of bed time 1 to 2.5 hours every six days & also known as CHRONOTHERAPY and this therapy is repeated until the person should not get normal sleep schedule.

### **BRIGHT LIGHT THERAPY:-**

After waking up the patient should sit near a light box for 30 minutes. The morning light exposure can help sleep sooner by advancing the internal clock.

### **MELATONIN SUPPLEMENTS:-**

Doctors may prescribe the patient to take melatonin i.e., a hormone that regulate the sleep wake cycle.

## IMPROVING SLEEP HYGINE:-

Good sleep habits include to follow regular sleep schedule & avoid electronic device before bedtime. Person should avoid these things before going to sleep like..,

- Caffeine
- Alcohol
- Tobacco
- Vigorous exercise

# SUGGESTIONS

## PREVENTION

### GOOD SLEEP HABBITS:-

- Children and adolescents with DSPS have to develop and maintain good sleep habits & a consistent sleep schedule by regulating their daily activities with strict time schedule. These habits include-
- Going to bed & waking up at same time including weekends and vacation.
- Avoid caffeinated products such as coffee, tea, colas, non-colas pops, energy drinks , chocolates & some medication.
- Avoid other stimulant and product that can disturb the sleep i.e., alcohol, sleeping pills, nicotine.
- Maintain cool, quiet, comfortable, pleasant environment in bedroom.
- Avoid blue light radiating equipment before bed time.

### STAYING MOTIVATED TO STICK WITH THE SCHEDULE:-

- It is important to stick with the routine schedule & not to loose sight of the goals during holidays and weekends.
- Regulate their schedule only for sometime can not cure the tendency toward a DSPS , so it is important to keep the schedule to entire life help to control the internal clock & reduce the complication cause by the disruption of sleep.
- The child and adolescents must stay motivated & stick with going to bed at the desired bed time on a nightly basis to regulate & control their internal clock perfectly.

## IN 2019 WHO ISSUED RECOMMENDATION ABOUT ACTIVE LIFE STYLE, SLEEP AND SCREEN TIME FOR CHILDREN AT AGE 0-5 YEAR.

These recommendations are:-

AGE	PHYSICAL ACTIVITY	SCREEN TIME	SLEEP DURATION
<1 year	30 minute	0 hr	14-17 hr
1 year	180 minute	0 hr	11-14 hr
2 year	180 minute	1 hr	11-14 hr
3-5 year	180 minute	1 hr	10-13 hr

### PHONE SETTING:-

- Turning phone screen to grayscale mode, may help to reduce time spent on screen by making it boring to look at.
- Turning phone on mobile data/WI-FI off, set it on airplane mode possible, putting the phone far away from bed to reduce the chance of easily accessible/reachable tendency at night time.

### PHONE APPS:-

- German psychotherapist and online addiction expert Bert Te Wildt recommendation that using such apps which control the screen time by setting by an individual to reduce the overuse may result in better performance & reduce the complication.
- Such as iOS 12 Apple added a function called “screen time” that allows users to see how much time they spent on the phone.
- In Android a similar function called “digital wellbeing” has been implemented to keep track of cellphone usage.
- These apps increase awareness about the screen time used by person and help them to control the addiction of smartphone for better health & future outcome.

## REVIEW OF LITERATURE

### SOCIAL

- The smartphone overuse, smartphone addiction or cell phone dependency has been proposed as a subset of forms of “digital addiction” or “digital dependence” reflects increasing trends of overdependence on technological device. Forms of technological addiction have been considered as diagnoses since the mid 1990s. Panova and Carbonell (2018) published a review that specifically encouraged terminology of problematic use in regard to technology behavior, rather than continuing research based on other behavioral addictions.
- Dije Ayar et al (2017) The average age of the participants was  $12.3 \pm 0.9$  years. Of them, 52.3% were male, and 42.8% were 10th graders. All participants had smartphones, and 89.4% of them connected to the Internet continuously with their smartphones. The study found that there was a statistically significant correlation between Internet addiction and smartphone addiction.

### HEALTH

- The use of smartphones significantly increased since the late 2000s. In 2019 conducts, global smartphone users penetrated in 41.5% of total population. Due to prolific technological advances, smartphone overuse continued to be a major threat in Asian countries such as China, with around 700 million users are registered in 2018. Digital media overuse tangentially linked to ocular problems, especially at young age. It has been estimated that 49.8% (4.8 billion) of global population with digital media overuse would be affected with myopia by 2050.
- Sanjeev davey (2014) study based on smartphone addiction in which 1304 participants were enrolled. The smartphone addiction magnitude in India ranged from 39% to 44% as per fixed effects ( $P < 0.0001$ ). Smartphone addiction among Indian teens can not only damage interpersonal skills, but also it can lead to a significant negative health risk & harmful psychological effects on Indian adolescents.

### PSYCHOLOGICAL

- A survey conducted by Hejab M. Al Fawareh and Shaidah Jusoh also found that people also often feel incomplete without their smartphones. Of the 66 respondents, 61.41% strongly agreed or agreed with the statement, “I feel incomplete when my smartphone is not with me.

- Digital media addictive behavior has focused mostly on Internet use and video games, yet the growing use of applications and texting (mostly used on mobile devices) may also lead to addictive behavior (Love et al., 2015). While males appear to demonstrate video game addiction, the addictive behavior of females is found to be focused primarily on social networking (Andreassen et al., 2016).

## **DISTRACTED DRIVING**

- WHO (2014), 58% states advised the general population to reduce radio frequency exposure below heating guidelines. The most common advice is to use hands-free kits (69%), to reduce call time (44%), use text messaging (36%), avoid calling with low signals (24%) or use phones with low specific absorption rate (SAR) (22%).

- The Insurance Institute of Highway Safety (IIHS) reported those who used cell phones more often tended to brake harder, drive faster, and change lanes more frequently, predisposing them to crashes and near-crashes. They are also two to six times more likely to get into an accident. Research indicates driver performance is adversely affected by concurrent cell phone use, delaying reaction time and increasing lane deviations and length of time with eyes off the road. It can also cause "inattention blindness," in which drivers see but do not register what is in front of them.

- Taiwan (2015) banned toddlers under the age of two from using mobile phones or any similar electronic devices, and France banned Wi-Fi from toddlers' nurseries.

## **INCREASE LONLINESS & DEPRESSION**

- A nationally representative study of American 12th graders funded by the *National Institute on Drug Abuse* titled *Monitoring the Future Survey* found that “teens who spent more time than average on screen activities are more likely to be unhappy, and those who spend more time than average on non-screen activities are more likely to be happy.” One of the most important findings of this study is how the amount of time spent on non screen activities versus on screen activities affects the happiness levels of teenagers.

- Sonu H. Subba et al (2013) A cross sectional study conclude that among the total number of students 335 , (51%) 220 of them talked to parents on phone, (48%) 150 talked for less than half hour in a day & (41%) 137 were high volume message users. Ringxiety was experienced

by (34.5%) 116 of the student & they were more likely to use phone in restricted area like classroom 99% & libraries (60.3%).

## **DISTURBING SLEEP AND CONCENTRATION**

- Surabhi P. Dharmadhikari, (2019) stated that among the total 1000 medical student, possessed their own mobile with about 76.4% student having smartphone using for communication, co-ordination of activities, downloading game, music & videos. Nighttime usage of mobile was highly significant ( $p < 0.0001$ ) associated with the difficulty in waking up, waking time tiredness, decline in study habits, difficulty in concentration, increase in mixed classes.
- Tanu Kulkarni (2019) The survey revealed that among those who used their mobile phones before going to bed, 72.4% had poor sleep quality. The survey also found that among the users who slept with their mobile phone by their bedside, 70% of men and 54% of women reported poor quality of sleep. Among those who do not keep their mobile phones beside them, only 8.89-12.38 % reported poor sleep.
- Matthew Christensen from the University of California, San Francisco in the US and colleagues (2016) sought to test the hypothesis that increased screen-time may be associated with poor sleep by analysing data from 653 adult individuals across the US participating in the study. The researchers found that each participant totaled an average of 38.4 hours over this period, with smartphones being activated on average for 3.7 minutes in each hour.
- Jocelyne Matar Boumosleh et al (2017) study claims that 688 undergraduate student mean age  $20.64 \pm 1.88$  years, 53% men results that 35.9% felt tired during daytime due to late night smartphone use, 38.1% acknowledged decreased sleep quality & 35.8 % sleep less than 4 hours due to smartphone use more than once.
- Surobhi Chatterjee et al (2021) This cross-sectional study was conducted on 224 medical students of a tertiary care teaching hospital in North India, The prevalence of smartphone addiction is was found out to be 33.33% in females and 46.15% in males. In the study, 63.39% were poor sleepers as assessed by their PQSI scores, and 62.05% reported poor health status as per their GHQ scores.

# OBJECTIVE OF THE STUDY

- To study the effect of smartphones among different age group.
- To study the various factors responsible for affecting sleep quality by smartphone use
- To study the concentration ability in children.
- To know about the knowledge level among parents about smartphone addiction in Urban CHC, N.K Road, Hazratganj, Lucknow.

## RESEARCH METHODOLOGY

### Research Design:

After conducting a preliminary study on the mentioned research topic descriptive research was adopted to collect data. The research followed simple random sampling as every respondent had an equal chance of delivering his/her responses. The study tool is a self-designed questionnaire, which was structured to obtain information relating to the effect of smartphone addiction on sleep and their study concentration & the influencing factors such as sleep & wake time, light-emitting device usage, activity without mobile, weight, mental status, etc. The majority of respondents belong to the age group 10-19 (adolescents) with 78%. On analysing the survey results, certain inferences were reached & conclusions were drawn.

### Primary source includes: -

- Discussion with children, parents.
- Data collected from questionnaire.
- **Location/Study Area:** CHC. N K road Hazratganj, Lucknow
- **Study Area:** C HC. N K road Hazratganj Dist. Lucknow.
- **Samples:** 73 children participated in this study
- **Inclusion criteria:** the study subjects are age of 2 years to 18 years' age children.
- **Exclusion criteria:** exclude the children & adolescents suffering from Autism, blindness, cerebral palsy, deafness, down syndrome, developmental delay, or mentally retarded, as these conditions might affect their day-to-day functioning.
- **Study period:** 1 month
- **Data Analysis:** frequency distribution, chart formation with the help of Microsoft excel.

# DATA ANALYSIS & INTERPRETATION

Age Group base responses:-

AGE	FREQUENCY	PERCENTAGE
02-10	15	20%
10-13	15	20%
13-16	31	44%
16-19	11	16%

Table 1: classification of respondents based on age

The respondents were asked to indicate their age group; all age ranges in the result as shown in table 1. It consists of 20% between 2-10, 20% between 10-13 (early adolescents), 44 % between 13-16 (middle adolescents), 16% between 16-19 (late adolescents).

Gender base responses: -

GENDER	FREQUENCY	PERCENTAGE
Male	38	52.7%
Female	34	46.5%

Table 2: classification of respondents based on gender.

The respondents are separated on their gender bases , all results are shown in table 2. It consist of 52.7 % as male & 46.5% as female.

### How many hours do you estimate to spend a day in front of screen?

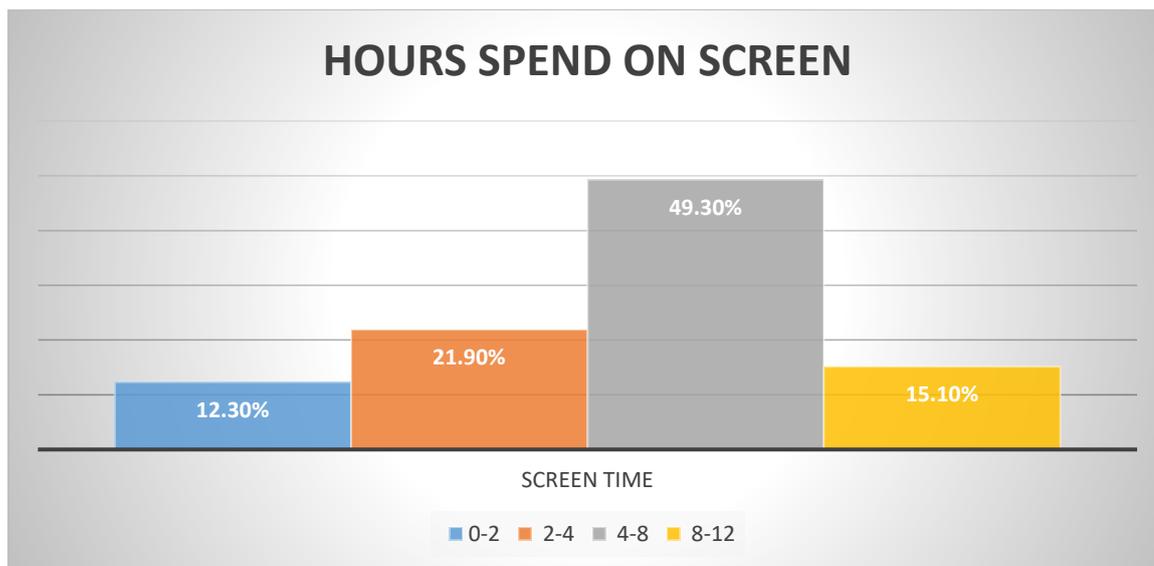


Figure 1: Distribution of hours spent in front of screen/day on different devices

In the case of duration of screen time, the given option varied from >1 hrs to 8-10 hrs. out of 73 respondent , 9 responses 12.3% correspond to less than 1 our , 16 responses 21.9% correspond to 2-4 hr, 36 responses 49.3% correspond to 4-8 hr & 11 responses 15.1% correspond to 4-8 hrs. the majority of responses spent between 4-8 hrs/day looking at screen, which is significant part of the day.

### Which device do you spend most of your screen time?

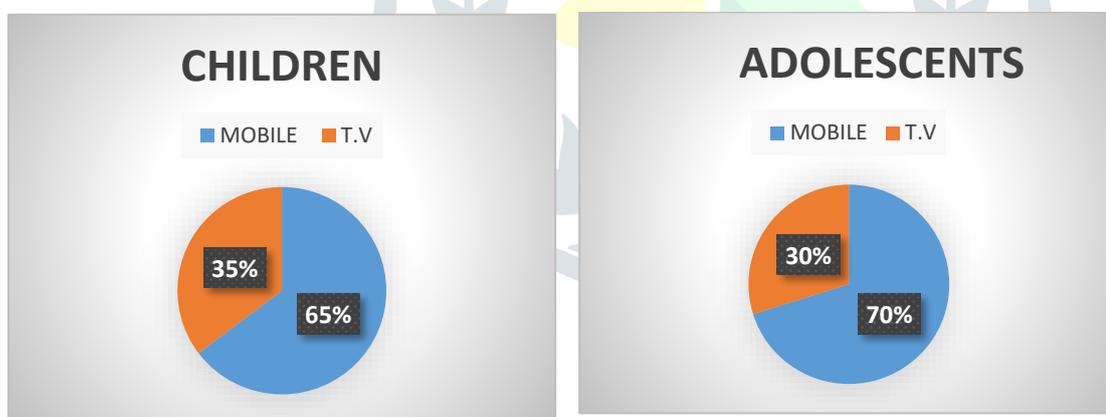


Figure 2: Percentage distribution of favourite screen device to spend time among children and adolescents.

In this case both children and adolescents spend their most of the time on mobile screen with 65 % among childrens with an mean average of 3.3 and 70% among adolescents with 4.0 mean average time. On the other hand 35% with mean time 1.8 & 30% with mean time 1.7 among children and adolescents respectively.

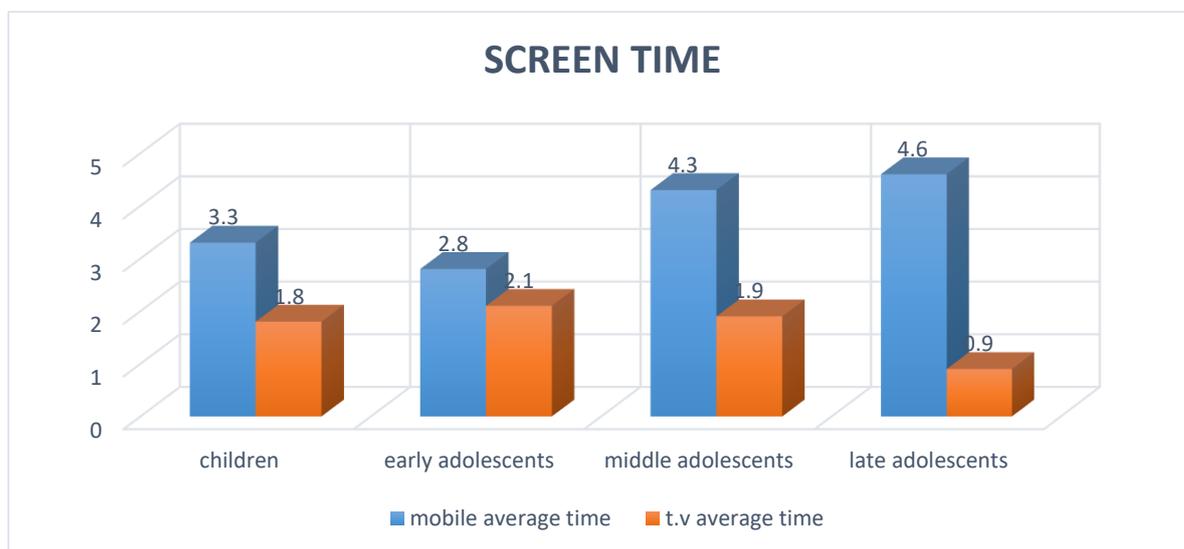


Figure 3: Average distribution of screen time on the basis of age group.

This result shows that late adolescents with age group of (16-19) year spend their most of the time with 4.6 mean average time on mobile screen & 0.9 of mean with television screen, middle adolescents (13-16) year spend their time mobile screen with 4.3 & 1.9 on t.v screen, the early adolescents like to spend their time on mobile screen with 2.8 & 2.1 on television screen which show approx. similar distribution of screen time, but the children like to spend their most of the time on mobile with 3.3 mean average time & 1.8 mean time on television.

So this result estimated that there is majority of respondent like to spend their time on mobile screen irrespective of age group in the form of social media or game addiction.

**How much of sleep affected due to increase screen time?**

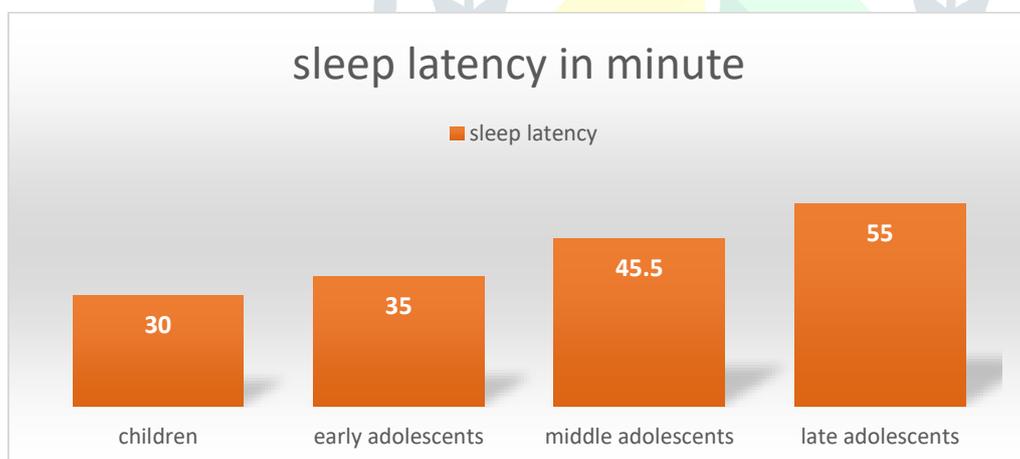


Figure 4: Distribution of sleep latency in minute among all age group

In this figure it is estimated that the late adolescents(16-19) year age group show highest sleep latency with 55 minutes, middle adolescents show 45.5 minute of sleep latency, early adolescents with 35 minute of sleep latency and children with 30 minute of sleep latency.

If we associate the data of screen time and sleep latency then we easily estimate that late adolescents have higher mean average of screen time with 4.8 hr and also have highest sleep latency with 55 minutes, this correlation shows that higher screen time is directly affect the sleep latency of the individual.

### What is the majority of your screen time spent on?

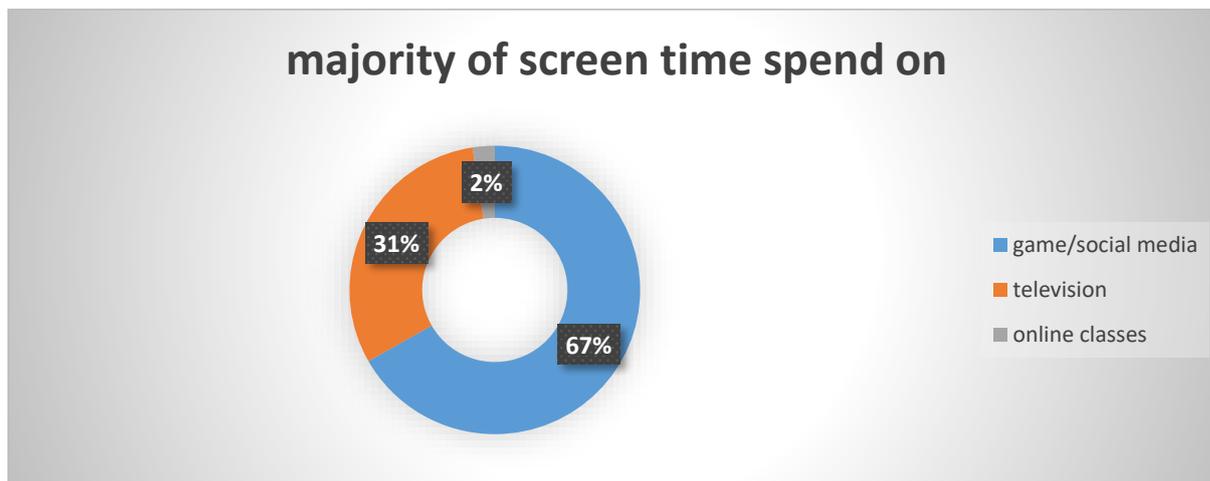


Figure 5: Percentage distribution of majority of screen time spent on

In this figure is estimated that all age group like to spend their time on mobile devices with 67% of respondent and 31% respondent correspond to television and only 2% of respondent spend their time on online classes. The majority of screen time spent on mobile screen in form of gaming, social media, movies, entertainment programme etc.

### How activity affect the weight status of the individual?

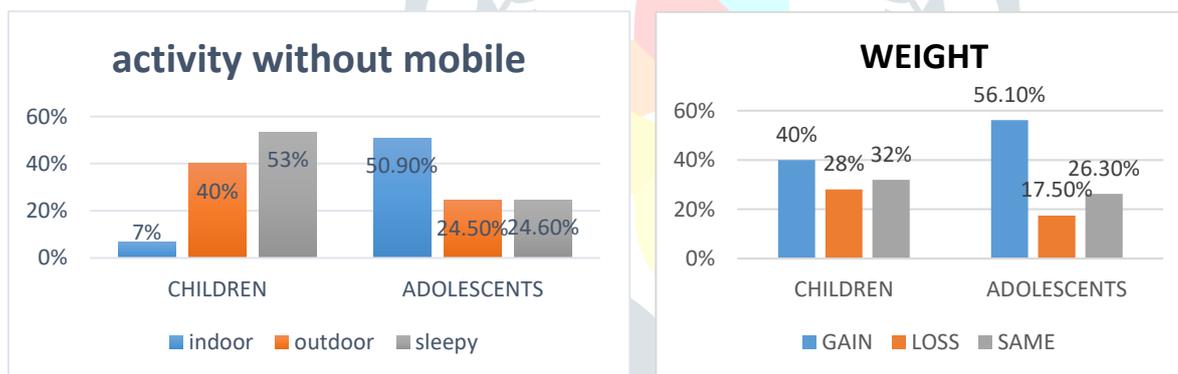


Figure 6: Percentage distribution & association between activity & weight among children and adolescents.

This result shows that approx 53% of children are in sleepy mode without mobile, while on the other hand adolescents like to spend their time in indoor activity with 50% & this activity might affect their weight status by which the both age group gain their weight with 40% & 56.1% due to less interest in any physical activity and irregular & high fatty diet during COVID period.

### How much the screen time affect behavior of children and adolescents?

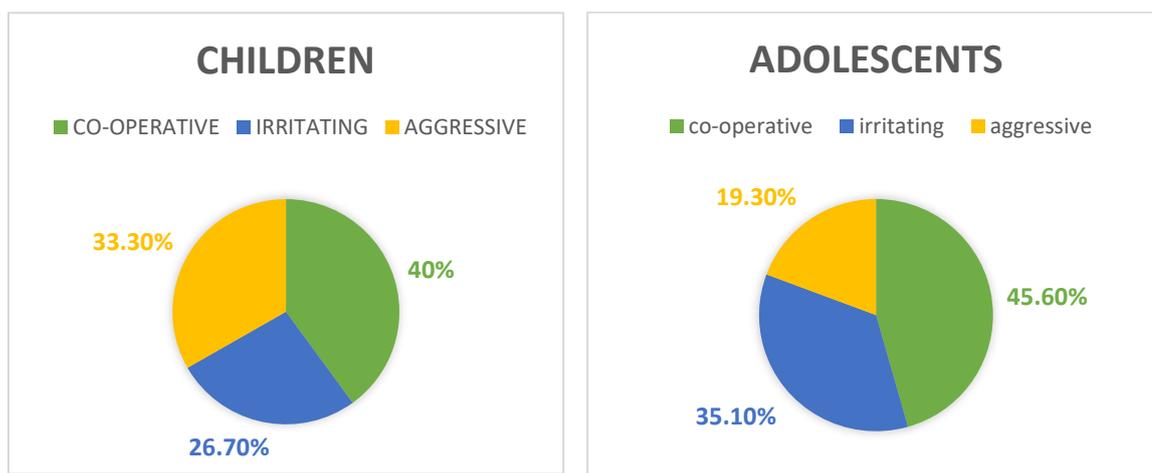


Figure 7: Percentage distribution of behavior among children & Adolescents.

In this data the quality of behavior separated in 3 categories in which who have normal behavior without any device (mobile, television etc) termed as co-operative behavior, who have irritating behavior such as crying for electronic gadget, refuse to play, study or quality time with parents and who have aggressive behavior such as argue with parents, fight with siblings, refuse to eat until gadget not given & does not involve any activity.

This data estimates that though both age group shows co-operative behavior in majority but also show the significant percentage of aggressive behavior in children with 33.3% and irritating behavior of adolescents with 35%.

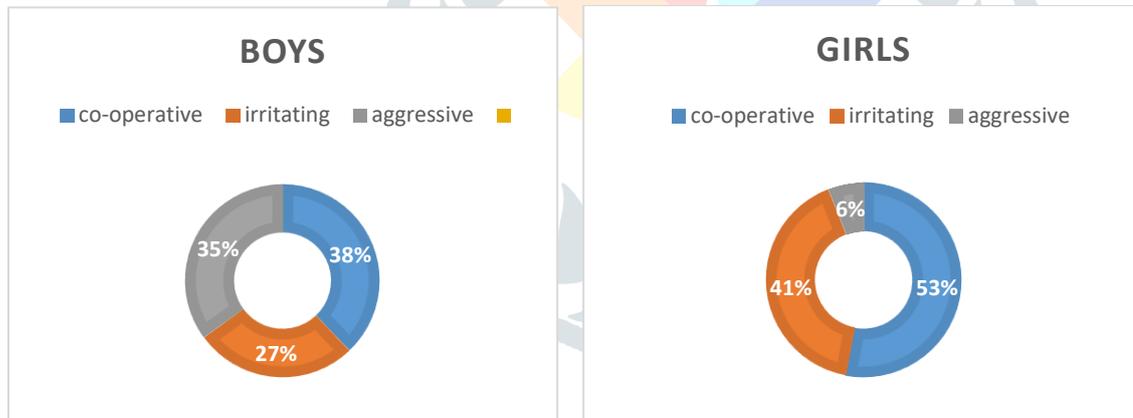


Figure 8: Percentage distribution of behavior change due to screen time on gender basis.

In this figure it is estimated that boys have 38% of co-operative behavior and 35% boys aggressive in nature and 27% of them are irritating on the other hand more than half of the female respondent with 53% have co-operative behavior and 41% of them are irritated without electronic gadget and onle 6% of girls are aggressive in nature.

**How does the screen time affects the concentration on study?**

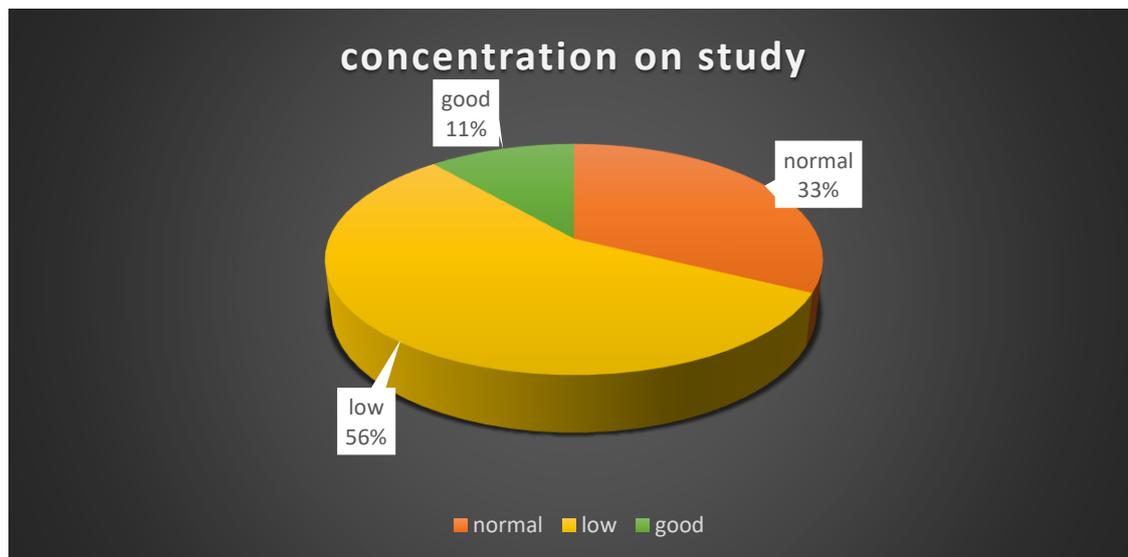


Figure 9: Percentage distribution on concentration on study among respondents.

In this data the quality of concentration separated in 3 categories such as low, normal & good. This data shows that more than half of the respondents have low concentration n study with 56% , 33% of them have normal concentration and 11% have good concentration.

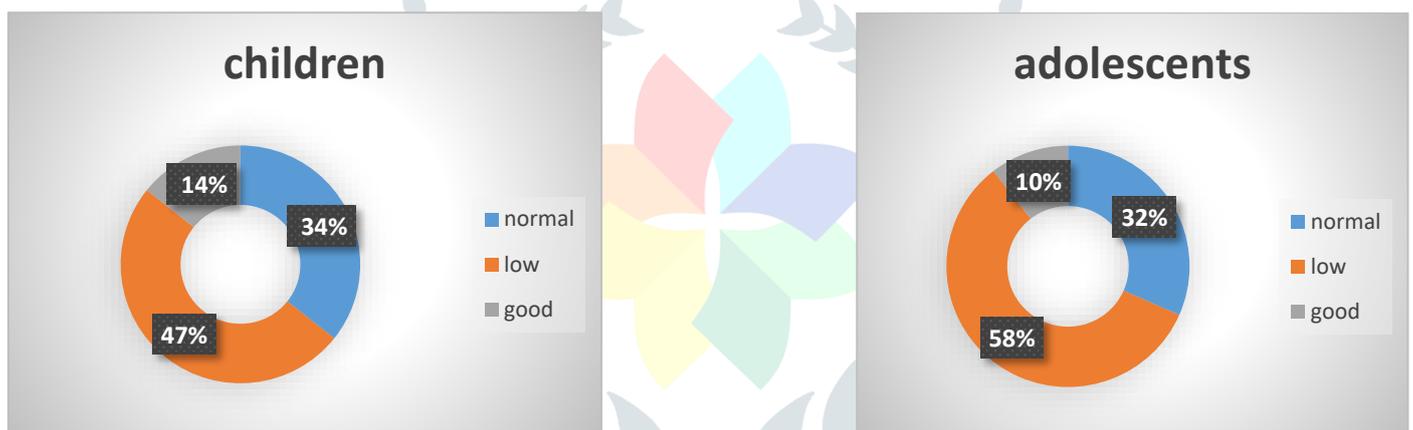


Figure 10: Percentage distribution of screen time effect on concentration among children and adolescents.

This figure shows that both of the age group have low concentration in majority with 47% in children and 58% in adolescents. 34% of children and 32% of adolescents have normal concentration and only 14% of children and 10% of adolescents have good concentration on study may be because of caregivers awareness about the screens hazard effect on the health.

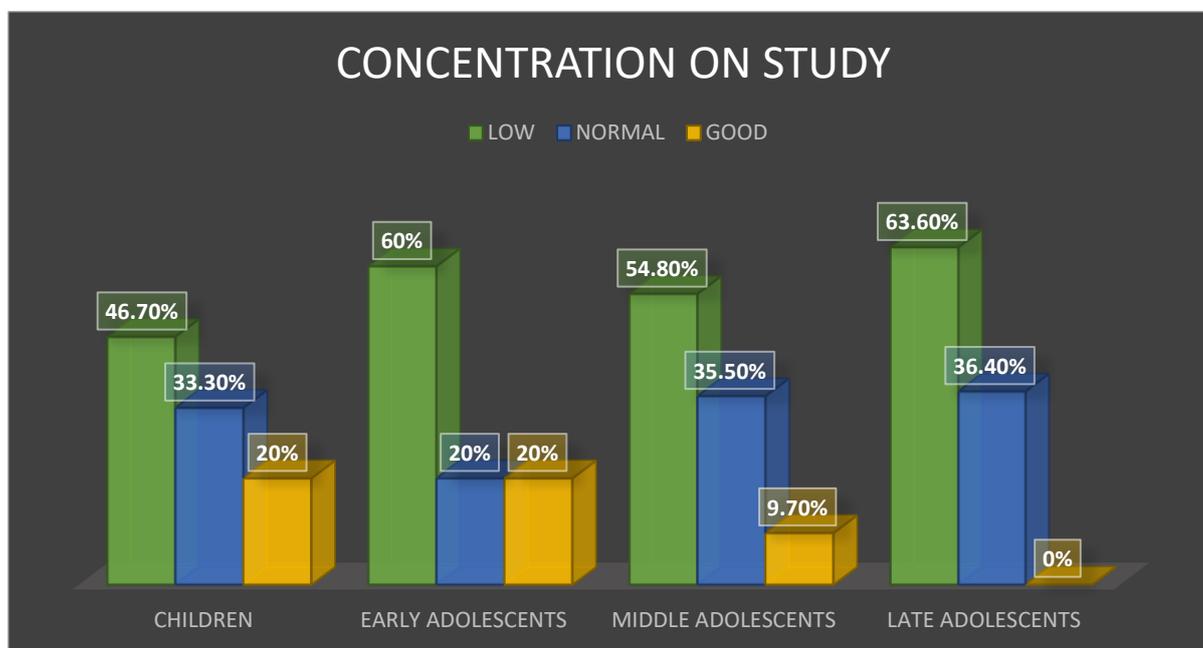


Figure 11: Percentage distribution of concentration on study among all age group.

In this figure it is concluded that all the age group have low level concentration on study in majority but amongst them the late adolescents have heigher percentage of low concentration with 63.6%, middle adolescents with 54.8%, early adolescents with 60% and children with 46.7% .

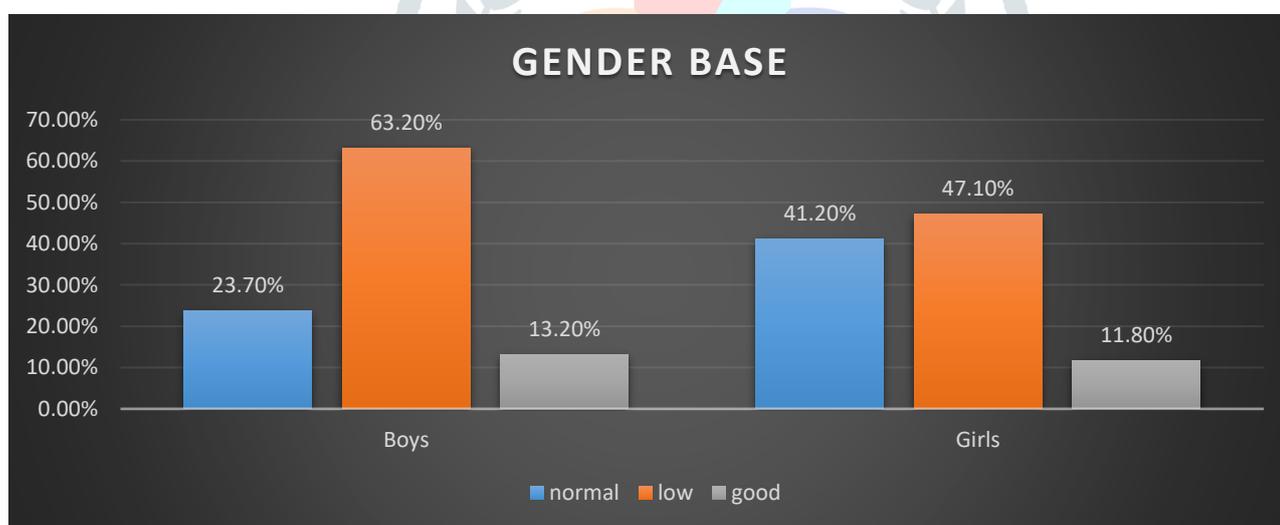


Figure 12: Percentage distribution of concentration on gender basis.

This figure estimated that more than half of male population have low concentration on study with 63.2% , 23.7% of them have normal concentration and 13.2% have good concentration on study. While the girls have low concentration on study with 47.1% but with minor difference of normal concentration with 41.2% and 11.8% of them have good concentration on study.

# CONCLUSION

The aim of the research was to understand the health effect arising due to screen. The analysis of the data collected conclude quite a few point of discussion. We see that this screen time equally affect the all age group but adolescents have higher effect than children.

When it comes to screen time, the pandemic has definitely made a significant impact, with increase in screen time, physical health effect lowered physical activity which have an adverse effect on their physical growth and development.

With regard to mental health it was seen that behavior of an individual affect due to increase in screen time, respondent & their parents believe that to set a goal it would be essential to reduce their screen time for their better concentration, physical and mental development.

In the data it is also estimated that the respondent prefer to spend their time alone on mobile and television for gaming and social media rather than watching their favorite programme or play any indoor game with their peers or family. This behavior also shows that the social-gap or reduction in one two one interaction between children, parents and their surroundings.

So it is important for all age group to cope up with these physical & mental hazard, they must include any physical activity such as yoga, exercise and outdoor sports, spending more time with family friends and peer groups & finding new hobbies which are helpfute l for their growth and development.

# DISCUSSION

Figure 1: In the case of duration screen time the majority of respondents belongs to 4-8 hrs of category with 49.3%, which is the significant part of the day, the majority of the respondent spent their 1/3 of the day on mobile, t.v and laptop rather than study or any other sports which is helpful for their future. Louise L. Hardy (2010)Mean ST for all students was 3.1 hours per day and for weekdays and weekend days, 2.6 hours per day and 4.4 hours per day, respectively. Boys were more likely to exceed ST guidelines than girls (odds ratio [OR], 2.71; 95% confidence interval [their, 1.67-4.38).screens.

Figure 2: conclude that children and adolescents spend their most of the time on mobile screen with 65 % among childrens with an mean average of 3.3 and 70% among adolescents with 4.0 mean average time. Jean M. Tvenage (2016) Total screen time averaged 3.20 h a day (SD = 2.40) and was progressively higher among older children, primarily driven by more time spent on electronic devices .The largest increase in screen time occurred between elementary school and middle school. By high school (ages 14 to 17), adolescents spent 4 h and 35 min a day with screens according to caregivers' reports.

Figure 3: shows that late adolescents with age group of (16-19) year spend their most of the time with 4.6 mean average time on mobile screen & 0.9 of mean with television screen, middle adolescents (13-16) year spend their time mobile screen with 4.3 & 1.9 on t.v screen, the early adolescents like to spend their time on mobile screen with 2.8 & 2.1 on television screen which show approx. similar distribution of screen time, but the children like to spend their most of the time on mobile with 3.3 mean average time & 1.8 mean time on television. Randjelovic P.(2021) In “Problematic Smartphone Use, Screen Time and Chronotype Correlations in University Students” Almost one quarter (22.7%) of students involved in our study could be classified as being “smartphone-addicted”. The students with problematic smartphone use more frequently (statistical significance) belonged to the evening chronotype. Those students spent significantly more time on their phones compared to the non-addicted ones.

Figure 4: In this figure it is estimated that the late adolescents(16-19) year age group show highest sleep latency with 55 minutes, middle adolescents show 45.5 minute of sleep latency, early adolescents with 35 minute of sleep latency and children with 30 minute of sleep latency. Monique K. LeBourgeois, *Pediatrics* (2017) In” Digital media and sleep in childhood and adolescents” Data from US population-based studies show that ~30% of preschool-aged children and between 50% and 90% of school-aged children and adolescents do not get as much sleep as they may need.<sup>1,2</sup> The pervasive use of screen-based media is a likely contributor to widespread sleep insufficiency. Screen-based media devices are present in the bedrooms of 75% of children,<sup>3</sup> and ~60% of adolescents report viewing or interacting with screens in the hour before bedtime.<sup>4</sup> In a recent systematic review of 67 studies of screen time and media use in school-aged youth and teenagers (1999–2014), 90% found that screen time was adversely associated with sleep health, primarily via delayed bedtimes and reduced sleep duration.

Figure 5: In this figure is estimated that all age group like to spend their time on mobile devices with 67% of respondent and 31% respondent correspond to television and only 2% of respondent spend their time on online classes during covid period. The majority of screen time spent on mobile screen in form of gaming, social media, movies, entertainment programme. Isha Akulwar-Tajane (2020) “Rethinking Screen Time during COVID-19: Impact on Psychological Well-Being in Physiotherapy Students” “All the participants reported using at least one screen based mobile device, smartphone being the commonest device followed by

television and other portable digital devices. It can be seen that with the evolution of mobile phones to smartphones and by encompassing all of the internet features and mobile applications, the technological usage discussed above have been shifting gradually to smartphones. Multiple device use in varied combinations is also reported by the participants. Usage pattern of digital devices in the lockdown by the participants Mobile phone 98% Tablet 7.3% Laptop 28% Computer 3.3% Video game 1.3% Television 48.7%.

Figure 6: shows that approx 53% of children are in sleepy mode without mobile, while on the other hand adolescents like to spend their time in indoor activity with 50% & this activity might affect their weight status by which the both age group gain their weight with 40% & 56.1% due to less interest in any physical activity and irregular & high fatty diet during COVID period. Anna Dahlgren, et al (2021). A total of 121 children and adolescents (mean age:  $12.1 \pm 1.5$ ) were included in the study. Objectively measured smartphone screen time was  $161.2 \pm 81.1$  min/day. Mean physical activity, measured with the SCRIIN activity tracker, was  $32.6 \pm 16.5$  active min/day. Carol Maher, et al (2012) Screen time is more strongly associated than physical activity with overweight and obesity in 9- to 16-year-old Australians. Increased likelihood of overweight or obese was often associated with high screen time (ORs, 2.13–2.55 for boys and 1.47–1.72 for girls), but only sometimes and less strongly associated with low Moderate to Vigorous Physical Activity (ORs, 0.49–2.55 for boys and 1.06–1.47 for girls). Analyses conducted for combined screen time and MVPA categories showed screen time to be a stronger indicator of weight status than physical activity, especially in boys.

Figure 7: estimates that though both age group shows co-operative behavior in majority but also show the significant percentage of aggressive behavior in children with 33.3% and irritating behavior of adolescents with 35%. Youn-Joo Um (2019) Smartphone dependency showed a significant correlation with aggression. A total of six questions were answered according to a four-point Likert scale ranging from 'very strongly' (one point) to 'not at all' (four points); all were reverse-coded. We then determined the sum of all the items for each respondent. Higher scores indicated higher aggression. smartphone dependency was positively correlated with aggression ( $r = 0.27, p < 0.01$ ).

Figure 8: In this figure it is estimated that boys have 38% of co-operative behavior and 35% boys aggressive in nature and 27% of them are irritating on the other hand more than half of the female respondent with 53% have co-operative behavior and 41% of them are irritated without electronic gadget and only 6% of girls are aggressive in nature. Eun Jee Lee (2018) Gender Differences in Smartphone Addiction Behaviors Associated With Parent–Child Bonding Of the participants, 14.3% (15.18% boys and 13.39% girls) were in the SA behaviors risk group, and the prevalence of SA behaviors was not significantly different between gender groups.

Figure 9: shows that more than half of the respondents have low concentration in study with 56% , 33% of them have normal concentration and 11% have good concentration Aric Sigman (2012) quantitatively studied how children's health in Britain is being affected by increase in screen time. The research found that children by the age of 10 have regular access to five different screens at home. Research also found that over the course of childhood, children spend more time watching television than they spend at school. It was also found that the increase in screen time has been associated with negative cognitive outcomes for children

between the ages of 0 and 4. Children with higher screen time scored lower on number knowledge and classroom engagement

Figure 10: shows that both of the age group have low concentration in majority with 47% in children and 58% in adolescents. Kawashima, 2001. the World Federation of Neurology as “[computer games are] halting the process of frontal lobe development and affecting children’s ability to control antisocial elements of their behaviour ... alarmingly, computer games stunted the developing mind”. (Kawashima, 2001).

Figure 11: concluded that all the age group have low level concentration on study in majority but amongst them the late adolescents have higher percentage of low concentration with 63.6%, middle adolescents with 54.8%, early adolescents with 60% and children with 46.7%. Shailesh Rai (2016) 36.33% students experienced fall in their academic performance. 55.67% students did not experience lack in concentration in class due to smart phone.

Figure 12: This figure estimated that more than half of male population have low concentration on study with 63.2% while the girls have low concentration on study with 47.1% Billieux et al. (2008) [10] tested gender differences in both teams of impulsion and problematic mobile phone use among the young. The results showed that men use their mobile phones more frequently in dangerous situations whereas women are more dependent on them. The results on impulsion showed that men exhibit significantly higher levels of sensation seeking and lower levels of perseverance, while women reveal significantly higher levels of urgency.



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