Adverse health effects and unhealthy behaviors among dental undergraduates surfing social networking sites

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Introduction: Little is known about the relationships between adverse health effects and unhealthy behaviors among dental undergraduate students surfing social networking sites (SNSs). Objectives: The aim of this study was to determine the associations between adverse health effects and unhealthy behaviors with social networking usage among dental students. Materials and Methods: A cross-sectional study was conducted in a private university in Madhya Pradesh (India) among 300 dental undergraduate students. A self-administered questionnaire was used. It included questions on sociodemographical data, pattern of social networking use, social relationship, unhealthy behaviors, and health effects. Results: The mean age was 21.5 (± 2.3) years. The average daily SNSs surfing hours were 3.5 (± 1.8). Significant associations were found between average hours of social networking and the following factors: isolation from family members and society, refusing to answer calls, musculoskeletal pain, headache, and eye irritation (P < 0.001). The average hours spent on social networking were significantly associated with holding urination and defecation while online, surfing SNSs until midnight, and postponing, forgetting, or skipping meals (P < 0.001). Cohen’s effect size value between adverse health effect and social networking hours were 0.78, 0.86, 0.82, 0.86, and 0.81 for back pain, shoulder pain, wrist pain, headache, and eye irritation, respectively. The effect size value between health-related behaviors and social networking hours were 0.72, 0.62, 0.72, 0.71, and 0.84 for holding urine, holding defecation, postponing meal, skipping meal, and social networking until midnight, respectively. Gender-wise comparison for social networking hours showed a low practical significance (d = 0.09). Conclusions: The average hours spent on social networking were associated with adverse health effects and unhealthy behaviors among dental undergraduate students, as well as social isolation from the family and society.

Keywords: Physical health, social networking, websites

Since 1995, mobile phones have been developing extensively and have become a crucial part of our daily life nowadays.3] Mobile phones are used widely for making calls and messaging, for playing music, watching movies, accessing internet, and variety of applications. Jadhav et al.4] reported that Android is grabbing more and more user attention and thousands of Android applications are currently being developed. These Android applications are WhatsApp (WA), Skype, and GO SMS Pro, which are also, the most popular messenger applications among the college-going students. Internet has had a more dramatic influence on education than any previous technological innovation because it has allowed individuals of all ages to access education and training programs.3] Lorenzetti5] noticed the most dramatic changes with the introduction of Web 2.0. The basic elements of Web 2.0 are communication and collaborative technologies that involve voice, video, social networking, and content sharing; the direction and content of these applications

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SNSs have become increasingly popular with the rise of Web 2.0, providing increased collaboration and sharing among users through applications such as wikis, blogs, podcasts, and RSS feeds. Castells found that SNSs such as MySpace, Friendster, and most recently, Facebook (FB), are used by a great variety of people, both for social and professional purposes; youth, in particular, use these new technologies to communicate and stay connected. This popularity should help SNSs act as natural supports for educational activities if they are used effectively. Gafni and Deri reported that the FB is by far the biggest social network worldwide. Until December 2012, FB had one billion monthly active users. The adoption of FB among students increased over time. A recent study from the US showed that up to 96% of medical undergraduate students regularly use FB.

Social media grows rapidly and is an indispensable part of every organization. In the last 2 years, social media use has become one of the most rapidly growing activities worldwide since the invention of television. Within 30 years, radio reached 50 million listeners, while it took only 13 years for television to reach 50 million viewers. Strikingly, the internet reached 50 million users in only 4 years; indeed, FB reached that figure in 1½ years. Designed for students at Harvard University in 2004, FB is a single phenomenon. In 2009, FB had 100 million members, and by the end of 2010, that number increased to 500 million users worldwide. As social media grows at a faster rate than other communication programs, the importance of social media increases and following its development has become even more challenging. By the year 2013, more than half of 2.4 billion internet users have become members of and use the services offered by a social network. Globally, each month, approximately 800 million users visit “YouTube” and each minute, at least 7000 videos are shared through “Twitter.” Twitter is used mostly in USA, Brazil, and Japan. Considering all these figures, it is predicted that in the near future, an important part of internet use will be through social media.

SNS is a communication tool for members. This kind of platform was designed as a way for friends, family, or strangers to have discussions and interaction or be in contact with each other. It allows members to explore new opportunities and experiences. SNSs allow students to express themselves, communicate, and collect profiles that highlight their talents and experience. Students are increasingly utilizing these social networks for friends’ news feeds, personal updates, events and activities, notes, and messages. According to an extensive study by the Office of Communications (Ofcom) of the United Kingdom, almost half (49%) of children aged 8–17 who used the Internet had set up their own profiles on SNSs. Hendrix et al. noted that the use of SNSs is increasing extensively in the field of medical education and has gained substantial interest among educators and institutions. Boon and Sinclair showed that the institutions of higher education around the world began to focus on the benefits of FB for educational purposes. Vivian searched several literatures and reported that these literatures have focused on the potential of FB as a learning tool in higher education. FB was reported to be useful for students in the social and the academic aspects as it allows for interactive learning between students and facilitators in higher educational institutions. Several authors discussed the addiction to SNSs on the internet and thought that like any new phenomena in our life, facebooking might hold its own risks. However, limited literatures focused on its harmful effects on health and social life. Possible impacts of social networking use reported in the previous literature include addiction, waste of time, and money. Hall et al. conducted a survey of the use and views on SNSs of pharmacy students in the United Kingdom and reported that some criminal offences and deterioration of morale prompting disciplinary actions were attributed to misuse of social networking in circumstances of disclosing privacy issues and posting unethical materials.

Kim et al. conducted a questionnaire-based survey in Korean adolescents and reported an association between the use of social networking and changes in self-esteem. Fovet focused the impact of facebooking on mental health among students of high school and observed a link between social networking and sleep disorders and high level of depression among them. Al-Dubai et al. conducted a cross-sectional study in a private university in Malaysia among medical students and reported a significant association between facebooking and adverse health effects and unhealthy behaviors among students. Little is known about the relationships between adverse health effects, social isolation, and unhealthy behaviors and SNSs (such as WA, FB, Twitter, YouTube, LinkedIn, Instagram, and Skype, etc.) surfing hours among dental students.
undergraduates. This study aimed to assess the direct association between SNSs surfing and physical health, unhealthy behavior, and the social relations of dental students.

**MATERIALS AND METHODS**

A cross-sectional study was conducted among 300 dental undergraduate students in a private dental college under Rani Durgavati University in Jabalpur, Madhya Pradesh (India) where all students were asked to participate in the study. Permission for access to the students was obtained from the coordinators and lecturers. Confidentiality and freedom to participate were assured. Written consent was obtained from the participants. The ethics committee of the university approved the study protocol. The questionnaire was pilot tested on ten students who were not participating in the study.

A self-administered questionnaire was distributed to the participants. The first part included questions on sociodemographic data such as age, gender, and year of study. The second part included questions on pattern of social networking usage such as the average daily hours and place of social networking use. The third part assessed the health-related behavior during social networking, and it included five items: holding urine, holding defecation, postponing, forgetting, or skipping meal, and social networking until midnight. The answer responses were “not at all,” “sometimes,” or “frequently.” The fourth part assessed perceived isolation from family and society during social networking activities. It included three questions: during social networking, do you (1) feel isolated from the family; (2) feel isolated from the society; (3) refuse to answer calls? The answer responses were “not at all,” “sometimes,” or “frequently.” The fifth part included questions on adverse physical health effects during social networking; in the last month, how frequently did you experience the following conditions during social networking use: back pain, shoulder/neck pain, wrist joint pain, headache, and eye irritation? The response options were “not at all, sometimes, or frequently.”

The Statistical Package of the Social Sciences (SPSS, Inc, Chicago, USA) version 20.0 for Windows was used for data analysis in this study. Normal distribution: normality test of the number of social networking hours/day yielded abnormal distribution. Nonparametric Mann–Whitney U-test was used to assess the association between social networking hours and other variables. To ease interpretation, we categorized “not at all” and “sometimes” as “no” and “frequently” as “yes.” The accepted level of significance was set below 0.05 ($P < 0.05$).

**RESULTS**

A total of 312 questionnaires were distributed among dental undergraduates, and only 300 students returned valid questionnaires. This represented 96.1% response rate. A response rate of above 50% is adequate for analysis, and therefore, 96.1% response rate was considered as being very good for analysis.

In analysis, data from questionnaires were coded and analyzed into quantitative summary reports using the SPSS version 20. Data were keyed into the program under specific category from which analysis was run to obtain descriptive statistics in the form of frequencies and percentages.

**Gender distribution**

The study sought to know the gender distribution of the respondents. From the responses, the majority of respondents were female (71.7%), while the minority respondents were male (28.3%) as shown in Graph 1. The gender imbalance is not likely to affect the study as the nature of the research and questions asked were not gender sensitive and any unlikely error as a result of the gender imbalance may be tolerated. However, given that most of the responses in the research questions relied on opinions and perceptions, the gender distribution is expected to accommodate the perceptions and opinions of either gender. Cohen’s effect size value ($d = 0.09$) suggested low practical significant difference between both the genders and social networking hours [Table 1].

**Year of education or level of study of the respondents**

The study sought to find out the level of study of the respondents considering that the level of study was likely to have an influence on their capacity to sufficiently respond to the questions asked. From the responses, the majority (24.0%) were 3rd year students, 20.0% were 1st year students, 20.0% were 2nd year students, and 3rd year students were the minority with 7.0%.

![Graph 1: Gender-wise distribution (in percentage) of respondents](image-url)
students, 19.3% were 2nd year students, 18.0% were 4th year students, and 18.6% were 5th year (interns) students as shown in the Graph 2. Considering that the respondents were drawn from the five levels of study, it shows that the data collected had adequately varied views and opinions representative of every level.

**Age bracket of the respondents**
The study wanted to know how old the respondents were. Majority (74.3%) of the respondents were between 18 and 22 years, which is the appropriate age in the Indian Universities. About 17.0% were 23–27 years old and 8.7% were above 27 years old as shown in Graph 3. The study managed to include respondents that were at different age brackets and therefore are likely to be at different stages of their developments and socializations. These representation may strengthen the study given the findings will reflect the ideas and opinion from different categories of respondents.

**Respondent’s most common social media**
The respondents were asked the most common social networking site (SNS) they visited. As shown in Graph 4 and Table 2, a majority (35.3%) said they were on FB, findings that agreed with a July, 2010 report in the New York Times that indicated FB had surged from 200 million to nearly 500 million users in the last 15 months. About 9.4% said they were on Twitter, 11.8% said they were on YouTube, 29.3% said they were on WA, only 5.9% said they are in LinkedIn, 2.3% said they were on Instagram, and another 5.9% said they were on Skype.

**Hours spent for surfing social networking sites by the respondents**
The respondents were asked how many hours they spent for surfing SNSs on every day basis. Graph 5 shows the summary of the findings. About 27.5% said they spend 1–2 h a day, 26.7% said they spend less than 1 h, 30.6% said they spend 2–5 h a day, and 15.2% said they spend 5–10 h a day. Available evidence suggests that most internet users probably visit social network sites daily or at least every other day (Ofcom, 2008), and young people lead the pack. The mean (± standard deviation) of daily social network surfing hours was 3.5 (±1.8) hours and the total surfing hours ranged from 1 to 8 h/day.

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**Table 1: Gender-wise comparison for social networking hours**

| Gender | Time (h), mean±SD (median) | Mann–Whitney U-test value | P | Effect size |
|--------|---------------------------|---------------------------|---|-------------|
| Male   | 3.3±1.7 (1.1)             | 8037.500                  | 0.100 (>0.05) | 0.09 NS     |
| Female | 3.06±2.65 (2.0)           | NS                        |   |             |

NS = Not significant; SD = Standard deviation

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**Place the respondents had social networking sites access**
The respondents were asked the places they had SNSs access. From Graphs 6 and 7, 35.9% said used their mobile phones to access the internet, 4.9% said they used computers at school, 33.7% said used computers at home, 11.7% used cybercafés to have access to computers, and only 14.4% used library for surfing SNSs.
Most respondents surfed SNSs at their homes (33.7%), particularly in their bedroom (20.3%) followed by surfing in their living room (6.4%) or dining room (4.7%), and other places (2.3%), respectively.

**Adverse health effects of social networking among respondents**

As seen in Graph 8, about 183 students complained of occasional back pain, while another 121 of them had occasional shoulder pain. In addition, the majority of respondents experienced occasional wrist pain (152 students), headaches (118), and eye irritations (160) during social networking activities.

**Health-related behavior during social networking**

As shown in Graph 9, it is evident that the majority of respondents denied holding urine (208 students) and defecation (243 students) or skipping meals (211 students) during social network surfing. However, most of the respondents agreed to postponing meals (92 students) occasionally during social networking usage. Around 111 respondents had occasional midnight logins for social networking activities.

**Interpersonal factors of social networking among respondents**

It is evident from Graph 10 that the majority of respondents denied feeling isolated from family (66.3%) and society (63.3%) while surfing SNSs. However, most respondents (51.4%) preferred refusing to answer calls during such surfing. The majority of respondents (48.7%) denied refusing to answer calls during social networking activities.
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There was a significant association between back pain, shoulder pain, and wrist pain and social networking hours ($P < 0.001$). Headaches and eye irritation also showed significant associations with SNSs surfing hours ($P < 0.001$) [Table 3]. Cohen’s effect size value ($d = 0.78$) suggested a moderate-to-high practical significance between back pain and social networking hours. However, the effect size values ($d = 0.86, 0.82, 0.86$ and $0.81$) suggested a high practical significance for shoulder pain, wrist pain, headache, and eye irritation, respectively, when compared with social networking hours. There was a significant association between holding urine and defecation with such surfing activities ($P < 0.001$). Postponing or skipping meals and midnight logins also showed significant associations with such activities ($P < 0.001$). Significant associations were found between feeling isolated from the family and the society with social networking ($P < 0.001$) [Table 4]. Cohen’s effect size values ($d = 0.72, 0.62, 0.72,$ and $0.71$) suggested a moderate-to-high practical significance for holding urine, holding defecation, postponing meal, and skipping meal, respectively, when compared with social networking hours. However, the effect size value ($d = 0.84$) suggested a high practical significance between social networking until midnight and social networking hours.

**DISCUSSION**

This study found preliminary associations between behavioral and intrapersonal factors affecting social networking hours and health well-being among small population of dental students in India. The year 1995 marked the inception of internet into medical education and university students.[23] Our sample showed that the majority of dental students surfed SNSs between 2 and 5 h a day, inconsistent with the findings reported by Kalpidou et al.[24] who found that the majority of university students surfed between 1 and 2 h per day only and by Al-Dubai et al.[22] who reported that medical students surfed SNSs between 1 and 8 h a day. Some researchers argued that students mainly use the social network to keep in touch with other individuals, with minimal informal academic use of SNSs for learning purposes.[25] Raacke and Bonds-Raacke[26] found that only 10.9% of students use SNSs for academic purposes. The adoption of SNSs as a channel of learning resources by dental students is fundamental to cope with the paradigm shift toward self-directed learning in dental schools globally. Thus, the time of dental students (as an important resource) is better to be used mainly for academic purposes rather than for unnecessary activities. The dawn of social networking in the digital era had marked the beginning of cyberpsychology, causing adverse physical and mental health effects to human well-being.[27,28]

This study found significant associations between social network surfing hours with potential adverse health effects among dental students. Dental students surfing SNSs had significantly experienced musculoskeletal pain (back pain, shoulder pain, or wrist pain), eye irritation, and headaches. This study found significant associations between social network surfing hours and unhealthy behavioral actions such as holding urine and defecation, postponing or skipping meals, and SNSs surfing until midnight. Young[27] found that university student’s sleep patterns were disrupted due to late night logins and surfing, causing extensive sleep deprivation side effects such as excessive fatigue, impaired academic performance, and decreased immunity. Sharifah et al.[26] identified the behavioral consequences of social networking in the current digital era as hyperactivity, inattention, depression, and multitasking mania. This study is the first to enumerate significant associations between interpersonal factors (social isolation from family and society and self-isolation) with SNSs surfing among dental undergraduates. These findings were consistent with the Gratification Theory interpreted by Cabral[29] that motivation related factors to social networking are influenced by social escapism, pass time, interactive control,
Table 3: Association between adverse health effect and social networking hours

| Health effects | n (%) | Time (h), mean±SD (median) | Mann–Whitney U-test value | P         | Effect size |
|----------------|-------|-----------------------------|---------------------------|-----------|-------------|
| Back pain      |       |                             |                           |           |             |
| Yes            | 218 (72.7) | 4.13±2.90 (4.00)          | 2750                      | 0.000 (<0.001) | 0.78         |
| No             | 82 (27.3)   | 0.47±0.16 (0.50)         |                           | Significant difference |
| Shoulder pain  |       |                             |                           |           |             |
| Yes            | 153 (51.0)  | 5.39±2.58 (5.00)          | 148.500                   | 0.000 (<0.001) | 0.86         |
| No             | 147 (49.0)   | 0.78±0.44 (0.75)         |                           | Significant difference |
| Wrist pain     |       |                             |                           |           |             |
| Yes            | 185 (61.7)  | 4.69±2.81 (5.00)          | 374.000                   | 0.000 (<0.001) | 0.82         |
| No             | 115 (38.3)   | 0.62±0.27 (0.50)         |                           | Significant difference |
| Headache       |       |                             |                           |           |             |
| Yes            | 141 (47.0)  | 5.68±2.48 (5.00)          | 142.500                   | 0.000 (<0.001) | 0.86         |
| No             | 159 (53.0)   | 0.87±0.54 (0.75)         |                           | Significant difference |
| Eye irritation |       |                             |                           |           |             |
| Yes            | 188 (62.7)  | 4.63±2.82 (5.00)          | 387.500                   | 0.000 (<0.001) | 0.81         |
| No             | 112 (37.3)   | 0.61±0.27 (0.50)         |                           | Significant difference |

SD = Standard deviation

Table 4: Association between health-related behaviors and social networking hours

| Health-related behaviors | n (%) | Time (h), mean±SD (median) | Mann–Whitney U-test value | P         | Effect size |
|--------------------------|-------|-----------------------------|---------------------------|-----------|-------------|
| Holding urine            |       |                             |                           |           |             |
| Yes                      | 92 (30.7) | 6.52±2.57 (5.00)          | 1069.000                  | 0.000 (<0.001) | 0.72         |
| No                       | 208 (69.3) | 1.63±1.56 (1.00)         |                           | Significant difference |
| Holding defecation       |       |                             |                           |           |             |
| Yes                      | 57 (19.0)  | 7.78±2.55 (8.00)          | 631.000                   | 0.000 (<0.001) | 0.62         |
| No                       | 243 (81.0) | 2.06±1.80 (1.00)         |                           | Significant difference |
| Postponing meal          |       |                             |                           |           |             |
| Yes                      | 95 (31.7)  | 6.45±2.56 (5.00)          | 1084.000                  | 0.000 (<0.001) | 0.72         |
| No                       | 205 (68.3) | 1.59±1.54 (1.00)         |                           | Significant difference |
| Forgetting or skipping meal |       |                             |                           |           |             |
| Yes                      | 89 (29.7)  | 6.60±2.57 (5.00)          | 1003.000                  | 0.000 (<0.001) | 0.71         |
| No                       | 211 (70.3) | 1.67±1.58 (1.00)         |                           | Significant difference |
| Social networking until midnight | |                             |                           |           |             |
| Yes                      | 127 (42.3) | 5.96±2.42 (5.00)          | 336.500                   | 0.000 (<0.001) | 0.84         |
| No                       | 173 (57.7) | 1.05±0.89 (1.00)         |                           | Significant difference |

SD = Standard deviation

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Information, and communication. SNSs exhibited an ultimate isolating technology among tech-savvy youngsters and indeed reduced their participation and interconnectivity activities in many real-life situations in the world.28

The cross-sectional design of this study cannot prove a causal relationship between the variables. The study sample was exclusively made up of dental students from a single university. This may affect the generalizability of the findings from this study. This study found a significant association between SNSs use and many adverse health effects and unhealthy behavior. This study conveys a message to both students and educators that SNSs might have some negative issues not without its issues. Health education and promotion should be proposed by educational institutions to create awareness of the possible health adverse effect of SNSs.30,31 Safety precautions should be considered during its use. Health screening of students for musculoskeletal disorders and eye disorders periodically is recommended. Self-control of SNSs surfing hours is essential to avoid the possible health consequences.

Future scope
Since the study targeted on the general social media, a study can be done further on the specific social media platform, such as FB or WA. While the study recognized that social media has impacts on other age groups outside the youth bracket, and as such, this study limited itself only to the youths in a small population of India. Therefore, a similar study can be done on other age groups outside the youth bracket. The study focused itself only in one university that is based around Jabalpur District (Madhya Pradesh), as opposed to other institutions outside the stated realm of orientation or geographical boundary. Similar studies can
be done outside of Jabalpur District in Madhya Pradesh and even in other states of India. Severity and frequency of musculoskeletal disorders and other health effects should be investigated in the future studies.

**CONCLUSIONS**

The study found that the dental undergraduates in Jabalpur, Madhya Pradesh (India) use social media a lot and they spent more time on the mobile or computer. About 30.6% of the students spend 2–5 h a day for surfing SNSs. Most of the students were on social media with FB, WA, and YouTube topping the list. Most of these respondents used their mobile phones to access the SNSs on the internet and preferred bedroom for such social networking activities, while at home.

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**Conflicts of interest**
There are no conflicts of interest

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