Virtual Content, Screen Time and Health: An Interrelation Analysis

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Abstract

In today's digital era, the consumption of virtual content and screen time have become integral aspects of daily life. This study examines the interplay between virtual content consumption, screen time, and their impact on mental health outcomes, specifically focusing on depression, anxiety, and stress. The study used quantitative research approach. The study selected 384 participants using Cochran's equation from three districts i.e. Okara, Pakpattan, and Sahiwal, of Division Sahiwal. Using simple random sampling, the researchers approached the selected respondents and collected data through face-to-face interview schedule of survey method. Statistical analysis, including correlation and regression analyses, was conducted to examine the interrelationships among these variables and explore potential gender differences. The study's findings show an association between mental health difficulties and screen time, with more screen time connected with higher stress, anxiety, and depression. These findings highlight the potential adverse effects of prolonged exposure to virtual content and extended screen time on psychological well-being.

Keywords: virtual content, screen time, mental health, depression, anxiety, stress, gender differences, District Pakpattan.

Introduction

Over the past two decades, there has been a significant rise in the usage of digital technology. Humans are now spending more time in front of screens, which is a growing

concern. (Sigman, 2012). Electronic devices are a tool for interpersonal connectivity, virtual interactions, and communication. For humans to operate, they need social connections. The amount of time people spends engaging in virtual social connectivity and how they use digital devices to preserve or avoid social connections are both influenced by virtual content (Chi, 2011).

Sharing virtual content online has become an integral part of modern living, as people routinely forward newspaper articles, YouTube videos, and restaurant reviews to friends, relatives, and neighbors (Berger and Milkman, 2010). However, it remains unclear why certain online information is more contagious than others, with some customer service situations being extensively discussed on blogs while others receive little attention. Virtual content encompasses these varied forms of information dissemination (Leib, 2012).

The COVID-19 pandemic, which restricted face-to-face social interactions, further accelerated the use of digital devices for socializing (Sjølie, Espenes and Buø, 2022). As physical distancing measures became prevalent, people turned to their electronic devices as a primary means of maintaining social connections.

Virtual connection provides several advantages, but it also has effects on server health. Numerous research has looked at the connection between screen time and indicators of physical health in kids and teenagers. Regardless of other health practices like proper eating, rest, and exercise, the research reveals that more screen usage is linked to worse health outcomes. One of the health markers related to screen time that is most often investigated is adiposity (excess body fat). For instance, Fang et al. (2019) conducted a systematic review and meta-analysis to explore the connection between screen time (mostly television viewing) and obesity in school-aged children and young adults. According to the findings, kids who watch more than 2 hours of television every day are more likely to be overweight or obese.

Thus, the time spent online increasing usage of virtual content is effect the physical and mental health of individuals. This problem is dealt in this study. Considering this problem i.e. increasing virtual content usage and decreasing mental health, this study aims study aims to measure the effects of screen time on mental health, considering the ever-spreading virtual world and increasing time spent watching virtual content, specifically among youth. Social media platforms are the most essential tools for comprehending this issue. Therefore, this study also targeted youth's time spent on social media sites.

Review of Literature

Virtual content and screen time

Gupta et al. (2022) looks at the adverse effects of too much screen time and screen-based media on young people's health. The members received a thorough review document, and on March 26, 2021, an online national consultative meeting was held to discuss formulating the guidelines. The group's recommendations and consensus review were distributed to the participants, and the rules were then codified. Excessive screen usage (>1-2 hours per day) and early exposure to screen-based media appear widespread in Indian children. Screen time should not replace other activities crucial for children and teenagers' general development and health, including outdoor play, sleep, family and peer interaction, schoolwork, and skill development. Families should provide a safe, secure, loving, nurturing atmosphere for their children at home, and they should control what they let them watch on screens to make sure it is educational, age-appropriate, and free of violence. Families, schools, and pediatricians should get education on the value of documenting screen time and digital well-being as part of routine child health assessments. It will help them spot any early warning signs of media addiction or cyberbullying and take appropriate action, such as seeking professional advice.

Drescher et al. (2011) surveys of parents' activity and sleep patterns, caffeine and food consumption, screen usage, and anthropometric measurements. a cross-sectional study cohort with a local focus. There were 319 participants, aged 10 to 17, who were Caucasian and Hispanic. BMI z-score along with parents' reported sleep duration. Total sleep time (TST) as reported by parents was inversely associated to BMI z-score but did not significantly correlate with any of the tested food parameters or exercise components. While the BMI z-score was higher in children of Hispanic descent, the parent-reported TST was significantly lower. However, these outcomes differed according to age. Electronic screen time and caffeine use were inversely associated to parent reported TST. Caffeine usage was mostly associated with a decrease in TST as reported by parents in older adolescents. Less screen time reported by parents was associated with lower TST in younger adolescents. Hispanic ethnicity and parental reports of TST were shown to be the two variables most substantially associated with BMI z-score. Teenagers' increased screen time, increased coffee consumption, and decreased TST may all increase their risk of obesity.

The prevalence of the screen: An overview of the risks and advantages of screen time in our modern world was the subject of research by LeBlanc et al. (2017). According to the findings, excessive time spent engaging in various sedentary activities can coexist with a lifestyle that includes enough moderate- to vigorous-intensity physical activity. However, research has shown that people should limit their sedentary activities, especially screen time, and be physically active for the best health benefits. This narrative review gives a brief overview of the research on screen-related sedentary behavior, describes how screens have changed over time, identifies the advantages and disadvantages of screen-based sedentary behavior, and offers experimental support for limiting habitual screen usage.

Goldfield (2015) investigated whether screen use in overweight and obese kids is independently related to health-related quality of life. 358 overweight and obese teens between the ages of 14 and 18 were assessed at baseline between 2005 and 2010 as part of the Canadian Healthy Eating, Aerobic, and Resistance Training in Youth project. Hrolf was measured using the Pediatric Quality of Life and other self-report measures, and the amount of time that 97 men and 261 women spent using computers, watching TV, and playing video games was used to calculate their screen time. The quantity of screen time was connected to decreased psychosocial and total Hrolf but not physical Hrolf.

Hardy et al. (2010) looks into the connection between adolescent risk factors for cardiovascular disease, type 2 diabetes mellitus, and fatty liver disease and recommendations for screen time (ST), which includes watching television, DVDs, videos, and computers. Screen time was counted for each workday, weekend, and entire week and was divided into categories of less than 2 hours per day and more than 2 hours per day. HOMA-IR, almandine aminotransferase, glutamyl transferees, high-sensitivity C-reactive protein, blood pressure, and the levels of insulin, glucose, insulin-like growth factor 1, and insulin were all measured in fasting blood samples. The aberrant results were categorized according to established standards. In females, there was a significant correlation between metabolic risk factors and ST recommendations.

Agarwal et al. (2022) investigates the effects of increased screen use on ocular health during the coronavirus disease (COVID-19) crisis and found that 89% of the participants said their screen use increased during the lockdown. In comparison to older adults, younger people used screens more frequently and displayed greater symptoms of digital eye strain. The symptoms of digital eye strain that were most often reported in our study were eyestrain

and headache (31.3%). 81.37 percent, or 354 out of 435 individuals, had at least one symptom related to using digital devices. The report places a lot of emphasis on the rise in the epidemic's use of digital screens and the resulting eye strain. raising awareness of the negative impacts of using digital gadgets and taking precautions to protect our vision.

Virtual content, screen time and health

The contradicting findings of Twenge & Campbell (2018) study on the relationship between screen time and psychological wellbeing in children and adolescents have led some academics to question the medical groups' suggested restrictions on screen time. Comprehensive measures of screen time, including as time spent on mobile phones, computers, electronic devices, video games, and television, were evaluated in research done on a sizable national random sample of kids and teenagers in the US between the ages of 2 and 17 in 2016. The research examined a variety of psychological well-being indicators.

Even after just one hour of use, the results showed that more screen time per day was linked to worse psychological well-being. Increased screen usage was specifically associated with decreased interest in activities, worse self-control, higher levels of distractibility, greater difficulties establishing friends, lower emotional stability, more difficult to care for, and trouble finishing tasks.

The impact of screen time on psychological well-being was found to be more pronounced in teenagers than in younger children. These findings highlight the negative association between screen time and psychological well-being, with higher screen use linked to poorer mental health outcomes. It suggests that limiting screen time and promoting a healthy balance between screen-based activities and other aspects of life may benefit psychological well-being, particularly in adolescents.

A connection between screen usage and Chinese children's cognitive and social development is found by Hu et al. (2020). This study examined the association between screen use and cognitive and social development in a stratified random sample of 579 five-year-old children in Guangdong, China. The researchers evaluated a variety of skills related to active and passive screen use, including receptive vocabulary, numeracy, executive functioning, science knowledge, and social skills. According to the findings, Chinese preschoolers who spent more time passively watching television performed worse in the subjects of arithmetic, science, executive functioning, and social skills.

In her 2016 study, Montagni et al. (2016) looked at the relationship between young adults' excessive screen usage and migraine and headaches without a migraine. The purpose of this cross-sectional study, which involved 4,927 people from the French I-Share cohort, was to look at the relationship between screen time and headache/migraine symptoms. The participants, who were all female and had an average age of 20.8 years, answered questions about their demographics, their use of screens (including television, laptops, tablets, and smartphones), and their headache and migraine symptoms. 75.5 percent of the participants were women.

According to the multivariable model's findings, kids who spent the most time on screens had a higher chance of developing migraines. Those in the top quintile had a risk ratio for migraine of 1.37 (with a confidence range of 1.14 to 1.66) compared to those without headaches and with little exposure to screens. For migraines without aura, the connection was somewhat greater, with an odds ratio of 1.50 (CI 1.19 to 1.89). The study did not discover a statistically significant link between screen time and headaches that are not migraines, though.

Attygalle, Hewawitharana & Wijesinghe (2020) investigates the relationship between migraine and ADHD, as well as the relationship between screen usage and these two disorders, in children visiting a tertiary care center in Sri Lanka. The findings showed no statistically significant difference in the number of hours per day that children with and without clinically diagnosed ADHD spent watching screens. However, comparing children with migraine and those without migraine, there was a substantial difference in the median amount of screen usage (measured in hours per day).

Janke, Holroyd & Romanek (2004) emphasizes the impact of electronic screen exposure on headache-prone youngsters. Using digital and social media can positively and negatively affect one's mental and physical health. General physical problems, particularly headaches, and backache, increase due to screen time during early adolescence. In neurology practice, it was proposed that all children with early headaches be screened for electronic screen abuse. They also believe youngsters with migraines and tension-type headaches should be encouraged to limit their exposure to electronic screens before beginning medication. School-aged children may use computer screens for up to 2 hours daily, with a 20-second break every 20 minutes. In conclusion, restricting screen time reduces headache symptoms in children and elders.

In a sizable sample of Canadian teens, Maras et al. (2015) looked at the associations between screen use and symptoms of sadness and anxiety. In classes 7 through 12, there were 2482 English-speaking students. Screen time was associated with the severity of depression and anxiety, according to linear multiple regression models that took into account factors including age, gender, ethnicity, parental education, location, physical activity, and BMI. In contrast to watching television, using a computer and playing video games were connected to more severe depressive symptoms. Video game play was associated with anxiety severity. Screen time in teenagers may be a risk factor or an indication of sadness and anxiety.

In a study conducted by Aşut et al. (2019) in the Turkish Republic of Northern Cyprus, the links between screen time, internet addiction, other lifestyle behaviors, and obesity were examined in secondary school pupils. The study's findings underscored the importance of adopting a family-school-based integrated approach to address the issue of obesity and improve the quality of life for children and adolescents. By addressing lifestyle behaviors, such as reducing screen time, promoting healthy eating habits, and encouraging physical activity, interventions can be developed to mitigate the risk of obesity and internet addiction among this population.

Material and Methods

We used a quantitative research design and selected a sample of 485 respondents from Division Sahiwal, Pakistan, using Cochran's (1953, p. 54) equations ($n = \frac{Z_{\propto/2}.\ p(1-p)}{d^2}$). The sample was distributed across three districts, i.e., Okara, Pakpattan, and Sahiwal, through an equal proportion technique ($n_i = \frac{n_s}{k}, i = 1,2,3 \ldots n$), which directed to selected 161 respondents from each district. Using a simple random sampling technique, we approached the selected respondents and interviewed them through the face-to-face interview schedule of the survey method. The survey was conducted between October 2022 and July 2023. However, some respondents provided insufficient data that we excluded from the study. It reduced the sample size to 384 (response rate = 79.2%). Nevertheless, it did not affect the study's validity as we ensured the appropriate responses from the respondents within a suitable time (each questionnaire took almost 25 minutes).

In the study, most of the respondents (37%) were between the ages of 24 and 26 years. The smallest percentage of respondents (8.1%) were between the age group of 18 and 20 years. More than half of the respondents were female (55.7%) and 43.3% were male. The

majority of the respondents were from bachelor's degree or higher education 88.5%. The highest percentage of the respondents belong to urban area (70.1%) and 29.9% to rural area

Measurement

The measurement was divided into three major parts, i.e., demographic information, virtual content and screen time, and mental health. The description of each part is given below:

Demographic Information: We measured the basic demographic information of the respondents using relevant options such as gender was measured dichotomously, and education was measured from 0 = illiterate to 8 = Ph.D. or equivalent. Similarly, age, family income per month (PKR), and marital status were categorical measures.

Virtual content and Screen time: We used a well reputed questionnaire i.e., Digital screen exposure questionnaire (DSEQ) by Kaur et al. (2021) to assess the screen time of the participants. The scale consisted of 28 items and was based on three domains: Screen time exposure and home media environment, Level of physical activity, and Media behaviors of the adults.

Mental Health Status: The mental health questionnaire known as DASS-21 Scale was used to measure the mental health of respondents. It was developed by Lovibond, S. and Lovibond, P. in 1995. This scale measures Depression, Anxiety and Stress.

Results and Discussion

Table 1

Percentage and frequency distribution of social media sites and average time spent on social media.

Variable	frequency	percentage
Social websites		
Facebook	85	22.1
WhatsApp	152	39.6
Twitter	16	4.2
Instagram	23	6.0
TikTok	50	13.0
Snapchat	58	15.1

Average time spends		
On screen		
1-3 hours	49	12.8
3-6 hours	218	56.8
More than 6 hours	117	30.5

Table 1 comprises the frequency and percentage distribution of social media sites and their average time spent. The majority of the respondents use WhatsApp as social content about 152(39.6%), Facebook users (22.1%), Snapchat (15.1%), TikTok (13.0%), Instagram (6.0%), and the lowest percentage was Twitter users (4.2%). The table showed that the highest percentage of the respondents (56.8%) use 3 to 6 hours on social media daily. (30.5%) respondents use social media for more than 6 hours. The lowest percentage of respondents (12.8%) spend 1 to 3 hours daily on social media.

Table 2

Regression models of stress

Variable	M1	M2	M3	M4
STDA1[Ŧ]	.369(.048)*	.325 (.049)*	.278 (.050)*	.184 (.064)*
STDA2		.186 (.052)*	.166 (.051)*	.166 (.051)*
STDA3			.170 (.055)*	.159 (.055)*
STDA4				.144 (.062)*
R	.368	.405	.430	.443
R^2	.136	.164	.185	.196
R^2 Adj.	.133	.160	.178	.188
ΔR^2	.136	.029	.020	.012
ΔF	59.944	13.041	9.515	5.430

Note= *p < .05. **p < .01. ***p < .001. [Ŧ]. For full statements see Annexure 1.

The results of the stress models showed that the 19.6% of variance can be explained in the stress by the predictor variables (M4). However, all the variables significantly predicted the stress, but the regression coefficient of watching a laptop/computer is the highest (0.184) among all variables. (See Table 2). Further, regression models of anxiety showed that the predictors explained 15.7% of the variance in the outcome variable.

However, watching smartphones has the highest coefficient (0.265), which shows that frequently watching smartphones could increase anxiety more likely than the other variables (See Table 2).

Table 3

Regression models of anxiety

Variable	M1	M2	M3
STDA4[Ŧ]	.358(.052)*	.300(.054)*	.265(.055)*
STDA3		.226(.059)*	.190(.060)*
STDA5			.146(.056)*
R	.331	.377	.397
R^2	.110	.142	.157
R^2 Adj.	.107	.138	.151
ΔR^2	.110	.033	.015
ΔF	46.979	14.478	.6.908

Note= *p < .05. **p < .01. ***p < .001. [Ŧ]. For full statements see Annexure 1.

Table 4

Regression models of depression

Variable	M1	M2	M3	M4
STDA1[Ŧ]	.443(.050)*	.369(.053)*	.358(.052)*	.328(.054)*
STDA6		.214(.059)*	.335(.071)*	.305(.072)*
STDA7			-.205(.069)*	-.211(.068)*
STDA3				.133(.058)*
R	.416	.448	.468	.479
R^2	.173	.201	.219	.230
R^2 Adj.	.171	.197	.213	.222
ΔR^2	.173	.028	.018	.011
ΔF	80.080	13.133	8.891	5.264

Note= *p < .05. **p < .01. ***p < .001. [Ŧ]. For full statements see Annexure 1.

Lastly, the stepwise linear regression models on depression as outcome variables were developed. The results showed that variance in depression is explained by 22.2%, considering

the effects of the predictor variables (M4). Like the stress model, watching a laptop/computer has the highest value of coefficient (0.328), which signifies that using a laptop/computer has a higher predictability for the likelihood of depression among youth. However, watching television is not negligible because it also has a coefficient value of 0.305. Therefore, overall, the results reveal that watching a laptop, computer, and television increases the likelihood of depression among youth.

Discussion

This study explores an interrelationship among health, virtual content and screen time. The study is based on an inter-relational analysis focusing on physical and psychological health aspects. Here is some research that supported the results of the study. Results from the regression analysis Table 1 showed a positive relationship between Stress and Screen time in Young Adults. For this purpose, four items from the screen time scales were used to predict its relationship with stress in young adults. Here are a few pieces of research that support this idea. Wiciak, Shazley & Santhosh (2023) investigated the relationship between stress and screen time (ST) use in young adults. From September 2020 to January 2021, an international cross-sectional study was undertaken. The questionnaires cover ST use, stress, and mental wellness. The analysis included 183 participants. The findings revealed a substantial link between stress and screen time (ST) in young people.

Gupta et al. (2022) investigated the links between television viewing, electronic gaming, and computer use with stress and pleasure in adults. Participants reported spending their free time on various screen-based activities. He reported that television watching for more than four hours a day increases stress and decreases school performance. Similar results were reported concerning video games and computer use.Table 2 revealed a favorable link between anxiety and screen use in young adults. For this purpose, three items from the screen time scales were utilized to predict the association between screen time and anxiety in young people. Here are a few studies that back up this theory. This finding is consistent with a study by Khouja et al. (2019) who found that more time spent on television and computer on weekends increases the risk of anxiety and depression.

The positive relationship between depression and screen time in young adults. For this purpose, four items from the screen time scales were used to predict its relationship with depression in young adults. This finding supports the study by Cavalli et al. (2021) who

confirmed that the higher risk of depression by the higher time spent on television watching. His study further suggested limited time of watching television.

Conclusion

The study concludes an association between mental health issues and screen time. Specifically, frequent use of smartphones, laptops, and computers increases the probability of lower mental health because these predictors have a positive relationship with stress, anxiety, and depression. Considering the limitations of this study, we suggest including children below 18 years of age in future studies because the literature revealed that screen time could be more harmful to their mental growth.

References

Agarwal, R., Tripathi, A., Khan, I. A., & Agarwal, M. (2022). Effect of increased screen time on eyes during COVID-19 pandemic. *Journal of Family Medicine and Primary Care*, *11*(7), 3642.

Aşut, Ö., Abuduxike, G., Acar-Vaizoğlu, S., & Cali, S. (2019). Relationships between screen time, internet addiction and other lifestyle behaviors with obesity among secondary school students in the Turkish Republic of Northern Cyprus. *The Turkish journal of pediatrics*, *61*(4), 568-579.

Attygalle, U. R., Hewawitharana, G., & Wijesinghe, C. J. (2020). Migraine, attention deficit hyperactivity disorder and screen time in children attending a Sri Lankan tertiary care facility: are they associated?. *BMC neurology*, *20*(1), 1-7.

Berger, J., & Milkman, K. (2010). Social transmission, emotion, and the virality of online content. *Wharton research paper*, *106*, 1-52.

Cavalli, E., Anders, R., Chaussoy, L., Herbillon, V., Franco, P., & Putois, B. (2021). Screen exposure exacerbates ADHD symptoms indirectly through increased sleep disturbance. *Sleep Medicine*, *83*, 241-247.

Chi, H. H. (2011). Interactive digital advertising vs. virtual brand community: Exploratory study of user motivation and social media marketing responses in Taiwan. *Journal of interactive advertising*, *12*(1), 44-61.

Cochran, W. G. (1953). *Sampling Techniques*. Asian Publishing House.

Drescher, A. A., Goodwin, J. L., Silva, G. E., & Quan, S. F. (2011). Caffeine and screen time in adolescence: associations with short sleep and obesity. *Journal of Clinical Sleep Medicine*, *7*(4), 337-342.

Fang, K., Mu, M., Liu, K., & He, Y. (2019). Screen time and childhood overweight/obesity: A systematic review and meta-analysis. *Child: care, health and development*, *45*(5), 744-753.

Goldfield, G. S., Cameron, J. D., Murray, M., Maras, D., Wilson, A. L., Phillips, P., ... & Sigal, R. J. (2015). Screen time is independently associated with health-related quality of life in overweight and obese adolescents. *Acta Paediatrica*, *104*(10), e448-e454.

Gupta, P., Shah, D., Bedi, N., Galagali, P., Dalwai, S., Agrawal, S., ... & IAP Guideline Committee on Digital Wellness and Screen Time in Infants, Children and Adolescents. (2022). Indian Academy of Pediatrics Guidelines on screen time and digital wellness in infants, children and adolescents. *Indian pediatrics*, *59*(3), 235-244.

Hardy, L. L., Denney-Wilson, E., Thrift, A. P., Okely, A. D., & Baur, L. A. (2010). Screen time and metabolic risk factors among adolescents. *Archives of pediatrics & adolescent medicine*, *164*(7), 643-649.

Hu, B. Y., Johnson, G. K., Teo, T., & Wu, Z. (2020). Relationship between screen time and Chinese children's cognitive and social development. *Journal of Research in Childhood Education*, *34*(2), 183-207.

Janke, E. A., Holroyd, K. A., & Romanek, K. (2004). Depression increases onset of tension-type headache following laboratory stress. *Pain*, *111*(3), 230-238.

Kaur, N., Gupta, M., Kiran, T., Malhi, P., & Grover, S. (2021). Development and evaluation of the digital-screen exposure questionnaire (DSEQ) for young children. *Plos one*, *16*(6), e0253313.

Khouja, J. N., Munafò, M. R., Tilling, K., Wiles, N. J., Joinson, C., Etchells, P. J., ... & Cornish, R. P. (2019). Is screen time associated with anxiety or depression in young people? Results from a UK birth cohort. *BMC public health*, *19*, 1-11.

LeBlanc, A. G., Gunnell, K. E., Prince, S. A., Saunders, T. J., Barnes, J. D., & Chaput, J. P. (2017). The ubiquity of the screen: an overview of the risks and benefits of screen time in our modern world. *Translational Journal of the American College of Sports Medicine*, *2*(17), 104-113.

Lieb, R. (2012). *Content marketing: Think like a publisher-How to use content to market online and in social media*. Que Publishing.

Lovibond, S. H., & Lovibond, P. F. (1995). *Manual for the Depression Anxiety Stress* (2nd ed.). Sydney, New South Wales, Australia: Psychology Foundation.

Maras, D., Flament, M. F., Murray, M., Buchholz, A., Henderson, K. A., Obeid, N., & Goldfield, G. S. (2015). Screen time is associated with depression and anxiety in Canadian youth. *Preventive medicine*, *73*, 133-138. https://doi.org/10.1016/j.ypmed.2015.01.029

Montagni, I., Guichard, E., Carpenet, C., Tzourio, C., & Kurth, T. (2016). Screen time exposure and reporting of headaches in young adults: A cross-sectional study. *Cephalalgia*, *36*(11), 1020-1027.

Sigman, A. (2012). Time for a view on screen time. *Archives of disease in childhood*, *97*(11), 935-942.

Sjølie, E., Espenes, T. C., & Buø, R. (2022). Social interaction and agency in self-organizing student teams during their transition from face-to-face to online learning. *Computers & Education*, *189*, 104580.

Twenge, J. M., & Campbell, W. K. (2018). Associations between screen time and lower psychological well-being among children and adolescents: Evidence from a population-based study. *Preventive medicine reports*, *12*, 271-283.

Wiciak, M. T., Shazley, O., & Santhosh, D. (2023). Reevaluating Sleep Quality During COVID-19 and Associations With Quarantine, Mental Health, Stress, and Screen Time in Young Adults: Results From a Cross-Sectional Online Survey. *American Journal of Lifestyle Medicine*, 15598276231182621.

Annexure 1

Label	Statements
STDA1	Does the person watch laptop/computer supervision frequency by an adult
STDA2	The person uses digital media gadgets to learn letters, words, vocabulary, language online
STDA3	Average duration of screen time per day of the caretaker
STDA4	Does the person use Smartphone supervision frequency by an adult
STDA5	Duration of watching laptop/computer on a typical holiday
STDA6	Does the person use Smartphone supervision frequency by an adult
STDA7	Duration of watching television on a typical holiday