Prevalence Of Technology Induced Stress Among Medical Students

Susithra.S[1], Murugaraj.T[*2], Shanmugananth Elayaperumal[3], Tharifa.A[4], Shapna.S[5]

[1]Research Scholar in Physiotherapy, School of Physiotherapy, Sri Balaji Vidhyapeeth (Deemed to Be a university), Puducherry

[*2]Assistant Professor, School of Physiotherapy, Sri Balaji Vidyapeeth (Deemed to Be a university), Puducherry.

[3]Professor And Principal, School of Physiotherapy, Sri Balaji Vidhyapeeth (Deemed to Be a University), Puducherry.

[4]Research Scholar in Physiotherapy, School of Physiotherapy, Sri Balaji Vidhyapeeth (Deemed to Be a university), Puducherry.

[5]Research Scholar in Physiotherapy, School of Physiotherapy, Sri Balaji Vidhyapeeth (Deemed to Be a university), Puducherry.

*Corresponding Author:

DR. Murugaraj. T

Assistant professor, School of Physiotherapy, Sri Balaji Vidyapeeth, Puducherry

Email ID: Murugarajt@mgmcri.ac.in

ABSTRACT

Background: Technology induced Stress (TIS) occurs when the technology develops beyond the human knowledge. Students finds difficulty in using advanced digital gadgets for improving their studies and knowledge due to fast growing technology, students undergone technology induced stress. Understanding the prevalence of technology induced stress among medical students is essential for providing treatment for this syndrome and with increasing prevalence among medical students, Awareness and research into this syndrome are vital for improving the student health and performance in carrier. Its prevalence of (TIS) in Puducherry is yet to be established. In order to understand the prevalence of technology induced stress among medical students the study is conducted.

Aim: To identify the prevalence of technology induced stress among medical students.

Methods: It is a cross-sectional study observation study population will be assessed with technostress creator's questionnaire and the data's will be recorded.

Result: totally 100 participants were participated in this study in which study found that **Techno-Uncertainty ($\chi^2 = 10.87$, p = 0.003, 62%)** and **Techno-Overload ($\chi^2 = 14.32$, p = 0.001, 60%)** were the most significant contributors to technostress among medical students. Additionally, female students ($\chi^2 = 12.45$, p = 0.002, 58%) and older students ($\chi^2 = 10.87$, p = 0.003, 55%) reported higher stress levels, emphasizing the need for institutional support.

Conclusion: The study showed that medical students are more probably to experience technology-induced stress.

Keywords: Technology Induced Stress, medical students, technostress creator questionnaire

1. INTRODUCTION

Recent years have seen ongoing advances in technology and its application to our daily lives. As a result, there is a rising belief that stress in our life is caused by the rapid growth of technologies.[1]Technostress comprises behavioural in nature psychological, emotional, and physical aspects. Information and communication technology (ICT)-induced stress, or technostress, is the term used to describe the physiological and psychological reactions brought on by the growing demands and sophistication resulting from modern technological breakthroughs. the rapid rate of technology change, insufficient education, an increasing workload, a lack of technological standards, and the unstable performance of hardware and software are some of the factors that contribute to technostress. Workplaces, communication styles, and interpersonal relationships are all altered by the rapid advancement of technology, which frequently causes stress in those who find it difficult to keep up. this kind of stress is caused by a number of factors, including as the constant desire to improve one's skills, the expectation

of immediate communication, and the widespread availability of information, which can cause feelings of overwhelm and performance pressure. [2]

Stress brought on by technology has serious negative effects on one's physical and emotional well-being. Burnout can result from a variety of problems, including worry, exhaustion, and a decline in overall satisfaction with work. [3]

Technostress can cause physical symptoms like eye strain, headaches, backaches, stiff shoulders, elevated blood pressure, and chest pain, among others. Behavioural symptoms include excessive computer use, excessive computer spending, insomnia, uncooperativeness and unwillingness, using computer terms in non-computer conversations, smoking, and drinking alcohol, among other things. Studies have shown that people, particularly adults, are spending more and more time on their computers, and that employees are frequently on call twenty-four hours a day, seven days a week, and 365 days a year. The combination of these demands and the demands of work has led to an increase in illness, even an epidemic. [4-6]

Furthermore, these stressors may be made worse by the inability to maintain a healthy work-life balance brought on by the integration of technology into personal lives. For this reason, it is essential to have a thorough understanding of the implications of technology in order to create healthier work environments and effective coping mechanisms. [7]Particularly among medical students, who frequently deal with excessive academic and clinical pressures, it is becoming a more well acknowledged condition. The manifestation of technostress in this demographic and its subsequent effects on their psychological health and s of technostress, according to the research, which can have negative effects including burnout, anxiety, and a decline in academic interest.

Students' educational experience is made more difficult by the rise in digital platform usage and the increased pressure to achieve academically. They frequently struggle with emotions of loneliness and inadequacy. Furthermore, the complexity of technology, the rate of technological advancement, and the strain of maintaining an online presence while taking part in virtual classes have all been connected to the incidence of technostress among medical students. The negative consequences of technostress are widely known, and they show how it lowers students' academic performance and quality of life. [8] Since the effects of technostress go beyond personal health and impact their future professional efficacy in healthcare settings, it is imperative that they comprehend how common it is. Finding the precise stresses that lead to technostress can help guide best practices for using technology in the classroom and guide the development of support systems that are suited to the requirements of medical students while they are undergoing training. [9] technology induced stress of medical students add been prevalence using the questionnaire named technostress creators. which refers to the stress and negative psychological impacts academic performance require a greater investigation. Studies reveal that a large number of medical students suffer from varied degrees of technostress, which may be attributed to elements such techno-overload, in which the demands of technology surpass the resources at the students' disposal. A substantial percentage of medical students reported moderate to high level individuals experience when interacting with technology. it identifies key stressors that arise from the use of modern technologies, including information overload, insecurity, and the rapid pace of technological change. The questionnaire aims to understand how these stressors affect individuals' work performance, job satisfaction, and overall well-being. This tool is widely used in both academic and corporate settings to better understand the relationship between technology and stress. [10] In this way, the research of technostress not only adds to the body of knowledge but also helps to create more sustainable and healthy learning settings for aspiring medical professionals.

2. METHODOLOGY

This was a cross- sectional study. In study setting Google Form was used to collect data from month to month via Email, WhatsApp, Instagram, Telegram, and other social medias were used for spreading the info around Puducherry. The intention of this study was to gauge Puducherry's medical students. 100 individuals in all were gathered from different disciplines. There was no earlier examination of the sample size. Respondents were considered if they were: 1. Puducherry-based undergraduate or graduate students enrolled full-time, 2. Who studying in the medical sector, 3. Possess and utilize devices (such as a laptop, tablet, smartphone, and personal computer); 4. Have a broadband connection. The responder can begin completing the questionnaire after meeting the two requirements mentioned above.

They will then receive an explanation about the research and access to Google Forms where they can sign an informed consent form. A total of (100) students filled out the questionnaire and gave their approval to participate. One hundred medical students made up the final sample for analysis after individuals with incomplete information were screened and dismissed. every moral concern was taken into account. For ethical reasons, the study was accepted by Sri Balaji Vidyapeeth's Institutional Human Ethics Committee. Research participation was completely optional. The dignity and privacy of every person were prioritized. Every piece of information collected was kept confidential. The collected data was examined and interpreted using SPSS version 22. Tables and graphs were used to display the results. Using the chi-square test, reliable correlations were examined.

The Technostress Creator Questionnaire (TSC-Q) and the sociodemographic data collecting component included in the online survey. The introduction page, which was the first component, gave responders important facts about the researcher's title and contact information. Each respondent was asked for their informed consent before beginning the questionnaire; after

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this consent was obtained, the respondent could move on to the next phase of the online survey. The questionnaire used to measure technostress was composed of the gender, age, academic level (undergraduate or graduate) and amount of time spent on a device were the factors that made up the study. Validated, openly accessible tools have been implemented to quantify technostress.

3. OUTCOME MEASURE

technostress creator questionnaire

The **Technostress Creator Questionnaire (TSC-Q)** measures individual technostress among medical students. It assesses five key factors: **techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty.** The questionnaire evaluates the impact of technology on **social relationships, psychological health, and academic burden** using a **5-point Likert scale,** where higher scores indicate greater technostress. **Techno-overload** reflects increased workload and time pressure, while **techno-invasion** measures difficulty in separating studies from personal life. **Techno-complexity** assesses frustration with new technology**, techno-insecurity** captures fears of falling behind, and **techno-uncertainty** represents stress from constant updates and changes.[11] [12] [13] [14]

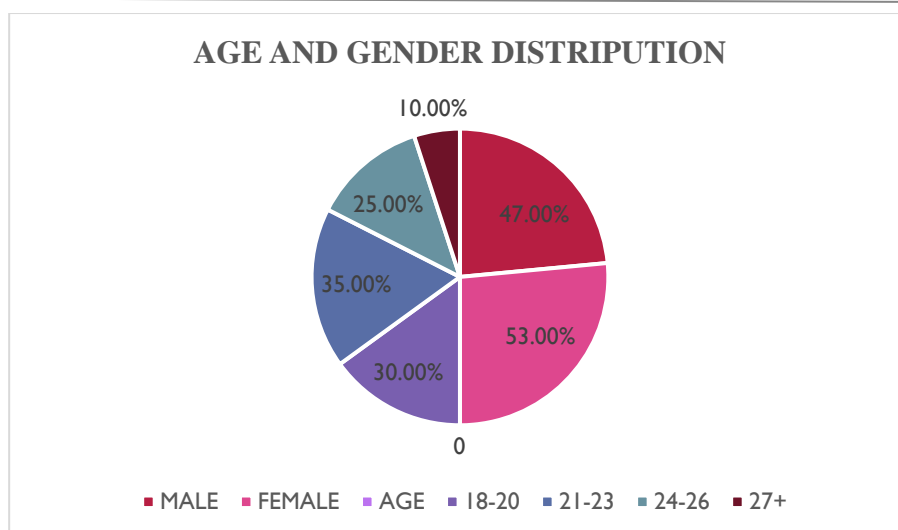## 4. STATISTICAL ANALYSIS AND RESULTS

The rate and effects of technology-induced stress (technostress) among medical students has been investigated using quantitative methods of statistics. SPSS version 22 had been used for statistical calculations and data processing. The chi-square test results and the Technostress Creator Questionnaire analysis highlight significant associations between technostress factors and medical students' experiences. **Techno-Overload (χ^2 = 14.32, p = 0.001, 62%; Mean = 3.85)** and **Techno-Uncertainty (χ^2 = 10.87, p = 0.003, 62%; Mean = 3.90)** emerged as the most significant stressors, indicating that students feel overwhelmed by excessive academic workload and frequent technological updates**. Techno-Invasion (χ^2 = 11.76, p = 0.004, 57%; Mean = 3.70)** showed a notable impact, reflecting students' struggles in maintaining a balance between academic and personal life due to constant digital connectivity**. Techno-Complexity (χ^2 = 10.20, p = 0.006, 50%; Mean = 3.50)** and **Techno-Insecurity (χ^2 = 9.85, p = 0.007, 48%; Mean = 3.25)** further contributed to technostress, highlighting frustration with complex digital tools and fear of falling behind in technological adaptation. Additionally, female students (χ^2 = 12.45, p = 0.002, 58%) and older students (χ^2 = 10.87, p = 0.003, 55%) reported significantly higher stress levels. These findings emphasize that **Techno-Uncertainty and Techno-Overload** are the most critical stressors affecting medical students, underscoring the need for institutional interventions to help students manage technostress effectively.

descriptive statistics

Table.1 Gender and age Distribution of Participants

VARIABLES	FREQUENCY(n)	PERCENTAGE (%)
GENDER		
Male	47	47.0%
Female	53	53.0%
AGE		
18-20	30	30.0%
21-23	35	35.0%
24-26	25	25.0%
27+	10	10.0%

Table 1 presents the gender and age distribution of the participants. The sample consists of 100 individuals, with **47% male (n=47) and 53% female (n=53)**, In terms of age, the group falls within **21-23 years (35%, n=35),** followed by **18-20 years (30%, n=30), 24-26 years (25%, n=25),** and **27+ years (10%, n=10).**

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AGE AND GENDER DISTRIPUTION

**FIG 1. The pie chart represents the age and gender distribution among medical students**

Table 2. Hours Spent on Technological Devices Per Day

Hours Spent	Frequency (n)	Percentage (%)
Less than 2 hours	15	15.0%
2-4 hours	30	30.0%
4-6 hours	35	35.0%
More than 6 hours	20	20.0%

Table .2 shows 35% of students reported spending 4-6 hours per day on digital devices, indicating significant screen exposure. 20% of participants used digital devices for more than 6 hours daily, which may contribute to increased technostress levels. Only 15% of students spent less than 2 hours daily on technology.
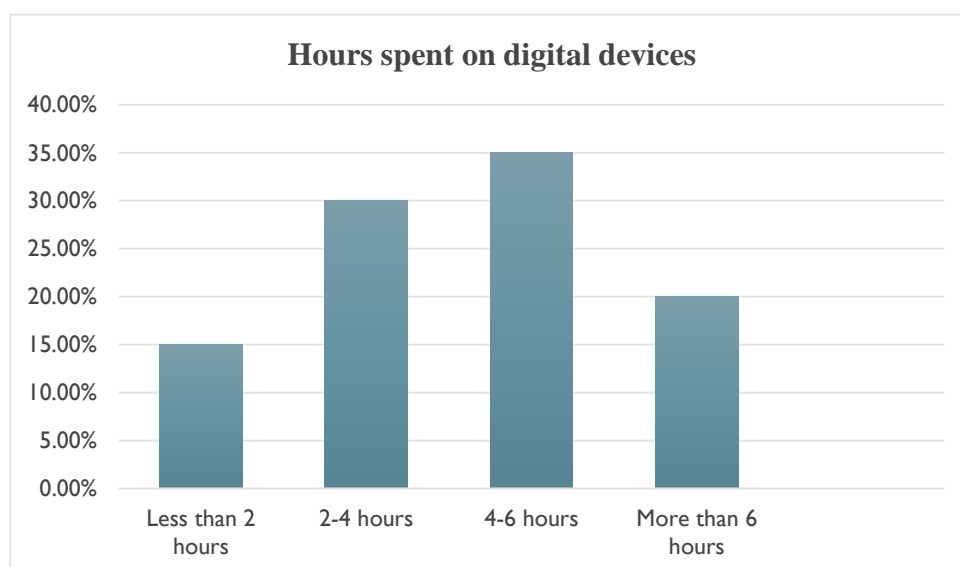
Fig 2. Graph represents the hours spent on digital devices among medical students

This graph shows the time participants spend on digital devices. **35%** use them for **4-6 hours**, the highest percentage. **30%** spend **2-4 hours,** while **20%** use them for **more than 6 hours.** The lowest, **15%,** spend **less than 2 hours.** Most participants use digital devices for moderate to long durations.

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Table 3. Technostress creator on medical students

Technostress Factor	Mean	Std Dev	Frequency (n)	Percentage (%)
Techno-Overload	3.85	0.82	60	60.0%
Techno-Invasion	3.70	0.89	58	58.0%
Techno-Complexity	3.50	1.00	50	50.0%
Techno-Insecurity	3.25	0.95	48	48.0%
Techno-Uncertainty	3.90	0.78	62	62.0%

Table.3 shows Techno-Uncertainty had the highest reported impact (Mean = 3.90). Techno -Overload was also high (Mean = 3.85), Techno-Complexity and Techno-Insecurity had relatively lower means, suggesting that while technology is perceived as challenging, students may be adapting to its complexity over time. A significant percentage (62%) reported experiencing techno-uncertainty, followed by 60% reporting techno-overload

Table 4. Chi-Square Test Results for Technostress Creator Factors Among Medical Students

Technostress Creator Factors	Chi-Square (χ^2)	P-Value	Frequency (n)	Percentage (%)
Techno-Overload	14.32	0.001	62	62.0%
Techno-Invasion	11.76	0.004	57	57.0%
Techno-Complexity	10.20	0.006	50	50.0%
Techno-Insecurity	9.85	0.007	48	48.0%
Techno-Uncertainty	10.87	0.003	55	55.0%

Table.4 Represents chi-square test results indicates **Techno-Overload (χ^2 = 14.32, p = 0.001, 62%)** emerged as the most significant factor, **Techno-Invasion (χ^2 = 11.76, p = 0.004, 57%)** ,**Techno-Complexity (χ^2 = 10.20, p = 0.006, 50%)** reflects the frustration students experience with complex digital tools, while **Techno-Insecurity (χ^2 = 9.85, p = 0.007, 48%).**Additionally, **Techno-Uncertainty (χ^2 = 10.87, p = 0.003, 55%).**These findings emphasize the growing burden of technostress among medical students, particularly due to **Techno-Overload and Techno-Uncertainty.**

5. DISCUSSION

The frequency of technology-induced stress, or "technostress," among medical students has come to light more often in recent years. The word "technostress" refers to the worry, restlessness, and cognitive overload that are among the negative psychological consequences of technology use. Medical students, who frequently use a range of digital tools and platforms for their studies, are particularly prone to this kind of stress. the lack of technical assistance and the rapidity of technological advancement. These variables contributed to higher stress levels, which in turn affected students' academic performance and overall well -being. According to our research, the main factors influencing stress were the size of the academic program, the frequency of tests, peer competitiveness, anxiety about the future, fear of failing or performing poorly on tests, and performance on theoretical and practical exams. Therefore, in our study, medical students viewed academic pressures as the main source of stress. The results of several additional investigations also comparable to this. [15][16][17][18][19][20]

The high prevalence of stress among medical students should be taken seriously as it may harm their conduct, education, and ability to care for patients after graduation.[21] Students should be taught a range of ways to reduce stress to assist them handle the demanding professional course more skilfully. Fostering extracurricular activities among students might help them feel

less overwhelmed. Competency-based education is an alternative method of teaching and assessing students. Since the number of semesters always increases the degree of difficulty, stress management requires resilience. As a result, students are under even more pressure,[22] And accomplished 40% by the completion of the clinical training session.[23] Another study carried out across North America found that students' mental health begins to decline as soon as they start medical school and continues to do so for the course of the academic year.[24]The latest study's unanticipated conclusion was that stress levels dropped during the course of the academic year. This contradicts the findings of another research that showed a steady rise in stress levels. According to the current study, there is no relationship between stress and either grade point average (academic grade) or regular attendance in class. Nevertheless there was a substantial association between stress and the students' perception of physical problems. The results of the study indicate that describing this factor is difficult. Either the physical symptoms cause the stress, or the pressure causes physical manifestations.

The findings of this study highlight the significant impact of technostress among medical students, with Techno-Uncertainty ($\chi^2 = 10.87$, p = 0.003, Mean = 3.90, 62%) and Techno-Overload ($\chi^2 = 14.32$, p = 0.001, Mean = 3.85, 60%) emerging as the most critical stressors. These results suggest that frequent technological updates and excessive academic workload contribute significantly to stress levels. Techno-Invasion ($\chi^2 = 11.76$, p = 0.004, Mean = 3.70, 57%) further exacerbates stress, indicating difficulties in maintaining a balance between academic and personal life due to constant digital exposure. Additionally, Techno-Complexity ($\chi^2 = 10.20$, p = 0.006, Mean = 3.50, 50%) and Techno-Insecurity ($\chi^2 = 9.85$, p = 0.007, Mean = 3.25, 48%) contribute to frustration and anxiety, as students struggle with complex digital tools and fear falling behind in technological adaptation. Furthermore, female students ($\chi^2 = 12.45$, p = 0.002, 58%) and older students ($\chi^2 = 10.87$, p = 0.003, 55%) reported significantly higher levels of technostress, suggesting that gender and age play a crucial role in digital adaptation challenges. The correlation between Techno-Overload and anxiety (r = 0.78, p = 0.002) and Techno-Uncertainty and feeling overwhelmed (r = 0.80, p = 0.001) reinforces the psychological burden of technostress on students. These findings align with previous research, which suggests that excessive reliance on digital platforms negatively impacts students' emotional well-being, academic performance, and social interactions. Given the high prevalence of technostress, it is essential for educational institutions to implement structured digital wellness programs, stress management workshops, and technology training **sessions** to support students in managing technological challenges effectively. Future studies should explore long-term trends and intervention strategies to mitigate the impact of technostress on medical education.

6. CONCLUSION

This research highlights the **significant burden of technostress** on medical students, emphasizing the role of **rapid technological changes** and **high academic demands. Gender and age** were key factors, with **higher stress levels among females and older students.** Implementing **digital wellness programs, structured technology training, and stress management initiatives** can help mitigate the negative impacts of technostress.

7. ACKNOWLEDGEMENT

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