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Impact of Excessive Screen Time for Work Entertainment on Eyesight

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Abstract

Purpose: The study sought to investigate impact of excessive screen time for work entertainment on eyesight.

Methodology: The study adopted a desktop methodology. Desk research refers to secondary data or that which can be collected without fieldwork. Desk research is basically involved in collecting data from existing resources hence it is often considered a low cost technique as compared to field research, as the main cost is involved in executive's time, telephone charges and directories. Thus, the study relied on already published studies, reports and statistics. This secondary data was easily accessed through the online journals and library.

Findings: The study found that digital eye strain is non-vision-threatening but discomfort caused due to it can have implications on overall physical, mental, and social well-being. The study highlights the increase in digital screen time during the pandemic and the resultant eye strain. There is need of spreading awareness regarding the adverse effects of digital device use and the preventive measures to safeguard our ocular health.

Unique contribution to theory, practice and policy: The theory on planned behaviour was very instrumental in guiding the study, future studies can use the theory especially in shedding light on the impact of screen time on other health issues. No screen usage guidelines are there for adults till date thus our study strongly recommends that guidelines should be formulated and strictly imposed. It is also responsibility of parents to guide their children by becoming role model as well as emphasize digital etiquette. Screen time related problems are non vision-threatening but discomfort caused due to it is gruesome in majority of population. With joint efforts of parents, policymakers, teachers, and health workers excessive screen time related issues could be superseded.

Keywords: *Impact, Excessive Screen Time, Work, Entertainment, Eyesight*

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INTRODUCTION

Screen time is explained as time spent using an electronic screen, such as a TV, computer, or a mobile device (Wang, 2018), "anything else that requires watching a screen" (Elizabeth, 2013). Research has emphasized the influential role of parental perceptions of children's literacy development. Parents' beliefs guide caregiving activities, and their beliefs are shaped by parents' history, culture, standards, and the interaction between the parent and child (Austin, 2017). So, a child's development influences what a parent believes and gives value. A child's brain undergoes an amazing period of development from birth to producing more than a million neural connections each second. The development of the brain is influenced by many factors, including a child's relationship, experiences, and environment. From birth to age 5, a child's brain develops more than at any other time in life. And early brain development has a lasting impact on a child's ability to learn and succeed in school and life (Jones, 2017)

According to the American Academic of Pediatrics1 the standard duration for using screen media for preschool children (2-6years old) is 1hour per day. There are unwelcome consequences from using screen media for extended periods. Sedentary behaviors, screen addiction, increased obesity and metabolic conditions and poor sleep and eyesight can come from excessive daily indulgence in digital media. Some descriptive studies conducted in several Asian countries in the last 5 years reported that young children experienced significant amounts of screen time from television, computers and other forms of mobile digital devices, even before primary school.2-5 Yet the research into the effects of such exposure to screen media on the health and development of preschool children in Asia and elsewhere cannot match the increased use of such technologies.4 Moreover, learning from home in Indonesia mostly involved using screen media such as television, mobile phones, tablets, and laptops, and the duration of using screen media is longer than 1hour among preschool children. The purpose of this research was to determine the amount of time that preschool children (2-6 years old) in Indonesia used digital media and the impacts of that use.

Twenty years ago, the advent of computers revolutionized the workplace. Until that time, office work had involved a range of activities including typing, filing, reading, and writing. Each activity was adequately varied in the requirements of posture and vision, posing a natural "break" from the previous activity. The introduction of computers, however, has combined these tasks to where most can be performed without moving from the desktop, thereby improving quality, production, and efficiency. In fact, it is estimated that the 75% of all jobs in the year 2000 involved computer usage (Austin, 2017). The popularity and affordability of personal computers with Internet capabilities at home has introduced even more computer users. In 1990, about 15% of U.S. households owned a computer, a number that has now increased to 50% of all households (Albert, 2021).

As computers become part of our everyday life, more and more people are experiencing a variety of ocular symptoms related to computer use (Mosley, 2021). These include eyestrain, tired eyes, irritation, redness, blurred vision, and double vision, collectively referred to as computer vision syndrome. This article describes both the characteristics and treatment modalities that are available at this time. Computer vision syndrome symptoms may be the cause of ocular (ocular-surface

abnormalities or accommodative spasms) and/or extraocular (ergonomic) etiologies. However, the major contributor to computer vision syndrome symptoms by far appears to be dry eye (Olson, 2015). The visual effects of various display characteristics such as lighting, glare, display quality, refresh rates, and radiation are also discussed. Treatment requires a multidirectional approach combining ocular therapy with adjustment of the workstation. Proper lighting, anti-glare filters, ergonomic positioning of computer monitor and regular work breaks may help improve visual comfort. Lubricating eye drops and special computer glasses help relieve ocular surface–related symptoms. More work needs to be done to specifically define the processes that cause computer vision syndrome and to develop and improve effective treatments that successfully address these causes (Pendya, 2021).

Because of this extensive use of computers many studies have been conducted in an attempt to address questions concerning safety and health for video display terminal (VDT) users. The large majority of research has addressed the question of radiation levels from VDTs, known to emit many types of radiation including x-radiation, optical radiation, radio frequency radiation, very low frequency radiation, and extremely low frequency radiation (Dong, 2020). Studies have not clearly indicated a negative effect on the computer user (Abelson MB: How to fight Computer Vision Syndrome. Rev Ophthalmol 114–6, 1999). During the late 1980s and early 1990s, concern of possible reproductive effects from using VDTs arose following reports of adverse pregnancy outcomes among groups of women computer users. A recent review concluded that for most women in modern offices, work with VDTs does not increase their risk of miscarriage (Davis, 2021). Another study has even revealed that somatic disorders, depression, and obsessions are increased with computer usage, especially when operating time is more than 30 hours per week and usage of more than 10 years (Hu, 2020).

Studies have shown, however, that eye-related symptoms are the most frequently occurring health problems among VDT users (Kamoy, 2022). The main visual symptoms reported by VDT users include eyestrain, tired eyes, irritation, burning sensation, redness, blurred vision, and double vision, thus termed the phrase “Computer Vision Syndrome” (Reddy, 2013). In 1992, a total of 1,307 surveys were completed by optometrists who reported that the majority of VDT patients have symptoms that are different than other near-point workers, especially as related to glare, lighting, unique viewing conditions, and spectacle requirements. Greater frequency and severity of symptoms were also noted. Travers and Stanton (2022), identified a trend in symptomatology, whereby symptoms appeared to increase as duration of VDT exposure increased. It is estimated according to some reports that the diagnosis and treatment of these symptoms costs almost US$ 2 billion each year (Abelson MB: How to fight Computer Vision Syndrome. Rev Ophthalmol 114–6, 1999). As computer users become more aware of CVS, it is important that ophthalmologists are attentive to this rapidly evolving disorder, as we could be facing a possible epidemic of the 21st century (Tang, 2021).

Statement of the Problem

Children who spend an excessive amount of time on TV are more likely to be overweight. Research showed that while watching television, the metabolic rate is slower than when just resting

(Thomas, 2014). Children who consistently spend more than 4 hours per day watching TV are more likely to be overweight (Thomas, 2014). Mobile screens affect children's brains and health. Cell phones have non-ionizing radiation. Mobile phones send radio-frequency waves from their transmitting unit or antenna to nearby cell towers. Microwave radiations from cell phones and other wireless devices are very harmful, particularly for children and unborn babies. Many researchers have proved that radiations pose a greater risk for bodily damage in children. The rate of microwave radiation absorption is higher in children than adults because their brain tissues are more absorbent, their skulls are thinner, and their relative size is smaller (Khan, 2019). According to a study it has been found that children who play video games can have depression, anxiety, shyness, aggression, and problems with too much cell phone use. Children with Attention-Deficit/Hyperactivity Disorder (ADHD) may be particularly vulnerable (McCarthy, 2020). National Institutes of Health (NIH) in 2018 mentioned that children who spent more than 2 hours a day on screen-time activities scored lower on language and thinking tests, and some children with more than seven hours a day of screen time experienced thinning of the brain's cortex, the area of the brain related to critical thinking and reasoning (Matters, 2020).

Moreover for those working as computers become part of our everyday life, more and more people are experiencing a variety of ocular symptoms related to computer use. These include eyestrain, tired eyes, irritation, redness, blurred vision, and double vision, collectively referred to as computer vision syndrome. This article describes both the characteristics and treatment modalities that are available at this time. Computer vision syndrome symptoms may be the cause of ocular (ocular-surface abnormalities or accommodative spasms) and/or extraocular (ergonomic) etiologies).Our study will be essential as fewer research has been done on the impact of excessive screen time for work and/or entertainment on eyesight our study will bridge that knowledge gap by shedding light on impact of excessive screen time for work or entertainment on eyesight.

LITERATURE REVIEW

The proposed study was guided by theory of planned behavior and rational choice theory.

Theory of Planned Behavior

The theory of planned behavior was proposed by Icek Ajzen in 1985, which was developed from the theory of reasoned action by Martin Fishbein & Iscek Ajzen in 1975. This theory emphasizes that behavior emphasizes that human behaviors are governed not only by personal attitudes, but also by social pressures and a sense of control (Azjen, 1985). This theory argues that human behavior is guided by three kinds of considerations: beliefs about the likely outcomes of the behavior and the evaluations of these outcomes (behavioral beliefs), beliefs about the normative expectations of others and motivation to comply with these expectations (normative beliefs), and beliefs about the presence of factors that may facilitate or impede performance of the behavior and the perceived power of these factors (control beliefs).

In this respect theory of planned behavior argues that behavioral beliefs produce a favorable or unfavorable attitude toward the behavior; normative beliefs result in perceived social pressure or subjective norm; and control beliefs give rise to perceived behavioral control. As a general rule,

the more favorable the attitude and subjective norm, and the greater the perceived control, the stronger should be the person's intention to perform the behavior in question. Finally, given a sufficient degree of actual control over the behavior, people are expected to carry out their intentions when the opportunity arises. In the context of this study, normative belief or the degree to which significant individuals such as friends, or colleagues, condone the act of using social media may influence student's intention toward the use of social media both in school and at home, just to fit in the group and may not be using it for enhancing school work. The perceived importance or relevance of these, friends affect the extent to which their approval will shape individual intentions to use social media for work or for entertainment.

This theory was used to shed light on how individual make plans to use screen time for entertainment and work. Social media networking is a behavior that influences screen time. There is need for planning and guidance on the use of screen time especially with adolescents. If well planned it can improve learning but if not planned as required it can lead to negative impact to individual without internal control to overindulge in social media, a situation that may negatively affect their concentration in their academic work leading and other related problems that results from excessive screen time. This theory impact on our study as it emphasizes that behavior emphasizes that human behaviors are governed not only by personal attitudes, but also by social pressures and a sense of control, which is highly correlated to work and personal entertainment.

Empirical Review

Samanta (2022), conducted a study to explore the prevalence and potential factors associated with computer vision syndrome (CVS) among the postsecondary students of Bangladesh pursuing online education. In total, there were 917 postsecondary students participated in this study. Information on sociodemographic variables, and CVS symptom-related variables were collected using a prevalidated self-administered questionnaire. The CVS questionnaire was used to assess an individual's CVS status. The bivariate association between CVS and other categorical variables was obtained using a $\chi 2$ test. A multivariable logistic regression model was used to explore variables associated with the CVS. The study found out that the overall prevalence of CVS was 68.16%. Most common symptoms were headache (42.4%), feeling of worsening eyesight (23.2%), and eye pain (23.2%). CVS was associated with educational status ($p=0.03$), family history of eye-related problems ($p<0.001$), personal history of eye-related problems ($p<0.001$), usage of eye accessories ($p<0.001$), type of device used for online education ($p<0.01$), average daily use ($p<0.01$), and usage pattern ($p=0.02$). After adjusting for confounders, CVS was significantly related to the use of mobile or tablet (adjusted OR, AOR 8.954, 95% CI 1.57 to 51.063), continuing online education for more than 12 hours/day without any break or insufficient break (AOR 7.654, 95% CI 1.625 to 36.053), and previous family (AOR 3.189, 95% CI 1.751 to 5.811) or personal history of eye problems or headaches, or insomnia (AOR 6.214, 95% CI 2.783 to 13.878).

Indri (2021), conducted a study to examine the duration and impact of digital media use by preschool children in urban areas in Indonesia during weekdays and weekends. Data were collected using a validated questionnaire called the Surveillance of digital-Media habits in early childhood Questionnaire (SMALLQ®). A total of 951 parents or guardians (17-70 years old) who

had preschool children volunteered to complete the questionnaire online. The study found out that preschool children have been using screen media since infancy, and the time they spend on-screen time is more than 1hour per day. The digital media most used were mobile phones (91.6%), followed by television (86.1%) and computers (61%). The parents realized the impact and the importance of limiting time of screen media, but it difficult to prevent their children from using it, especially when learning from home. Hence, there is a need different approach to learning from home, especially to manage the duration of screen time for preschool children.

Argwal (2019), conducted a study to assess the effect of increased screen time on ocular health during the coronavirus disease (COVID-19) crisis. An online pretested, self-reported questionnaire with relevant details was generated through Google form and sent to participants. Chi-square or Fisher's exact test was used to investigate the associations between the qualitative variables. The associated risk factors of number and frequency of ocular health problems were analyzed by univariate and multivariate logistic regression. The study found out that a total of 435 responses were considered where 48.5% (N = 211) were female participants and 51.5% (N = 224) were male. Average age of the participants was 35 years. 89% of the participants reported an increase in the screen time during the during the lockdown period. Younger age group reported to have greater screen time than the older participants ($p = 0.001$) and hence experienced more symptoms of digital eye strain (DES) ($p = 0.003$). The most common symptoms associated with digital eye strain in our study were eyestrain 52.8% (N = 230) and headache 31.3% (N = 136). In total, 81.37% (354/435) of participants had experienced at least one symptom related to digital screen usage. The study concluded that DES is non-vision-threatening but discomfort caused due to it can have implications on overall physical, mental, and social well-being. The study highlights the increase in digital screen time during the pandemic and the resultant eye strain. There is need of spreading awareness regarding the adverse effects of digital device use and the preventive measures to safeguard our ocular health.

Waruguru (2017), conducted a study on implications of psycho- social media networking on academic performance among Adolescents in Nakuru East Constituency. The study focused on exploratory survey design. The target population was 6632 form two and three students in Nakuru East constituency. A sample size of 140 was selected using stratified and purposive sampling methods. Data collection was done using questionnaires and interviews. Quantitative data was coded and analyzed using descriptive statistics mainly frequencies, percentages and means, with the results presented in tables and figure. Qualitative data was coded and analyzed through thematic analysis. The study found out that adolescents' frequent Whatsapp, Facebook, You tube and other sites with Whatsapp and Facebook being popular with 42% and 29.9% respectively. This study observed that 88% contacted friends and discussed trending issues while 0.7% contacted teachers and their friends on academic related issues. This indicated most adolescents' spent a substantial amount of time in discussing social issues that has potential of undermining their academic performance. The study recommends that school administrators and teachers need to do a lot of psycho-education of social media instead of punishments which have met with a lot of resistance

Gitahi (2011), conducted a study that endowered to explore the influence of television viewing of pre-school children's sociability in play in Juja Division in Thika West District. The study formulated research questions about the percentage of pre-school children who watch television, time spent by pre-school children watching television, kinds of programmes and parental supervision on television viewing on pre school children sociability in play. It was limited to pre-school children who watched television and delimited to Juja Division in Thika West District. Data was collected using interview guides and an observation schedule. The data was analyzed using both qualitative and quantitative methods. It was revealed that television was present in the lives of most pre-school children in Juja division in Thika West Division. It was also observed that television consumes pre-school children's time that they need for other important activities such as play which is crucial for their social development. It was also revealed that most of the programmes that pre-school children are exposed to have characters whose reactions, attitude and relations with other characters could influence the way pre-school children handles and relates with other children during their play. It was also observed that a big percentage of parents do not supervise what their pre-school children watch on television hence children enter a world of fantasy without the guidance and oversight of adults. Pre-school children are exposed to shows without adults' supervision to comment on content and discouraging the behavior they see on television. It was concluded that television watching could have negative influence on preschooler's sociability in play.

Gachungu (2009), conducted a study to find out the types of programs that pre- schoolchildren watch and their effects on social development, establish the duration children spent watching the television programs and to assess the kind of social interactions associated with TV viewing among pre-scholars. The study employed descriptive research design. Simple random sampling and systematic sampling were used to select the sample size. A sample of 58 parents, 58 children and 6 teachers formed the respondent in this study. The study used interview schedule and observation checklist as instruments for data collection. The validity of the questionnaires was enhanced through pilot study in two schools. Validity of the instrument was done by supervisors and examiners in Department of Education. Research permit was sought in the City Education Department and consent letter from the University of Nairobi to carry out the study. Data collected was coded, cleaned and categorized manually by researcher, transferred to computer sheet and processed by use of Statistical Package for Social Sciences. The data was then analyzed using frequency distribution tables and percentages for all items. The study established that 96.6% of families interviewed had televisions in their homes, when they are out of school, 93.5% of children watch television and the most watched program by the children are cartoons (86.2%). The study concludes that television is an instrument of change among pre-scholars.

Research Gaps

A knowledge gap occurs when desired research findings provide a different perspective on the issue discussed. For instance, Gachungu (2009), conducted a study to find out the types of programs that pre- schoolchildren watch and their effects on social development, establish the duration children spent watching the television programs and to assess the kind of social

interactions associated with TV viewing among pre-scholars. The study employed descriptive research design. This study focused on types of programs that pre- schoolchildren watch and their effects on social development, establish the duration children spent watching the television programs and to assess the kind of social interactions associated with TV viewing among pre-scholars while our study will focus on impact of excessive screen time for work and entertainment on eyesight.

Secondly, a methodological gap presents itself in this study, for example, the study conducted by Gitahi (2011), to explore the influence of television viewing of pre-school children's sociability in play in Juja Division in Thika West District used both qualitative and quantitative methods to analyze data while our study will use a desk study literature review methodology.

METHODOLOGY

The study adopted a desktop literature review method (desk study). This involved an in-depth review of studies related to impact of excessive screen time for work and entertainment on eyesight. Three sorting stages were implemented on the subject under study in order to determine the viability of the subject for research. This is the first stage that comprised the initial identification of all articles that were based on impact of excessive screen time for work and entertainment on eyesight. The search was done generally by searching the articles in the article title, abstract, keywords. A second search involved fully available publications on impact of excessive screen time for work and entertainment on eyesight. The third step involved the selection of fully accessible publications. Reduction of the literature to only fully accessible publications yielded specificity and allowed the researcher to focus on impact of excessive screen time for work and entertainment on eyesight which was split into top key words. After an in- depth search into the top key words (impact, excessive screen time, work, entertainment, eyesight), the researcher arrived at 5 articles that were suitable for analysis. The results are from analysis of research papers done by:

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CONCLUSIONS AND RECOMMENDATIONS

Conclusion

The study found that digital eye strain is non-vision-threatening but discomfort caused due to it can have implications on overall physical, mental, and social well-being. The study highlights the increase in digital screen time during the pandemic and the resultant eye strain. There is need of spreading awareness regarding the adverse effects of digital device use and the preventive measures to safeguard our ocular health.

The study also concluded that this study highlights the increase in digital screen time during the pandemic and the resultant eye strain. The study includes all age group with almost equal gender distribution thus the results can be generalised to the Indian population. It is understandable that

for many people it is difficult to reduce the overall screen time during this pandemic. Gradual increase in screen time can be a suitable option than abrupt changes. This will give the eyes an adaption time and might suffer less harm. There is need of spreading awareness regarding the adverse effects of digital device use and the preventive measures to safeguard our ocular health

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Recommendations

No screen usage guidelines are there for adults till date thus our study strongly recommends that guidelines should be formulated and strictly imposed. It is also responsibility of parents to guide their children by becoming role model as well as emphasize digital etiquette. Screen time related problems are non vision-threatening but discomfort caused due to it is gruesome in majority of population. With joint efforts of parents, policymakers, teachers, and health workers excessive screen time related issues could be superseded.

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