Smartphone Usage and Ocular Symptoms Experienced among Participants during the COVID-19 Lockdown Period

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ABSTRACT

To investigate the extent of smartphone usage and ocular symptoms experienced among the participants during the Covid-19 lockdown period. A Quantitative crossectional Survey study was conducted at Raipur, India for a period of 2-months with N=300 participants within the age group of 18-40 years responded to the survey. Closed-ended questionnaire was developed and statistically tested for the reliability and consistency before surveying from the participants. Smartphone usage duration before and lockdown time, purpose of smartphone usage, ocular symptoms and Blue light filter usage was measured as, main outcomes for the study.

The respondents were asked to specify the twenty-six questions that were validated with Choranbach alpha for the internal consistency. The categorical variables smartphone usage time was found significant (χ^2=53.06, df=5, P < .001) and it increased during the lockdown period .The smartphone usage purpose was measured and although there was an increase in the mean percentage after the lockdown, this increase was not significant (χ^2=5.61, df=3, P=.69). 40% participants reported that night mode or the blue light filter was not used by them during smartphones usage.

As COVID-19 pandemic effecting globally the mode digital gadgets and usage of smartphones and other VDT gadgets have increased rapidly this can indirectly effect the digital strain of eye and induce sleep disturbances.

Keywords: Smartphone, Adolescent, Blue light filter, Visual display units, Ocular symptoms

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INTRODUCTION

Coronavirus disease (COVID-19) is an infectious communicable disease caused by a newly discovered coronavirus, the first case of which was reported in Wuhan, China, which slowly spread to the other countries of the world. Most people infected with the COVID-19 virus will experience mild to moderate respiratory illness and recover without requiring special treatment. Older people and those with underlying medical problems like cardiovascular disease, diabetes, chronic respiratory disease, and cancer are more likely to develop serious illnesses and COVID-19 virus mode of transmission is primarily through droplets of saliva or discharge from the nose when an infected person coughs or sneezes, so it's important that you also practice respiratory etiquette. The best and easiest way to prevent and slow down transmission is to be well informed about the COVID-19 virus, and its awareness. The only protocol for protection of yourself and others is by washing the hands or using an alcohol-based rub frequently and not touching your face, mouth, eyes or nose and the mask is recommended to cover the nose while moving locally among the population.[1]This pandemic situation is a global emergency to be faced by the world.

At this time, there are no specific vaccines or treatments for COVID-19. However, many ongoing clinical trials are evaluating potential treatments. Hence as precautionary measure and to contain the spread of the virus, all the countries in world started to followed SOP procedures as a part of which the Indian government had announced a countrywide lockdown for three weeks that started at midnight on 24 March 2020.

Due to the lockdown in India majority of the families started settling in their homes and remained under complete lockdown due to which smartphones had become an important tool for work and as a source of entertainment to provide relief from tension and mood swings. Previous studies have reported that excess usage of the smartphone affects the vision and causes ocular symptoms and dry eyes, and also can lead to complication in ocular surface disorders. Excess usage of the smartphone also has an effect on sleep quality and the blue light emitted from these displays influence the circadian rhythms and sleep cycles.

Taking into consideration these issues and various related reports from literature, there is a need to understand the effect of extended hours of smartphone usage and ocular symptoms experienced during this COVID-19 lockdown period in India, in order to bring about eye care awareness, as negligence to mild ocular symptoms experienced along with continuing exposure to visual display terminal could result in ocular complicationsb.[2] This study mainly aims to understand the eye-related issues experienced across the varied age group during the lockdown phase due to increase in the usage of smartphones.

LITERATIURE REVIEW

Participants

This Quantitative survey study was conducted by DKF (Dakshin Koshal Foundation) for 2-months (25/03/2020 to 25/05/2020) and with tenure to Declaration of Helsinki rules and Institutional Review Board approval with N=300 (Male-170 and female-130) within the age group of 18-40 years. A closed-ended questionnaire was used to assess the prevalence among the college students of the Uparwara community at Naya Raipur. No, monetary award was given to the participants for filling their responses.

The sample size was measured by using single population proportion formula: $n = (Z\alpha/2)2\ p\ (1-p)\ /d2$, by considering the following assumptions: $Z\alpha/2 = 1.96$ (Standard score value for 90% confidence level), $P = 0.5$ (since there is no similar study conducted in the study setting) at Raipur, and d (tolerated margin of error) = 5.6%. Then the finite population correction formula was applied for the study population size is 15.81 lakhs (2019) Raipur population and finally, 95% response rate was added and the total number of study participants suggested was 280 and we took 300 to avoid bias and error. Sample size was calculated using the Raosoft software.

The online survey developed in was circulated among participants in Raipur after the tenth day of lockdown had been enforced. The invitation to participate was circulated through multiple groups and online platforms on social media, namely, Facebook, Whatsapp, Instagram, and Telegram. The survey, which consisted of 30 questions, was open for 60 days. It was mandatory to answer all questions and the survey was anonym zed.

Data Collection and Statistical Methods

All the collected data was stored in the Microsoft Excel version 2013 and Demographic variables were interpreted with percentage distribution followed by Association between categorical variables and was assessed using the Chi-square test as the data was nonparametric D'Agostino-Pearson normality test was applied. We considered $p < 0.05$ as statistically significant. All statistical analysis was performed with Graph Pad Prism 8.

DISCUSSION

Majority of the participants and families in India were in total lockdown busy working from home using visual display terminal gadgets and Smartphones for work and entertainment. The current study mainly focused on ocular symptoms and smartphone usage associations.[3] The data from the questionnaire show that majority of the participants were having increased ocular symptoms during the lockdown period, which could be due to excess usage of smartphones for work, communication, and entertainment purposes. On the other hand the smartphones usage have be proved beneficial for tracking the mobile phone data to infer the movements of people between Italian provinces and municipalities and this was the positive sign for the Italian health professionals to fight against COVID-19.

Considering these eye-related symptoms many eye care facilities including the emergency services had been lockdown and this also could have impacted participants with existing symptoms of dry eyes or taking any eye-related treatment or medications.15 The current study provided a finding of spectacle usage in history, and majority of participants were observed to be their new spectacles from the past six months.

We found that smartphone usage time duration before and during lockdown has increased and the participant's response gave us a clue and new impression that the majority of participants used more than >10hrs duration and this increased the ocular symptoms that would have effect on the eye during lockdown period than normal days.[4] These findings were supported by previous studies on CVS (computer vision syndrome), digital strain increases rapidly due to increases in smartphones, visual display terminals, and digital devices.

Sleep quality, mood swings also increased during the lockdown, this might be due to more working hours on the smartphones or digital for entertainment and social media which increased during the lockdown further news on social media related to COVID-19 increasing public panic could also be a reason to cause the mood swing and reduce sleep quality. Many study findings from the previous studies have indirectly supported the current findings.

Various smartphones have specifications that reduce the digital strain and control the blue light in the smartphones which cause sleep disorders and convergence and other focusing issues due to variation in illumination. From the current study, we found that the majority of participants were using the Xiaomi company smartphones (53%). Previous studies also suggest that positive responses and satisfaction for the design of visual display terminal, is not the only factor to be considered, we have to also focus on the ocular health and, circadian rhythms as they also influence on sleep. Excess usage of visual display terminal devices especially during the sleeping times affects the convergence and focusing problems due to spectral changes in lighting.

However, this survey gave us a clue and way to improve the usage of smartphones to avoid the digital strain, dry eyes and other sleep-related issue. Although the population in India is suffering from COVID-19 lockdown, eye care is important for the workers who are using these gadgets especially for work. Work from home may reduce the time and other factors that show growth to the economy but has increased concerns of ocular health which can increase the risk to various diseases of eye and effect sleep cycles .Further studies can be conducted by increasing the sample size in various cross-sections at various geographical locations in India to understand how, this smartphone usage is necessary in terms of work and the life style of people, did the smartphone usage increase more predominantly during COVID-19 pandemic, and to understand if it controls virtual emotions in society otherwise it may become an important tool for people in their daily life activities. In conclusion the COVID-19 pandemic is globally affecting the mode digital gadgets and usage of smartphones and other visual display terminal gadgets have been increased rapidly which can indirectly show the effect on the digital strain of eye, and induce sleep disturbances.[5] The usage can be monitored and regulated based on the importance can be limited to the necessity of work in order to avoid dry eye and other eye-related problems.

CONCLUSION

We also found that usage of smartphones for social media and entertainment purposes have increased and usage for communication has reduced during lockdown situation which may imply that human emotions and values are controlled virtually with digital gadgets and this can be further investigated in depth by conducting the empirical and cognitive-based paradigm studies which would be very beneficial in the present situation.

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