ORIGINAL ARTICLE

How Dental Students were Reliant upon Mobile Phones? – A Post-COVID Cross-Sectional Self-Concept Questionnaire (SCQ) Survey

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Abstract

Background: The availability of research on smartphone usage is quite remarkable. It is evident how technology has played a critical role during the pandemic. Despite affording benefits, there seem to be many potential challenges experienced during this period, likely overuse and addiction. However, these effects can be a source of mental and physical health problems with significance for individuals' work and academic performance. With this background, the current study tried to investigate changes in smartphone usage before and after COVID-19.

Objectives: To evaluate the mobile phone usage pre- and post-pandemic in dental students' perception and to characterize its impact on their socio-demographic & psychological aspects.

Methodology: A self-reported cross-sectional questionnaire survey was conducted among students from a dental institution in Guntur city of Andhra Pradesh from January to February 2023. The questionnaire contains demographic information, frequency of mobile usage, screen time, and day-to-day changes associated with it.

Results: A total of 168 participants were included in the study, of which a majority of them were females (79.2%). The study participants mentioned that the time spent on smartphones and social media has increased (54%) since COVID-19. Also, they mentioned that usage of gaming apps (89.3%) seemed an increase since the pandemic.

Conclusion: As COVID-19 brought up significant changes, this has forced dental students to increase mobile usage and to continue that even after the pandemic. The study population showed a high dependence on mobile phones for various activities like online games, media, web searches, *etc.,* highlighting the need for the development and implementation of effective mobile withdrawal strategies to promote academic advancements.

Keywords: *Mobile phones, dentistry, COVID, usage, self-concept.*

INTRODUCTION

Globally, as of December 2023, there have been over 772 million confirmed cases of COVID-19, including many deaths, reported to the World Health Organization (WHO) [1]. With the continuous increase in number of cases and current improvements in the variants of viruses and the long-term global disruptions of the pandemic, it was and is having a significant impact on all aspects of life along with many technical and academic fields, including dentistry [2, 3].

During that period, safety measures like quarantine and lockdown were among the strategies that were implemented by the governments and the regulatory bodies to prevent people from being infected [4, 5]. With the imposing restrictions, there are many challenges that people across the world face, especially the lack of proper food.

When comes to the educational field, the lockdown turned the whole system upside down and created difficulty in providing equal and appropriate education during the first few weeks to months until the initiation of online classes, which usually is termed emergency distance learning [6]. However, a few students were unable to attend or view the online classes due to the unavailability and access to sophisticated devices. It is a known fact that with good there is always an evil behind it, likewise, there were certain uses for mobile phones like communication with colleagues, teachers, family, and learning (digital literacy). Along with these, there were certain drawbacks associated with it like addiction, adverse health effects, radiation risk, distraction from regular lifestyle, psychological and behavioral implications, *etc.* [7]. Previously mobile phones were used originally to have conversations by making and receiving phone calls, nowadays with the increase in demand and availability of faster connectivity networks, the use of mobile phones for music, browsing social media, video games, photography, *etc.* has also increased [8].

Viewing these impacts of mobile phones on students, a study was conducted to investigate and evaluate the mobile usage frequency and its impact from a dental student's perspective on lifestyle after the pandemic.

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METHODS

A self-reported cross-sectional questionnaire survey was conducted among undergraduate dental students (n=168) from first year to final year and was included *via* convenience sampling from a private dental institution located in Guntur city of Andhra Pradesh in the months of January and February 2023. The sample size was calculated by using G* Power software 3.1.9.7 version with effect size 0.32, power of the study as 80, α-error 0.05.

Those students using a smartphone and have given consent to participate are included. Those individuals who hesitated or refused to participate were excluded. Age and gender were not been a criterion for inclusion or exclusion in the study.

The survey instrument is a modified 13-item close-ended questionnaire which was prepared based on a self-concept questionnaire (SCQ) [9, 10] and also by following the steps described in a review done by K Pushpanjali *et al.* (2011) [11]. The prepared questionnaire was pre-tested for validity and reliability (Cronbach's alpha -0.76) using a pilot survey among 20 participants. The basic determinants in the questionnaire were demographic information and mobile usage characteristics. Two major study outcomes described were the frequency of mobile usage and its impact on a person's lifestyle along with the eccentricities associated with it.

All the ethical standards that were needed for research on human participants were followed starting from the review till the approval by the Institutional Ethics Committee (IEC). Voluntary completion and return of the questionnaire were accepted as a form of individual consent to participate in the survey. Participants have been reassured of the anonymity of the answers.

Responses were collected using Microsoft Excel sheets and analyzed descriptively using a statistical package for social sciences software (IBM SPSS Statistics version 20.0). Frequency distribution of dental students according to basic categorical variables was used to report the main outcomes of the study. Pearson chi-square test was used to assess trends in association between outcome variables and demographic characteristics. Student t-test was used to compare differences in reasons for mobile usage among study groups. A p-value lower than 0.05 was considered statistically significant.

RESULTS

A total of 200 subjects were approached of which, one-hundred and sixty-eight students (n=168) responded to the survey questionnaire (response rate 84%). The study participants were aged between 17-25 years (mean age-20.9 +1.69), of which the majority of them were females (79.2%). The demographic data of the study participants based on gender and year of study was presented in Figs. **(1)** & **(2)** respectively.

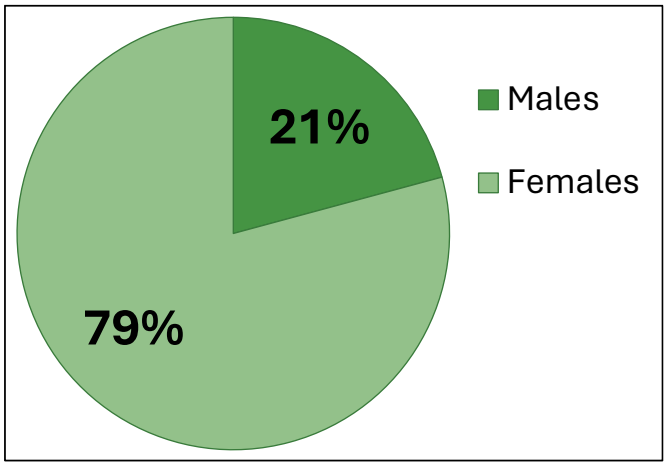

Fig. (1): Distribution of study participants based on their gender.

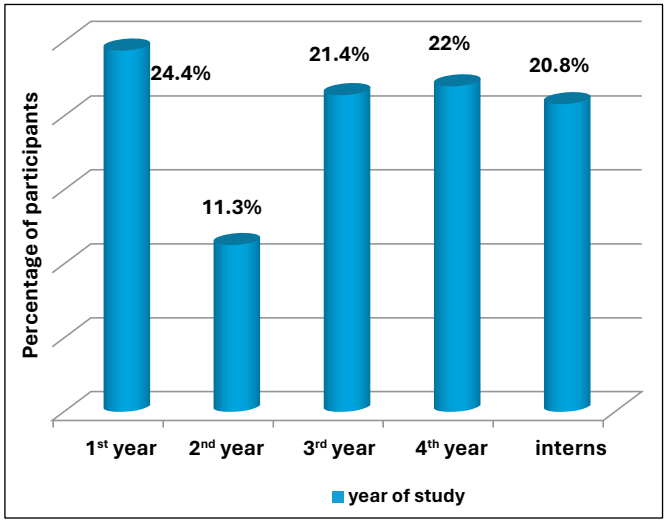

Fig. (2): Distribution of study participants based on the year of study.

Most of them (70.4%) approved the fact that there is an increase in screen time before and after COVID-19 and the reason mentioned for this increase is the availability of leisure time. An increase in screen time was observed as a majority of study participants (54%) mentioned watching movies, web series, listening to songs, *etc.* regularly. Only a few respondents mentioned that they were interested in watching news channels or listening to daily updates.

Sleep time was found reduced and can be observed as mentioned by the participants (63.7%) that there were significant changes in sleep time or the amount

Table 1: Distribution of study participants (N=168) based on various questions relates to mobile phone usage.

Question	Frequency (%)
Increase in screen time before and after COVID	104 (61.9)
Maximum time spent on watching (movies, games, songs)	90 (53.6)
Can watch any time in a day when free	99 (58.9)
Difference seen in bed time before and after COVID due to mobile usage (reduced)	107 (63.7)
Maximum time can be spent without using mobile – 20-25 min	98 (58.3)

Table 2: Comparison of study participants based on reasons for increase in mobile screen time with their year of study.

Reasons for Increase in Screen Time	Year of Study					p-value
	First year (n)	Second year (n)	Third year (n)	Fourth year (n)	House surgeons (n)	
Leisure time	5	1	11	7	15	0.004*
Online classes	20	9	9	12	9	0.103
OTT platforms	3	2	14	12	6	0.003*

*p<0.05 is considered statistically significant

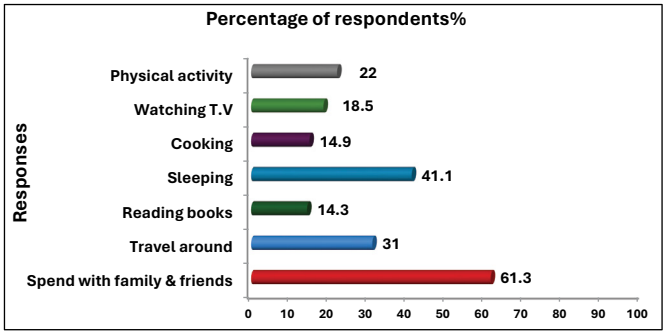

Fig. (3): Responses of the study participants when asked "If you are not allowed to use mobile phone for a full day (24 hours), what will you do?".

of bedtime they had before COVID and after. A majority (58%) mentioned that they can stay normal or forget about their mobile only for about 20-25 min in a day (**Table 1**). When the participants were compared based on the reasons for the increase in mobile screen time with the year of study, leisure time and other platforms seemed significantly associated (p<0.05) (**Table 2**). It has been observed that a majority of study participants were interested in spending time with their family & friends (61.3%) and sleeping (41.1%) when they were kept away from using mobile phones during the day (**Fig. 3**).

DISCUSSION

The present study was one of its kind attempts that were made to characterize the usage of smartphones and their applications, through socio-demographic variables, and psychological variables, along with their significant impact on the time and health of individuals. Mobile phones have certain advantages like internet exposure made available handy in mobile phones which can be used as an aid for health education by loading various health applications and sharing records and information between patients and clinicians [12, 13].

From a dental student perspective as the main background, the study intends to gather and characterize the data about the usage of mobile phones pre- and post-COVID to find the differences in mobile usage and to establish how a mobile phone has become a compulsion in recent times.

A significant increase in screen time was observed in the present study post-COVID, similar findings were observed in studies on the influence of computers on human behaviors conducted by S. Katsumata *et al.* (2022) [14] and Fischer *et al.* (2021) [15]., both in which the authors estimated and observed significant changes associated with COVID-19 crisis period in terms of daily smartphone usage behavior over increments of time. The most important thing that cannot be ignored or overlooked is the term 'addiction'. Of course, it is certain that the present study couldn't devise a specific instrument to measure the so-called mobile phone addiction, but could draw out a few important things by asking how participants felt when they left behind their mobile phones. Managing the usage of smartphones and their addiction in an educational setting is an important challenge that requires a multifaceted approach. Nowadays smartphones have become an integral part of students' daily lives, both for educational and social purposes, but their overuse can disrupt learning, socialization, and overall well-being. There can be a few intervention strategies for managing smartphone addiction in educational settings like setting clear policies and boundaries to limit smartphone usage in and around the campus and classrooms, setting up mobile-free zones, and limiting break time usage [16]. Digital detox is one more modern concept that can help students and teachers refrain from using smartphones. Other strategies like digital literacy education using awareness programs, behavioral interventions, and support by doing frequent monitoring, providing behavioral support, *etc.,* parental involvement and home support, promoting physical and social activities, redesigning the school creating more appropriate space and environment for digital detox, social interaction and face to face communication among peers.

Another study was conducted by N Avramova *et al.* (2021) [17]. Where participants expressed that their perceivedness of online learning in dentistry through the distance education model was low compared to the actual classroom-based face-to-face teaching and knowledge of practical skills performed live. The majority of dental students reported their dissatisfaction and expressed concerns about the unavailability of direct practical training leading to negative consequences for their future practice because of the crisis. Where in the present study, the participants express that the COVID period made them close to their families like never before and also helped them try various new advancements in technology and literature, whilst there also certain dissatisfaction in terms of financial aspects and restricted homestays away from friends and other activities that they were interestingly involved before the COVID.

Another research was conducted by Hassan *et al.* (2021) [18]. To evaluate the perceptions among dental students upon online dental education during the COVID-19 crisis, where it was observed that a maximum number (97.4%) of study participants reported that the COVID-19 pandemic has affected their academic performance because of various barriers, especially the loss of

interaction with educators, inappropriate clinical skills, and unstable network and internet connection. However, when asked to rate the online lectures, they replied that it was neutral and didn't find online practical education as effective (81.3%) as online theoretical teaching. The authors concluded that despite the reported benefits and effects, study participants preferred a hybrid approach in dental education to gain adequate clinical dental skills. The present study was not only concentrated on the academic effects alone rather it investigated the holistic effects of mobile usage on the overall lifestyle.

A study conducted by Roberto AL *et al.* (2021) [19]. It was observed that the pandemic has influenced the personal, mental, social, work, and everyday life of dental staff and the students; the same was reflected in the present study participants with varying degrees of differences observed in their day-to-day life. Many participants expressed that they felt very uncomfortable during the COVID lockdown when they were asked to attend online teaching classes and the exams conducted during that period as a major setback.

However, it was found that frequent use of online exam platforms could potentially decrease the anxiety that they might be experiencing [20, 21]. Their main observation or interest at that period seemed to be about their families and their health conditions, although they were not detailed in brief in the present study. Additionally, issues related to the financial aspect and mental health behind this were quite diverse, which the participants were reluctant to discuss and a few stayed silent when prompted to elaborate on this matter.

The present study has certain limitations throughout as it is a questionnaire survey like availability of an appropriate sample population, presence of selection and information bias, generalizability of the study findings, and insufficient literature evidence, but the authors tried to establish the study objective by discussing how the mobile phone and its usage has made a significant and profound impact on a student's life especially in the field of dentistry during the pandemic.

CONCLUSION

COVID-19 has impacted many parts of people's lives. The present study is one among very few in dentistry on dental students which has been able to find an increase in screen time before and after the pandemic. It was also evident that an increased number of studies revealed rising trends in screen usage in various groups, with potential health consequences. Even dental institutions will need to make particular efforts to implement programs that train students on how to deviate from constant mobile usage, and how to make it more beneficial in addition to safeguarding their digital and mental well-being. Further research in addition to brief recommendations and coping ways to cross these effects was needed.

ETHICS APPROVAL

Ethics approval of this study was obtained from institutional Ethics Committee (Pr.001/IEC/CARE/2023). All procedures performed in studies involving human participants were following the ethical standards of the institutional and/ or national research committee and with the Helsinki Declaration.

CONSENT FOR PUBLICATION

Voluntary completion and return of the questionnaire were accepted as a form of individual consent to participate in the survey.

AVAILABILITY OF DATA

Authors confirm that the data related was available within the article.

FUNDING

None.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

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AUTHORS' CONTRIBUTION

Conceptualization by Dr. Neeharika, methodology by Dr. P. Nava Mallika, data collection by Dr. H. Reshma, Dr. M. Pratyusha, data analysis and validation by Dr. S. Blessi, writing the draft and reviewing by Dr. P. Raja Sekhar.

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