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# Techno stress among medical freshmen: An exploratory study

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## Abstract:

**INTRODUCTION:** Use of technology and ICT tools is ubiquitous among college students including medical students. However overuse or misuse may lead to many physical and psychological problems including the risk of harming professional standing in the long term. The purpose of this study was to explore techno stress among freshmen at a medical institute and to suggest measures to reduce problematic use of technology pertaining to internet.

**OBJECTIVES:** (i) To explore the extent of technology use including internet among medical freshmen, (ii) To identify the content of usage (iii) To quantify the extent of techno stress and iv. To suggest measures to reduce problematic use of technology.

**MATERIALS AND METHODS:** The sample comprised all the freshmen at a medical institute ( $n = 61$ ). A semi structured questionnaire was used to collect socio demographic details of students and their patterns of technology usage. Perceived Stress Scale was used to measure stress.

**RESULTS:** The mean age of the sample was 18.34 ( $\pm 0.58$ ) years comprising 68% males and 32% females. Students spent a mean time of 3.96 h/day on the technology tools (standard deviation = 4.99). Ninety-two percent of the students used technology for educational purposes followed by entertainment (89%), social networking (77.78%), watching films (70.37%), communication (66.67%) and watching pornography (46.3%). 11.47% had symptoms suggestive of problematic internet use. One percent had craving suggestive of addiction. All these had stress out of which 43% had high and 57% had moderate levels of stress.

**DISCUSSION:** Considering the students' present usage of social media, it can serve as a potent academic tool. However, awareness is required to be raised with regard to its use as a medical professional.

**CONCLUSION:** Use of technology is crucial in the current academic world and restrictions on usage may neither be practical nor feasible. However, understanding patterns of usage among students is a preliminary step that can enable educators and administrators to formulate guidelines to channelise their usage in more productive ways.

## Keywords:

First year medical students, internet, Perceived Stress Scale, social media, stress, techno stress

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## Introduction

Most college age students belong to what are described as Generation Y, Net Generation, and are referred to as digital natives and millennials.<sup>[1]</sup> Students born after 1980 are considered as digital natives, as they grew up in a world where using technology (e.g., computers, the Internet, text messaging, blogging, and SMS text

messaging) was already integrated within their education, patterns of establishing/maintaining relationships, and means of self-expression. Techno stress is a modern disease of adaptation caused by an inability to cope with the new computer technologies in a healthy manner.<sup>[2]</sup> While, techno stress has been evaluated among older generations, the extent of stress related to technology in daily lives among medical students is still being studied. The purpose of this study was to explore techno stress

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among freshmen at a medical institute located in Delhi, India.

## Materials and Methods

This was a descriptive, cross sectional and quantitative study. The sample size comprised all the freshmen undergoing training in first semester of their 1<sup>st</sup> year of medical education ( $n = 61$ ). A self administered questionnaire in English was used. The first part collected the socio demographic details of students. The second part consisted of questions eliciting time spent on technology use, frequency and content of use, distress, guilt, loss of control, craving related to internet use etc., The third part comprised the Perceived Stress Scale (PSS) developed by Cohen *et al.*<sup>[3]</sup> which was used to measure stress. This is a standardised instrument with established acceptable psychometric properties.<sup>[4]</sup> The purpose of the study was explained to the students in a classroom setting and the questionnaire given to those willing to participate and provide informed consent. Responses were collected anonymously. Descriptive statistics were used and Chi square tests were used to compare frequencies. Approval was obtained from the institutional ethics committee prior to the start of the study.

## Results

The mean age of the students was 18.34 ( $\pm 0.58$ ) years comprising 68% males and 32% females. The study sample comprised students from 17 states of India. At present, after joining the medical institute, all students in the study used some form of technology and all of them used internet. Students spent a mean time of 3.96 h/day on the internet (standard deviation [SD] = 4.99). Comparatively, students spent 4.25 mean h/day on studies (SD = 2.34).

As expected, technology was used for multiple purposes. Ninety-two percent of the students declared using internet for educational purposes. This was followed by entertainment (89%), social networking such as facebook etc., (77.78%), watching films (70.37%), communication such as skype, video chatting (66.67%) and watching pornography (46.3%). These categories were not mutually exclusive [Figure 1].

Thirty-four percent students believed that their current manner of use of internet technology is not required. 85.7% of such students used social networking sites such as facebook followed by entertainment (78.57%).

Among those who believed that their current use is not required, 78.57% had moderate to high stress on PSS. Among these students who believed that their current

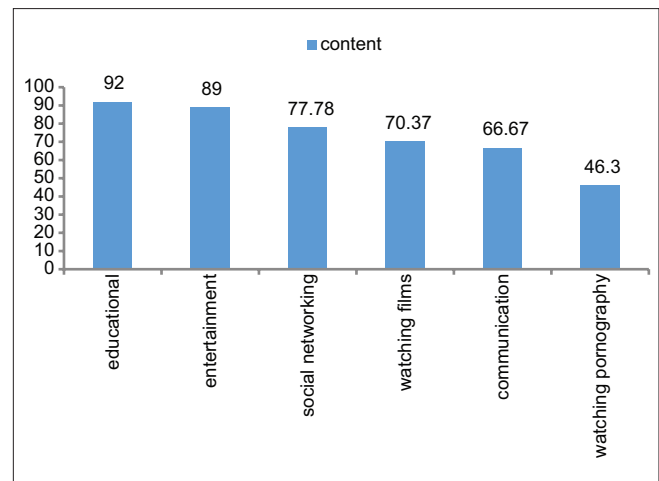


Figure 1: Content of usage pertaining to internet via various technologies (percentage)

manner of internet use is required, 81.48% had moderate to high scores on PSS. There was no significant difference in stress among those who believed usage of technology was required and those who did not. There was no significant difference in stress levels between those who watched pornography and who did not.

63.41% students reported that their current pattern of internet use affects their study hours. Among them, 80.77% had moderate to high levels of stress on PSS. There was no significant difference in perceived academic performance or stress levels with respect to perception of internet use affecting study hours.

Fifty-one percent students reported feelings of distress and or guilt due to internet usage. However, there was no significant difference in stress levels due to the feelings of distress or guilt. Students who reported distress or guilt spent 4.05 mean hours ( $\pm 3.9$ ) on internet per day. However, the number of usage hours did not significantly affect feeling of distress or guilt. Among these students, 76% used internet for educational and entertainment purposes, 72% for social networking, 62% for movies and 52% for watching pornography.

Among students who experienced distress with respect to internet use, 11%, 43% and 46% reported high, moderate and mild distress respectively. All students who reported high distress also had high levels of perceived stress. However, there was no significant difference in stress levels with respect to the three categories of distress. The main reasons stated for experiencing distress were wastage of time and reduction in study hours.

7.4% reported loss of control over usage of internet. Out of these, 75% experienced distress, but only 3.57% reported distress explicitly due to loss of control over internet use. There was no significant difference in

distress levels with respect to loss of control over internet use among students.

Forty-three percent reported distress if they are not able to use internet even for 1 day out of which 3.84% reported extreme form of distress i.e., craving.

There was no significant difference in stress levels among students with respect to internet use affecting productivity of work.

Internet use was stated as one of the methods of de-stressing for 65.57% of the students. Among these students, 45% paradoxically, reported distress due to internet use. 44.4%, 44.4% and 11.2% had mild, moderate and severe levels of distress.

All those who reported severe distress had high levels of stress on PSS. Among those who reported moderate distress, 75% had moderate stress and 25% had low stress on PSS. Among those who reported mild distress, all of them had moderate stress on PSS. There was no statistically significant difference between stress levels when levels of distress were compared.

There was no statistical significance to suggest that students used internet as a method of de-stressing due to problems of social adjustment with friends, colleagues, seniors, teachers etc.

11.47% of the students in this study had symptoms suggestive of internet addiction (IA) with varying levels of severity. Out of these, 42.86% had high and 57.14% had moderate levels of stress. 57% were boys and 43% were girls. All parents of these students were graduates and both parents were working for 85.71% of students. However, the results were not statistically significant to suggest that those students who had symptoms suggestive of IA belonged to only highly educated families. These students spent  $5.83 \pm 6.11$  mean h/day on the internet.

## Discussion

Our study explored the patterns of technology usage among a cohort of freshmen at a medical institute in Delhi, India. Technology usage among students was universal after joining the institute.

Students spent 3.96 mean hours (SD = 4.99) on various technologies pertaining to internet. Studies in the Indian sub continent have reported approximately similar hours.<sup>[5]</sup>

There is a qualitative shift in content of internet use over the decade among undergraduate medical students. Earlier, most undergraduate students used internet

mainly for E-mail, chatting, educational purposes and banking in that order.<sup>[6-8]</sup> The use of internet for professional and academic purposes was not more than 21%.<sup>[9]</sup> Presently, even among 1<sup>st</sup> year students, 92% use internet for educational purposes and 89% for entertainment.

The third major usage of technology was social media (77.78%). 28.9% students believed that their usage of social media was not necessary. Social media is a broad example of Web 2.0 and refers to Internet-based platforms devoted to blogging, social networking, collaborative writing projects, content communities, and virtual social worlds<sup>[10]</sup> such as youtube, facebook, whatsapp, Wikipedia, Instagram etc., A meta analysis reported that usage of social media among medical students is 75%.<sup>[11]</sup>

Social media has implications in health science education due to patient and provider confidentiality,<sup>[12]</sup> patient privacy violations and ethical behaviour. Many of the students at this age may not consider the future implications for career, professional standing, future job searches, etc., because Internet posts are “forever,” leaving a digital footprint behind.<sup>[13]</sup> There are instances of medical students being dismissed because of their “unprofessional” online image.<sup>[14,15]</sup> Use of social media channels for personal rather than professional purposes, unintentionally revealing details of patients’ private information, and the massive social media use by medical students raise awareness about the importance of acquiring skills related to digital technologies from the 1<sup>st</sup> year of medical school.<sup>[16]</sup>

The prevalence of use of interactive web technology by students underscores the need for social media education by medical educators, professional organizations, and regulatory groups. Universities in the United States and United Kingdom have developed guidelines and policies for health care professionals concerning proper social media use. In order to foster awareness, courses on handling social media associated with medical professionalism have been implemented in the professional curricula.<sup>[17-19]</sup> E-professionalism is an essential and increasingly important element of professional identity formation.<sup>[20]</sup> Education should not be limited to adherence to guidelines but should include what actions students should take when they observe guidelines being violated by others.<sup>[21]</sup> It is therefore important to engage with the students, early in their career, to inculcate ethical behaviours with respect to social media usage. It may also be noted that medical students are sensitised towards ethical issues in healthcare much later in their medical education. The revised curriculum of the Medical Council of India addressed this deficiency. However, the behaviours

required during social media usage also need to be stressed upon early in the course of medical education.

Studies also advocate the use of social media as part of a connectivist learning theory.<sup>[22]</sup> Social media fosters communication, engagement, and collaboration. Social media learning empowers students by providing greater autonomy for the learner.<sup>[23,24]</sup> This may be used as an academic tool by creating communities for learning purposes. However, this requires the pro active engagement of medical educators who may be, in comparison, digital naïve or immigrants. It is also reported that students may have greater understanding of different web 2.0 technologies, however, productive usage of social media for academic purposes is limited.<sup>[11]</sup> There is a need for further research to integrate the broad spectrum of social media's opportunities and challenges into the current existing frameworks for medical professionalism.

It is also reported that addiction to social networking is higher in people with anxiety, stress, depression and low self-esteem.<sup>[25]</sup> We could not measure stress levels of those to those specifically addicted to social media.

46.3% students watched pornography on various technology platforms. There was no significant difference in stress between those who watched pornography and those who did not. Pornography addiction is a diagnostic label which is used to define patients with a propensity and tendency to view pornography images and videos frequently and regularly and also experience distress when not allowed to do so.<sup>[26]</sup> This falls under the broader rubric of "sex addiction" or as a subtype of "internet addiction behavior."<sup>[27]</sup> The younger the user, the greater the neural response to pornography, potentially for the long-term. Studies that have highlighted the impact of pornography on young people's sexual health such as sexual function, arousal and relationships, links to violence, impact on attitudes, beliefs and behaviour, potential for addiction<sup>[28-31]</sup> need to be disseminated among students to act as a deterrent. The current cohort of freshmen is a group that is used to spending maximum time on studies daily which enabled them to successfully clear the examinations to enter into professional medical education. It is therefore not surprising to note the perception that time not spent on studies is a wastage of time which has led to distress or guilt among those spending time on internet. It may also be observed that none of the students reported guilt due to perceived "good versus bad behaviour" or morality. More than 50% of these students spent time on entertainment, social media, films and pornography. One third of the students were aware that their use of internet was not required. For 45% students, internet was paradoxically both a de-stressor and stressor. The challenge is to sensitise and

train the students into achieving a balance between time spent on work and recreation virtually. However, 11.47% of the students in this study had symptoms suggestive of problematic internet use including addiction with varying levels of severity based on symptoms such as feelings of guilt or distress due to internet use, loss of control and distress due to non availability of internet even for a day. One percent had symptoms suggestive of addiction (i.e., craving). All these students had stress out of which 43% had high and 57% had moderate levels of stress.

Problematic internet use has been found to be associated with various social and psychological problems in previous studies, including poor psychological well-being, academic failure, reduced work performance, social withdrawal, poor self-confidence, family problems, marital breakdown, poor diet, sleep deprivation, and cardiopulmonary-related death.<sup>[32]</sup> A study reported that 14% of the college population are addicted.<sup>[33]</sup> Specifically among medical students, there is a wide variation in the prevalence rates of problematic internet use and have been ranged from 7% to 21%.<sup>[34]</sup> The pooled prevalence of IA among 3651 medical students was reported to be 30.1% (95% confidence interval: 28.5%–31.8%) which was estimated to be approximately five times than that of the general population.<sup>[35]</sup> A study in north east India reported an IA prevalence of 0.5% and stated that the number of possible addicts may be as high as 46.3%.<sup>[36]</sup> There was no statistical significance to suggest that students used internet as a method of de stressing due to problems of social adjustment with friends, colleagues, seniors, teachers etc., Studies such as ours will initially help the students to reflect on their own behaviours and nudge them to seek professional help. Educators can also focus on measures to address these students identified at risk for addiction.

## Conclusion

Our study identified the broad patterns of technology use pertaining to internet among medical freshmen early in their entry into medical institute and detected their stress levels. Early detection can guide educators and administrators to formulate guidelines and intervene to channelise the usage among medical students in more productive ways. Implications of different technology uses were discussed. The limitations of our study were that the specific object of problematic internet usage could not be identified and a detailed qualitative analysis of social media usage among medical students was not done.

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## Conflicts of interest

There are no conflicts of interest.

## References

1. Prensky M. Digital natives, Digital Immigrants; 2001. Available from: [http://www.marcprensky.com/writing/Prensky%20%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part 1. pdf](http://www.marcprensky.com/writing/Prensky%20%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part%201.pdf). [Last accessed on 2017 Jun 05].
2. Brod C. Technostress: The Human Cost of the Computer Revolution. Reading, MA: Addison-Wesley; 1984.
3. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav* 1983;24:385-96.
4. Tarentino AL, Maley F. A comparison of the substrate specificities of endo-beta-N-acetylglucosaminidases from *Streptomyces griseus* and *Diplococcus pneumoniae*. *Biochem Biophys Res Commun* 1975;67:455-62.
5. Balhara YP, Gupta R, Atilola O, Knez R, Mohorović T, Gajdhar W, *et al.* Problematic internet use and its correlates among students from three medical schools across three countries. *Acad Psychiatry* 2015;39:634-8.
6. Inamdar SC, Rotti SB. Computer use among medical students in an institution in Southern India. *Natl Med J India* 2004;17:8-10.
7. Gour N, Srivastava D, Shahi A, Adhikari P. Use and need of computer among medical students. *J Community Med Health Educ* 2011;1:104.
8. Lal P, Malhotra R, Ahuja, C, Ingle GK. Internet use among medical students and residents of a medical college of North India. *Indian J Community Med* 2006;31:293-4.
9. Senok AC, Pipan C, Edan Y, Botta GA. Internet and computer use by medical students in traditional and problem based learning systems. *Kuwait Med J* 2008;40:196-201.
10. Kaplan AM, Haenlein M. Users of the world, unite! The challenges and opportunities of social media. *Bus Horiz* 2010;53:59-68.
11. Guraya SY. The usage of social networking sites by medical students for educational purposes: A meta-analysis and systematic review. *N Am J Med Sci* 2016;8:268-78.
12. Duggan M, Ellison NB, Lampe C, Lenhart A, Madden M. *Social Media Update*; 2014. Available from: <http://www.pewinternet.org/2015/01/09/social-media-update-2014/>. [Last accessed on 2018 Jun 02].
13. O'Sullivan E, Cutts E, Kavikondala S, Salcedo A, D'Souza K, Hernandez-Torre M, *et al.* Social media in health science education: An international survey. *JMIR Med Educ* 2017;3:e1.
14. Greysen SR, Kind T, Chretien KC. Online professionalism and the mirror of social media. *J Gen Intern Med* 2010;25:1227-9.
15. Chretien KC, Greysen SR, Chretien JP, Kind T. Online posting of unprofessional content by medical students. *JAMA* 2009;302:1309-15.
16. Griffith R, Tegenah C. District nurses' use of social networking sites: Caution required. *Br J Community Nurs* 2011;16:455-7.
17. Kind T, Genrich G, Sodhi A, Chretien KC. Social media policies at US medical schools. *Med Educ Online* 2010;15:1. doi: 10.3402/meo.v15i0.5324.
18. Chretien KC, Kind T. Social media and clinical care: Ethical, professional, and social implications. *Circulation* 2013;127:1413-21.
19. Farnan JM, Snyder Sulmasy L, Worster BK, Chaudhry HJ, Rhyne JA, Arora VM, *et al.* Online medical professionalism: Patient and public relationships: Policy statement from the American College of Physicians and the Federation of State Medical Boards. *Ann Intern Med* 2013;158:620-7.
20. Kaczmarczyk JM, Chuang A, Dugoff L, Abbott JF, Cullimore AJ, Dalrymple J, *et al.* e-Professionalism: A new frontier in medical education. *Teach Learn Med* 2013;25:165-70.
21. Kesselheim JC, Schwartz A, Belmonte F, Boland KA, Poynter S, Batra M, *et al.* A National survey of pediatric residents' professionalism and social networking: Implications for curriculum development. *Acad Pediatr* 2016;16:110-4.
22. El Bialy S, Jalali A. Go where the students are: A comparison of the use of social networking sites between medical students and medical educators. *JMIR Med Educ* 2015;1:e7.
23. Downes S. E-learning 2.0. *e Learn magazine*; 2005. Available from: <https://elearnmag.acm.org/featured.cfm?aid=1104968> <http://elearnmag.acm.org/featured.cfm?aid=1104968>. [Last accessed on 2018 Jul 15].
24. Couros A. Open, connected, social – implications for educational design. *Campus-Wide Info Systems* 2009;26:232-9. <https://doi.org/10.1108/10650740910967393>.
25. Guedes E, Sancassiani F, Carta MG, Campos C, Machado S, King AL, *et al.* Internet addiction and excessive social networks use: What about facebook? *Clin Pract Epidemiol Ment Health* 2016;12:43-8.
26. Ley D, Prause N, Finn P. The emperor has no clothes: A review of the 'pornography addiction' model. *Curr Sex Health Rep* 2014;6:94-105.
27. Sabina C, Wolak J, Finkelhor D. The nature and dynamics of internet pornography exposure for youth. *Cyberpsychol Behav* 2008;11:691-3.
28. Crooks R, Baur K. *Our Sexuality*. 12<sup>th</sup> ed. CA: Wadsworth Cengage Learning; 2014.
29. Sun C, Bridges A, Johnson JA, Ezzell MB. Pornography and the male sexual script: An analysis of consumption and sexual relations. *Arch Sex Behav* 2016;45:983-94.
30. Phillips B, Hajela R, Hilton DL Jr. Sex addiction as a disease: Evidence for assessment, diagnosis, and response to critics. *Sex Addict Compulsivity* 2015;22:167-92.
31. Zimbardo PG, Duncan N. The Demise of Guys. *Psychology Today* 2012. Available from: <https://www.psychologytoday.com/blog/hero/201205/the-demise-guys>. [Last accessed on 2018 Mar 02].
32. Scherer K. College life online: Healthy and unhealthy Internet use. *J Coll Stud Dev* 1997;38:655-65.
33. Salehi M, Norozi Khalili M, Hojjat SK, Salehi M, Danesh A. Prevalence of internet addiction and associated factors among medical students from Mashhad, Iran in 2013. *Iran Red Crescent Med J* 2014;16:e17256.
34. Mazhari S. The prevalence of problematic internet use and the related factors in medical students, Kerman, Iran. *Addict Health* 2012;4:87-94.
35. Zhang MW, Lim RB, Lee C, Ho RC. Prevalence of internet addiction in medical students: A meta-analysis. *Acad Psychiatry* 2018;42:88-93.
36. Nath K, Naskar S, Victor R. A cross-sectional study on the prevalence, risk factors, and ill effects of internet addiction among medical students in Northeastern India. *Prim Care Companion CNS Disord* 2016;18. doi: 10.4088/PCC.15m01909.