

Social Media and Teen Mental Health: Analyzing the Role of Screen Time in Anxiety and Depression

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ABSTRACT

Background: Studies focusing on impact of screen time on depression and anxiety related disorders among school going teenagers in TIER II and III cities are limited. This study examines how screen time is giving rise to anxiety and depressive symptoms. Methods: The research work utilizes primary data. The primary data related to screen time, anxiety and depression were collected through self-reporting structure. The questionnaire for screen time were self-structure while the anxiety and depression scores were collected through GAD-7 and CESD-R-10 scales respectively. The collected data was analysed using sensitivity analysis to determine the effect of screen time on anxiety and depression. Results: The results indicate that there exists a moderate positive relationship between screen time and depression score and screen time and anxiety score. The results indicate that screen time gives more rapid increase to depression score as compared to anxiety score. Conclusion: In conclusion, this study highlights the moderate relationship between screen time and both anxiety and depression among school-going teenagers in Chhattisgarh. Although screen time is an influential factor in the mental health of adolescents, it is only one piece of the puzzle. A multifaceted approach is needed to address mental health in teenagers, encompassing not only the management of screen time but also broader socio-cultural, familial, and psychological support systems. Further research is necessary to uncover additional contributing factors and explore effective interventions to mitigate the negative impacts of excessive screen time on adolescent well-being.

Keywords: Teenagers, Screen Time, Anxiety, Depression.

Introduction

The advent of digital technology has revolutionized the way we live, learn, and interact. However, the rapid increase in screen time, particularly among school-going teenagers aged between 15 to 17 years, has led to growing concerns about its impact on mental health [1]. The relationship between screen time and mental health disorders like anxiety and depression is becoming increasingly significant, especially among adolescents in classes 9 to 12 [2]. As digital media consumption continues to soar, the psychological well-being of adolescents has emerged as a pressing issue both globally and in India.

Global Context: A Rising Concern

Worldwide, there has been a marked increase in mental health issues among adolescents, with anxiety and depression being the most prevalent disorders. The World Health Organization (WHO) estimates that approximately **10-20%** of children and adolescents globally suffer from mental health disorders, and these figures have been on the rise in recent years [3]. The widespread use of smartphones, social media platforms, and other digital devices has been identified as one of the key contributing factors. Research has shown that adolescents who spend more than three hours per day on screens are more likely to report symptoms of anxiety, depression, and other emotional issues[4].

For example, a study published in the *Clinical Psychology Review* found that excessive screen time among adolescents in the United States was strongly correlated with higher levels of depression and anxiety [5]. A survey by the *Revista Paulista de Pediatria* in the UK also highlighted the negative impact of social media use on mental health, particularly in relation to body image, loneliness, and peer pressure, all of which are factors contributing to anxiety and depression [6].

Screen Time and Mental Health in India

In India, the situation is equally concerning. The rapid penetration of smartphones and the internet has led to a dramatic increase in screen time among adolescents. According to a 2021 study by the *Indian Journal of Psychiatry*, **67%** of Indian adolescents between the ages of 15-17 report spending more than three hours a day on digital devices [7]. This heavy reliance on screens, particularly for social media, online gaming, and entertainment, has led to a rise in anxiety, depression, and other mental health problems.

A report by the *National Institute of Mental Health and Neurosciences (NIMHANS)* revealed that **25%** of adolescents in India suffer from depression or anxiety, with screen time being one of the contributing factors [8]. The *Samarpan* also found that the rate of depressive symptoms among teenagers had increased by **15-20%** over the past five years, coinciding with the rise in digital media usage [9].

Chhattisgarh: The Local Landscape

In Chhattisgarh, the situation mirrors the national and global trends. The state has seen an increasing number of teenagers spending excessive time on their mobile phones and other digital devices. This trend is particularly noticeable in urban areas like Raipur and Bilaspur, where access to the internet and smartphones is more widespread. However, in rural regions, the rise in screen time is also notable, although limited access to digital devices and slower internet speeds mean that the impact is less immediate.

In urban centers of Chhattisgarh, studies show that **30%** of adolescents report spending more than three hours a day on screens, which correlates with a rise in anxiety and depression. A study conducted by the *Chhattisgarh State Health Department* found that anxiety and depression symptoms were most common among adolescents who spent excessive time on social media platforms like Instagram, Facebook, and TikTok, as well as on online gaming [10]. The lack of awareness about the mental health risks of excessive screen time, particularly in rural areas, further exacerbates the issue.

The Sensitivity Analysis and the Use of GAD-7 and CESD-R-10 Scales

To understand the relationship between screen time and mental health more comprehensively, the current study uses two widely recognized psychological assessment tools: the **GAD-7 (Generalized Anxiety Disorder 7-item) scale** and the **CESD-R-10 (Center for Epidemiologic Studies Depression Scale-Revised) scale**. These tools are designed to measure anxiety and depression symptoms, respectively, and are validated for use among adolescents.

The GAD-7 scale evaluates generalized anxiety symptoms, including feelings of nervousness, worry, and difficulty relaxing. The CESD-R-10 scale assesses symptoms of depression, such as feelings of sadness, hopelessness, and difficulty concentrating. Both scales have been extensively used in research to gauge mental health levels in adolescents.

This study seeks to perform a sensitivity analysis to examine how varying levels of screen time influence anxiety and depression scores among school-going teenagers in Chhattisgarh. By understanding this relationship, the study aims to contribute valuable insights into the mental health challenges faced by adolescents in the digital age and provide recommendations for mitigating the adverse effects of excessive screen time.

The growing concern over the impact of screen time on mental health, particularly anxiety and depression, is not only a global issue but also one that is deeply relevant in the context of India and Chhattisgarh. As the digital landscape expands, it is crucial to address the psychological well-being of adolescents and recognize the role of screen time as a contributing factor to mental disorders. This study, using the GAD-7 and CESD-R-10 scales, aims to provide critical insights into the extent of this relationship and highlight the need for strategies to reduce screen time and promote mental health among school-going teenagers.

Design

The research work is a cross-sectional study. The data was collected from the school going teenagers studying in class 9th to 12th. The age group for the study was affixed as 14 years to 17 years. The students selected for the study were from different cities of Chhattisgarh. The students were selected for the study through snowball sampling strategy. That is the information regarding the next sample was collected from the initial survey seed. Presently, social media messaging, gaming and video streaming platforms have taken a networking and collaboration form. Thus, consumers of such content could easily make available information of similar content consumers. The students were selected through this strategy as active parental consent was required for letting the students participate in the study. Further, this strategy allowed to ensure that parents provided active information passive-consent to their ward for screen time, the quality of content they were consuming and its genre. This translates to the fact that parents knew that their ward was consuming online content, but they were not monitoring nor restricting the type of content they were consuming. The students participating in the survey were provided with an assent. They were briefed with respect to the study and after that they were provided with a pencil and three sets of questionnaires. The data collected was analyzed to meet the study objectives.

Participants

The research work focused on studying the occurrence of depression and anxiety in school going teenagers due to the exposure to mobile and entertainment devices screen. The teenagers were segregated into two groups based on their gender. The total teenager population that should be studied in the research work was determined using the Cochran Method of Sample Size selection. The method resulted in a sample size of 384.6. As the sample size could not be in fraction it was rounded-off to nearest hundredth decimal place. Thus, the sample size was determined as 400. Students participating in the survey were divided into two equal groups of 200 males and 200 females. Surguja and Surajpur district were selected as study areas. From each selected study 200 samples were collected, 100 from male students and 100 from female students. During the survey it was observed that some of the students left some of the questions unanswered. The so obtained survey sheets were rejected and were not made part of the analysis. Efforts were further made to collect the 400 set of filled questionnaires.

Variables

• Screen Time

Screen time was assessed by asking participants the following question: "How much time per day do you typically spend on the following activities?" The five activities included: (1) "watching or streaming shows and movies" (inclusive of those streamed over television channels and over OTT platforms) (2) "playing video or computer games," (3) "talking on the phone," (4) "browsing the internet" (This included reel scrolling and insta-feeds scrolling or time spent on content consuming platforms such 'X', 'Threads', 'Chingari' etc.) and (5) "texting, messaging, or emailing" (This included time spent on platforms such Facetime, whatsapp, telegram). Participants reported their screen time in hours (from 0 to 9) and minutes (from 0 to 45) for each activity. This method has been validated for use among teenagers [11].

• Anxiety

General anxiety symptoms were evaluated using the Generalized Anxiety Disorder 7-item scale (GAD-7), a widely utilized tool in both clinical and research settings that has been validated for use among youth [12]. This self-reported scale examines generalized anxiety symptoms experienced over the past two weeks, including difficulty managing worry, fearfulness, trouble relaxing, nervousness, irritability, and restlessness. Participants responded using the following options: "not at all," "several days," "over half the days," and "nearly every day," which were scored on a scale from 0 to 3. These scores were summed to produce a total anxiety score ranging from 0 to 21, with higher scores indicating greater anxiety symptoms. For this study, two versions of the variable were analyzed: (1) the total score was treated as a continuous variable, and (2) a dichotomous variable was created, categorizing participants as having clinically significant anxiety symptoms (coded as 1) or not (coded as 0, reference category) based on a cut-off score of ≥ 10 .

- **Depression**

Depressive symptoms were assessed using the Center for Epidemiologic Studies Depression Scale (Revised)—10 (CESD-R-10), a self-reported tool designed to evaluate clinical depressive symptoms [13]. These symptoms include sadness, hopelessness, lack of motivation, difficulty concentrating, sleep disturbances, and irritability experienced over the past seven days. Participants selected one of four response options: “none or less than 1 day,” “1–2 days,” “3–4 days,” or “5–7 days.” Responses were scored on a scale of 0 to 3 and totaled to generate a score ranging from 0 to 30, with higher scores reflecting more severe depressive symptoms. The CESD-R-10 scale has been validated for use with both adolescents and adults. For this analysis, the variable was used in two forms: as a continuous variable representing the total score and as a dichotomous variable. The dichotomous variable classified participants into two groups—those with clinically significant depressive symptoms (coded as 1) and those without (coded as 0, reference category)—based on a cut-off score of ≥ 10 .

Analytical Tools

The research work utilized descriptive analytical techniques for analysis of collected data. Mean, standard deviation and frequency analysis were used to analyze the collected data. Once the descriptive analysis was complete the collected data was subjected to sensitivity analysis. The sensitivity analysis considered depression and anxiety as dependent variables over screen time. Two separate models were constructed for the same. Model 1 considered anxiety as a dependent variable on screen time whereas, model 2 considered depression as dependent variable on screen time.

$$\text{Anxiety} = a_1 + b_1 \text{Screen Time} \dots (1)$$

$$\text{Depression} = a_2 + b_2 \text{Screen Time} \dots (2)$$

Results

Table 1 indicates screen time characteristics of the 400 samples included in the study. From the table it is evident that 69.5% of the females and 70% of the males were having screen time greater than 120 minutes in a day. It was also observed that only 1% females were having screen time of less than 30 minutes in a day. No males were observed having a screen time of less than 30 minutes. Cumulatively it could be said that 69.75% of the teenagers had a screen time of more than 120 minutes. The maximum screen time observed in school going female teenager group was 6.9 hours while the minimum screen time observed in the same group was of 0.4 (approximating to 25 minutes) hours. In male school going teenager group the maximum screen time was observed as 6.3 minutes while the minimum screen time observed was 0.59 hours (approximately 35 minutes). Thus, it can be said that maximum screen time observed among the two classes was for school going females. Categorically females who were having more than 120 minutes of screen time were dedicating more time to playing videogames while males in similar category were dedicating more time to talking on the phone. Average screen time for the population was observed as 2.789 ± 1.24 hours.

Table 2: Anxiety and Depression Profile Observed

Symptoms	Female	%Female	Male	%Male	Total	Total %
Anxiety (≥ 10)	98	49	103	51.5	201	50.25
Depression (≥ 10)	164	82	162	81	326	81.5

Table 2 reveals the anxiety and depression symptoms observed among school going teenagers. The survey data analysis reveals that 49% of the females exhibited an anxiety score of greater than equal to 10 while 51.5% of the males exhibited an anxiety score of greater than equal to 10. A depression score of 10 or greater was observed among 82% of the females while 81% of the males exhibited a depression score of 10 or greater. Population wise it was observed that 50.25% of the population exhibited an anxiety score of 10 or greater while a depression score of 10 or greater was observed among 81.25% of the population. Average anxiety score for the population was observed as 9.5925 and average depression score was observed as 14.5375.

A sensitivity analysis was conducted between the screen time and anxiety score followed by screen time and depression score.

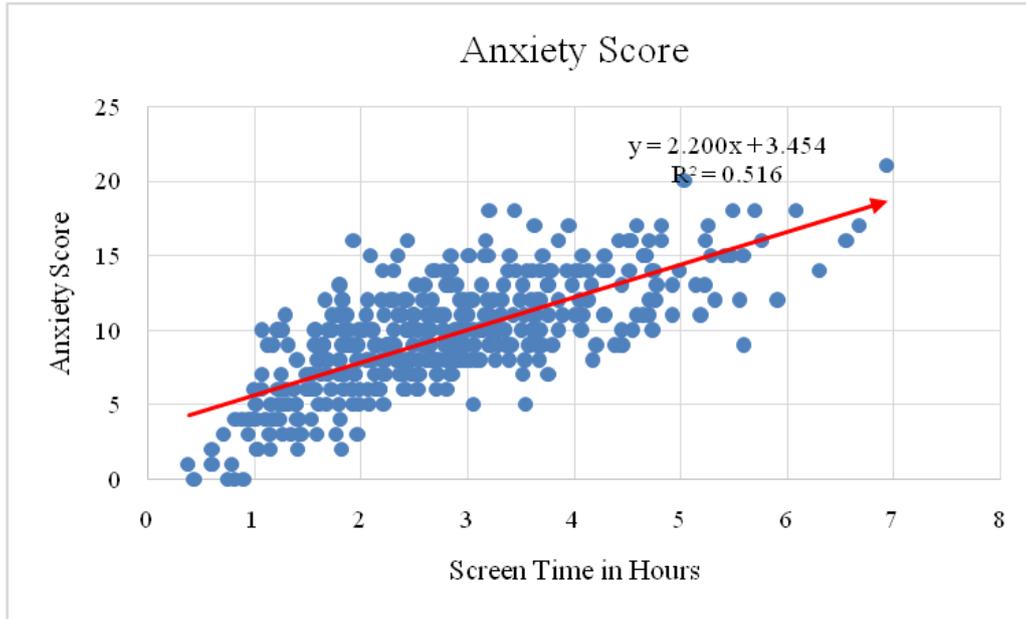


Figure 1: Sensitivity analysis between screen time and anxiety score for the population

Figure 1 reveals that the relationship between screen time and anxiety score is positive in nature. The figure reveals that for every one hour increase in the screen time the anxiety score increases by 2.2 score. R^2 for the relationship was observed as 0.5167. This indicates a moderate linkage between anxiety score and screen time.

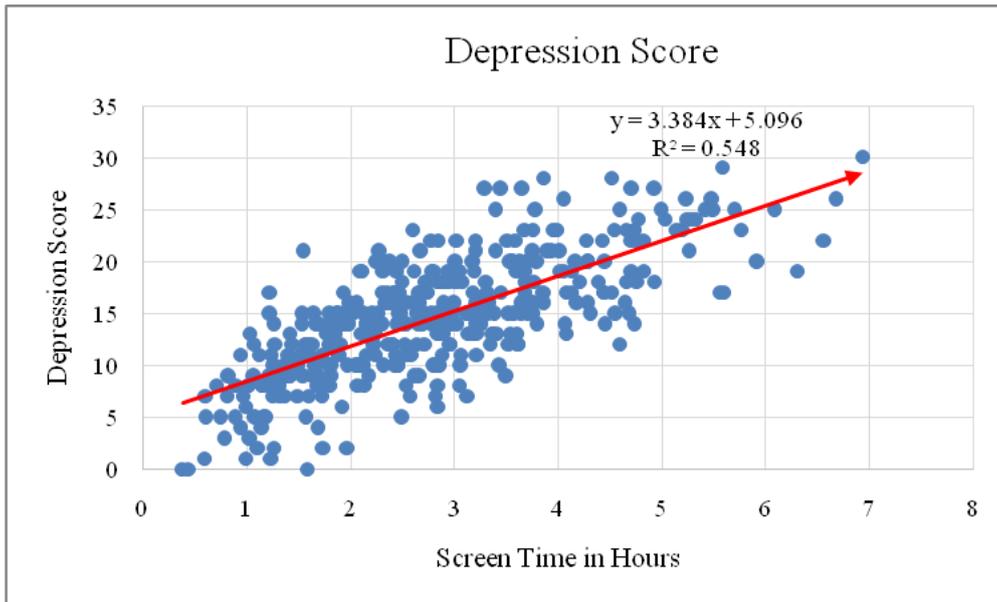


Figure 2: Sensitivity analysis between screen time and depression score for the population

Figure 2 reveals that the relationship between screen time and depression score is positive in nature. The figure reveals that for every one hour increase in the screen time the depression score increases by 3.384 score. R^2 for the relationship was observed as 0.5486. This also indicates a moderate linkage between depression score and screen time. The sensitivity analysis indicates that rise in depression score is much higher as compared to rise in anxiety score with increase in screen time.

Discussion

The sensitivity analysis revealed a positive association between screen time and anxiety score. The analysis also revealed a positive relationship between screen time and depression score. The relationship strength is measured using R^2 . For both the models an R^2 of over 50% was observed.

An R-squared value of 0.516 for screen time vs anxiety score indicates that 51.6% of the variation in the anxiety score can be explained by the variation in screen time. It can be interpreted as –

- **Moderate to Strong Relationship:** An R-squared value of 0.516 suggests a moderate to strong positive relationship between screen time and anxiety. This means that while screen time is a significant factor in explaining the variance in anxiety levels, other factors could also contribute significantly to the anxiety score.
- **Explained Variance:** With 51.6% of the variance explained, this suggests that screen time plays an important role in influencing anxiety levels, but nearly 48.4% of the variability in anxiety is due to other variables not accounted for in the analysis. These could include socio-economic factors, emotional support, genetics, sleep patterns, etc.
- **Implications for Further Research:** Given that R-squared is only slightly above 0.5, further investigation is needed to identify additional factors that could be influencing the anxiety score. It may also be valuable to examine if there are thresholds of screen time (e.g., exceeding a certain number of hours) that have a more significant effect on anxiety.
- **Causality vs. Correlation:** While the R-squared value suggests an association, it doesn't imply causality. Higher screen time may contribute to higher anxiety, but other unmeasured factors might be influencing both, or the relationship could be bidirectional.

In conclusion, while there is a moderate association between screen time and anxiety score, this relationship is not perfectly linear, and additional factors should be considered in understanding anxiety in relation to screen time.

Table 1: Screen time characteristics of the samples included in the study

Screen Time in Minutes	Females					% Female Population for screen time exposure	Males					% Male Population for screen time exposure	Total Population	% Population (Out of 400)
	watching or streaming shows and movies	playing video or computer games	talking on the phone	browsing the internet	texting, messaging, or emailing		watching or streaming shows and movies	playing video or computer games	talking on the phone	browsing the internet	texting, messaging, or emailing			
less than 30 minutes	132	109	114	115	120	1	118	125	128	123	111	0	2	0.5
30-60 minutes	41	54	50	48	49	3.5	45	44	32	43	48	4	15	3.75
60-90 minutes	11	20	9	13	9	10	6	15	9	16	11	11.5	43	10.75
90-120 minutes	13	9	23	17	16	16	24	11	19	15	21	14.5	61	15.25
120 and above	3	8	4	7	6	69.5	7	5	12	3	9	70	279	69.75
Total	200	200	200	200	200	100	200	200	200	200	200	100	400	100

An R-squared value of 0.546 for screen time vs depression score indicates that 54.6% of the variation in the depression score can be explained by the variation in screen time. The relationship could be interpreted as:

- **Moderate Relationship:** An R-squared value of 0.546 suggests a moderate relationship between screen time and depression score. It implies that screen time has a significant effect on depression, but there are other factors that also contribute to the variance in depression scores.
- **Explained Variance:** 54.6% of the variation in depression can be attributed to changes in screen time. This means that while screen time plays a meaningful role in affecting depression, nearly 45.4% of the variability in depression scores is due to other factors (e.g., genetic predisposition, socio-economic status, emotional support, lifestyle, etc.).
- **Moderate Predictive Power:** With a value slightly above 0.5, the model indicates moderate predictive power. While screen time is a relevant factor, it's clear that other variables are also significantly influencing the depression score, and thus, screen time alone cannot fully explain depression.
- **Implications for Further Research:** Given that 45.4% of the variance is unexplained, additional research is necessary to identify other contributing factors to depression. These could include lifestyle factors, social relationships, mental health history, or environmental influences, which could either interact with or exacerbate the effects of screen time.
- **Causality Considerations:** As with any observational study, the R-squared value indicates correlation, not causality. While there is an observed relationship between screen time and depression, it doesn't mean that screen time directly causes depression. It could be that individuals with depression may also spend more time on screens, or there could be other contributing factors.

Conclusively it could be said that screen time appears to have a moderate impact on depression levels, but it's clear that other important factors are at play. Understanding depression requires a broader analysis beyond just screen time.

Discussion

The results of this sensitivity study provide valuable insights into the relationship between screen time and mental health outcomes, particularly anxiety and depression, among school-going teenagers in Chhattisgarh. A moderate relationship between screen time and both anxiety and depression was observed, with R-squared values of 0.516 for anxiety and 0.546 for depression. These findings suggest that screen time significantly contributes to variations in the mental health scores of teenagers, but it does not fully explain the complex nature of these conditions.

- **Impact of Screen Time on Anxiety and Depression**

Screen time has become an integral part of daily life for teenagers, particularly in the context of social media, entertainment, gaming, and communication. The moderate correlation observed between screen time and anxiety indicates that increased screen usage is associated with higher levels of anxiety. This can be attributed to several factors, such as the pressure of social media, the impact of excessive screen exposure on sleep patterns, and the emotional toll of digital interactions. These factors may contribute to heightened levels of stress and anxiety, which are commonly reported among adolescents.

Similarly, the moderate relationship between screen time and depression suggests that excessive time spent on multimedia devices may contribute to the development or exacerbation of depressive symptoms. Prolonged screen time, especially when it replaces face-to-face social interactions, may lead to feelings of isolation and reduced physical activity, both of which are known risk factors for depression. Furthermore, exposure to distressing content or the pressure to conform to unrealistic standards promoted by digital platforms could negatively impact the emotional well-being of teenagers.

- **Other Factors Influencing Anxiety and Depression**

While screen time plays a notable role, it is important to recognize that anxiety and depression are multifaceted conditions influenced by numerous factors beyond screen time. In the context of Chhattisgarh, where socio-economic, cultural, and environmental factors also play a significant role, it is likely that the mental health outcomes of teenagers are influenced by a combination of these factors.

Family dynamics, educational stress, community support systems, and access to mental health resources are just a few examples of elements that could contribute to the mental health status of adolescents in this region.

The observed moderate relationships between screen time and mental health outcomes suggest that screen time is one of many contributing factors rather than the sole determinant. This highlights the importance of a more holistic approach to addressing mental health issues in adolescents, which includes not only managing screen time but also promoting healthy coping mechanisms, social support, and physical well-being.

Limitations of the Study

While the study sheds light on the connection between screen time and mental health, several limitations should be considered. First, the study considers only screen time as a single variable and does not account for other behavioral and psychological factors that may influence anxiety and depression. Second, the cross-sectional nature of the study does not allow for causal conclusions to be drawn. Longitudinal studies would be beneficial in understanding the directionality of the relationship between screen time and mental health. Lastly, the self-reported nature of the data may introduce bias, as teenagers may underreport or overreport their screen time usage.

Recommendations for Future Research

Future research should explore the broader context in which screen time affects anxiety and depression. This includes investigating the type of screen activities (e.g., social media usage, gaming, studying) and their differential impacts on mental health. Additionally, studies should consider other factors such as socio-economic status, family environment, and peer relationships, which could offer a more comprehensive understanding of adolescent mental health in Chhattisgarh.

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