

## PREVALENCE OF NOMOPHOBIA AND ITS RELATIONSHIP WITH DIGITAL DEVICE USE AND TECH-INDUCED POST-EXERTIONAL MALAISE (TI-PEM) AMONG YOUNG ADULTS; A CROSS-SECTIONAL STUDY

Erum Tanveer<sup>\*1</sup>, Hamza Ahmed<sup>2</sup>, Tasbiha Noor<sup>3</sup>, Ayesha Ahmed<sup>4</sup>, Kaneez Fatima<sup>5</sup>,  
Nimra Iqbal<sup>6</sup>, Erum Tanveer<sup>7</sup>, Sumeet Kumar<sup>8</sup>

<sup>1</sup>Principal and Professor, United College of Physical Therapy, Karachi, Pakistan

<sup>2</sup>Senior Lecturer, United College of Physical Therapy, Karachi, Pakistan

<sup>3,4,5,6</sup>DPT student, United College of Physical Therapy, Karachi, Pakistan

<sup>7</sup>Vice Principal and Associated Professor, United College of Physical Therapy, Karachi, Pakistan

<sup>8</sup>Associated Professor, United College of Physical Therapy, Karachi, Pakistan

<sup>1</sup>erumtanveer88@gmail.com, <sup>2</sup>hamzaahmed.ucpt@gmail.com, <sup>3</sup>tasbihanoor6@gmail.com,

<sup>4</sup>ayeshaahmed.qr@gmail.com, <sup>5</sup>fk2071076@gmail.com, <sup>6</sup>Nimraiqbal1622@gmail.com,

<sup>8</sup>sumeetucpt@gmail.com

Corresponding Author: \*

Erum Tanveer

DOI: <https://doi.org/10.5281/zenodo.19849948>

Received  
24 February 2026

Accepted  
04 April 2026

Published  
2 April 2026

### ABSTRACT

**Background:** The rapid expansion of digital technology had transformed communication, learning, and entertainment among young adults. However, prolonged digital device use had increasingly been associated with psychological dependence and physical fatigue. Nomophobia and technology-induced post-exertional malaise represented emerging concerns, yet limited evidence was available regarding their prevalence and interrelationship among young adults.

**Objectives:** The objective of this study was to determine the prevalence of nomophobia and to examine its relationship with digital device use and technology-induced post-exertional malaise among young adults aged 18–35 years.

**Method:** A cross-sectional study was conducted among 352 young adults aged 18–35 years from academic settings. Data were collected using the Nomophobia Questionnaire, the Chalder Fatigue Scale, and a structured digital device-use questionnaire. Descriptive statistics, frequency distributions, and correlation analyses were performed using Statistical Package for the Social Sciences version 22.

**Result:** Moderate nomophobia was reported by 52.8% of participants, while 28.7% exhibited mild and 18.5% severe levels. Moderate levels of technology-induced post-exertional malaise were observed in 50.9% of respondents. Android smartphones were the primary devices used by 69.9% of participants, and 66.2% reported more than four years of continuous digital device use. Daily screen exposure exceeding six hours was reported by 30.7% of participants.

**Conclusion:** The findings demonstrated a substantial prevalence of nomophobia and technology-related fatigue among young adults. Prolonged screen exposure and long-term digital engagement were associated with increased psychological dependence and post-exertional malaise.

**Clinical Implications:** These findings emphasised the importance of promoting healthy digital device use among young adults. Incorporating digital wellness awareness into educational and healthcare settings may help reduce technology-related fatigue and psychological dependence, while future research may explore targeted preventive strategies.

**Keywords:** Nomophobia, digital device use, Ti-PEM, screen time, young adults, smartphone dependence.

## INTRODUCTION

Virtual communication and technological advancements have become essential to modern life, changing how people communicate, work, and obtain information. Digital gadgets like computers, tablets, and smartphones are widely used and have made life easier and more connected, especially for young people. However, there are also serious social, psychological, and physical issues brought about by the quick growth of technology use. Over-reliance on smartphones has been linked to social problems like decreased interpersonal engagement and greater social isolation, as well as financial strain because of constant device upgrades (1). Additional negative health effects, such as musculoskeletal discomfort, sleep difficulties, anxiety, and an increased risk of accidents, have been connected to prolonged and uncontrolled use of digital gadgets(2,3). Digital engagement is still growing, with an average daily usage of 6.7 hours and 4.66 billion internet users worldwide(4). This increasing reliance has led to the development of new behavioural disorders, including nomophobia, which is the dread of being without a cell phone or other means of contact. Research shows that a significant percentage of people are dependent on their smartphones; up to 68% of respondents say they rely on them, and 61% check their phones as soon as they get up(5). Nomophobia is very common among young adults and students, with rates ranging from 18.5% to 73% in college populations and up to 99% among certain groups(6,7). Rapid increases in smartphone ownership and internet access in Pakistan have worsened this problem, particularly among those aged 18 to 34. Nevertheless, little study has been done on the wider health effects of this issue(8).

Existing literature has extensively studied the psychological effects of excessive smartphone use,

which has identified symptoms like anxiety, agitation, tachycardia, and cognitive disorders(5). People with nomophobia frequently report behavioral patterns including checking electronics frequently, having phones close at hand, and preferring virtual connections. Concurrently, studies have shown that extended usage of digital devices can have negative effects on one's physical health, such as fatigue, headaches, and musculoskeletal disorders(3,9). Furthermore, there is growing evidence that excessive technology use is associated with more general illnesses like digital addiction, sleep disorders, and chronic weariness(10). Despite the expanding body of research on digital addiction and its psychological and physical consequences, there is a clear knowledge gap regarding the integrated impact of behavioral dependence on digital technologies and its potential role in producing fatigue-related symptoms, particularly technology-induced post-exertional malaise (Ti-PEM). Although post-exertional malaise has been extensively studied in disorders like myalgic encephalomyelitis/chronic fatigue syndrome (ME/CFS), its correlation with excessive usage of digital devices has not been thoroughly examined(11). This emphasises the need for studies that look at how psychological dependence, usage patterns and physiological consequences interact.

This research is based on a multidirectional framework that incorporates physiological tiredness processes, psychological stress mechanisms, and behavioural addiction theory. Anxiety and emotional dysregulation are exacerbated by nomophobia, a type of behavioural reliance fueled by constant computer use. Sleep patterns may be disturbed, and daytime drowsiness may rise as a result of these psychological impacts. Fatigue and sensations

similar to post-exertional malaise can result from sleep difficulties and prolonged gadget use, which can also cause physical strain and cognitive overload. Research indicates that psychological dependence and fatigue effects are mediated by sleepiness(12). This reflects a cyclic relationship whereby more device use worsens physical tiredness and psychological stress, ultimately lowering general well-being.

This study aims to find out how common nomophobia is among people who use digital devices, as well as how it relates to usage habits and the emergence of technology-induced post-exertional malaise (Ti-PEM). The goals are to find out how common and severe nomophobia is among young users, evaluate the frequency and patterns of digital device use, investigate the relationship between nomophobia and psychological outcomes like anxiety and sleep disturbances, assess the relationship between excessive device use and physiological symptoms like fatigue and Ti-PEM, and investigate the combined effect of nomophobia, sleepiness, and device usage on fatigue outcomes.

## METHODOLOGY

Using an online survey as the method of data collection, a quantitative cross-sectional study was carried out in Karachi, Pakistan, among university students and working professionals from diverse academic and workplace settings. Young people between the ages of 18 and 35 who utilized digital devices for at least two hours a day made up the study sample. Convenience sampling was used. OpenEpi was used to estimate the sample size, which produced the necessary sample of 372 individuals; however, the final analysis only comprised 352 full and valid responses.

Participants had to be between the ages of 18 and 35, be able to read English, have access to the internet, use digital devices for at least two hours every day, and give informed consent in order to be included. People with diagnosed psychological illnesses, incomplete questionnaires, infrequent or little gadget use, inability to speak English, or refusal to participate were all excluded.

The Nomophobia Questionnaire (NMP-Q), a validated 20-item scale measuring nomophobia across four domains, the Chalder Fatigue Scale (CFS), an 11-item tool measuring physical and mental fatigue and used in this study to measure technology-induced post-exertional malaise (Ti-PEM), and a Digital Device Use Questionnaire that recorded screen time, duration and purpose of use, type of device used, and midnight usage patterns were the three components of a structured questionnaire. Prior to analysis, all replies were checked for completeness after informed digital permission.

Data analysis was done with SPSS version 22. While Pearson correlation analysis was performed to look at the connections between nomophobia, digital device use variables, and Ti-PEM symptoms, descriptive statistics were utilized to summarize participant characteristics and digital device use patterns.

## RESULT

After being screened for eligibility and completeness, 352 participants were ultimately included in the study. According to the demographic distribution, there were more female participants (n = 287; 81.5%) than male participants (n = 65), who made up 18.5%. With 38.4% of respondents being between the ages of 21 and 23 and 33.0% being between the ages of 18 and 20, the majority of participants were young adults in academic or early professional contexts.

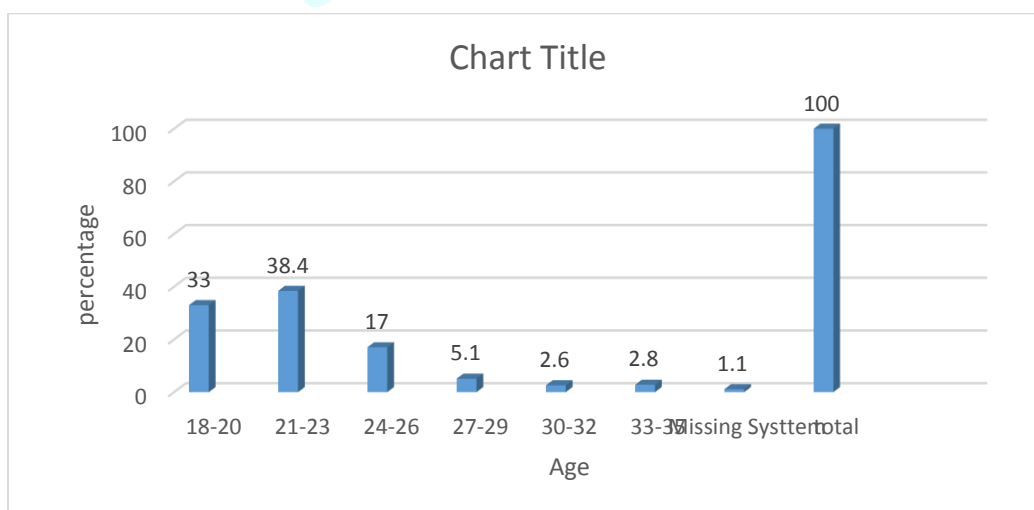
According to an analysis of nomophobia levels, the most common group was moderate nomophobia (52.8%; n = 186), indicating that over half of the participants had a moderate degree of dependence on digital gadgets. 28.7% (n = 101) had mild nomophobia, whereas 18.5% (n = 65) showed severe symptoms. The Chalder Fatigue Scale was used to assess technology-induced post-exertional malaise (Ti-PEM). The results showed that fatigue-related symptoms were prevalent in the study population, with 50.9% (n = 179) reporting moderate malaise, 42.9% (n = 151) reporting mild symptoms, and 6.3% (n = 22) experiencing severe malaise.

Android smartphones accounted for the highest percentage of device usage (69.9%), followed by tablets/iPads/iPhones (19.9%), laptops (7.1%), and desktop PCs (3.1%). Participants' daily screen time varied, with 35.5% reporting 4-6 hours and 30.7% reporting more than 6 hours. For more than four years, a significant percentage (64.2%; n = 226) reported using digital devices continuously. Academic purposes accounted for 61.4% of gadget use, with entertainment (26.4%), work-related activities (6.8%), and communication (5.4%) following closely behind. Higher levels of nomophobia and Ti-PEM were more frequently seen in people with longer daily

screen time (>6 hours) and longer device use (>4 years), according to descriptive analysis, indicating a possible cumulative effect of digital exposure. Regression analysis, however, showed that the entire model was not statistically significant ( $F(10, 340) = 1.711, p = 0.077$ ). The only predictor that was statistically significantly associated with reduced nomophobia scores was the amount of time spent on entertainment devices ( $B = -0.087, \beta = -0.134, p = 0.030$ ). Conversely, years of use, total screen time, Ti-PEM severity, and device type were not statistically significant predictors ( $p > 0.05$ ).

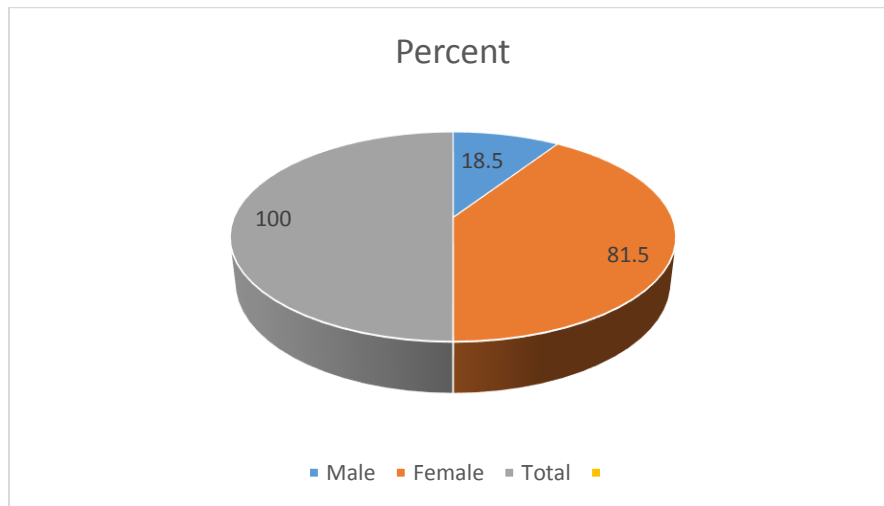
**Table-01: Age Group Distribution of Participants**

Age	Frequency	Percent
18-20	116	33.0
21-23	135	38.4
24-26	60	17.0
27-29	18	5.1
30-32	9	2.6
33-35	10	2.8
Total	348	98.9
Missing System	4	1.1
Total	352	100.0



**Table-02:Gender Distribution of Participants**

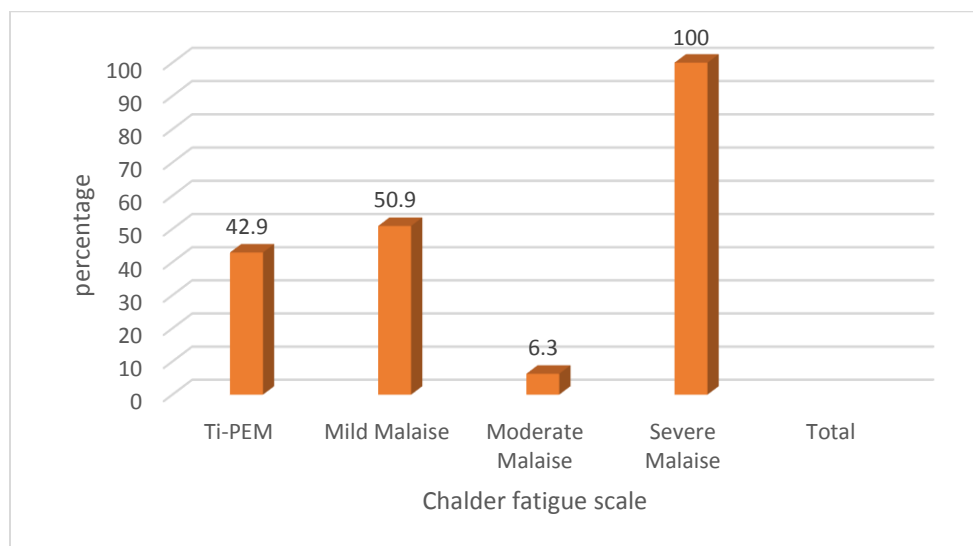
Gender	Frequency	Percent
Male	65	18.5
Female	287	81.5
Total	352	100.0



**Figure-02:Gender Distribution of Participants**

**Table-03:Tech Induced Post Exertional Malaise (Ti-PEM) of Participants**

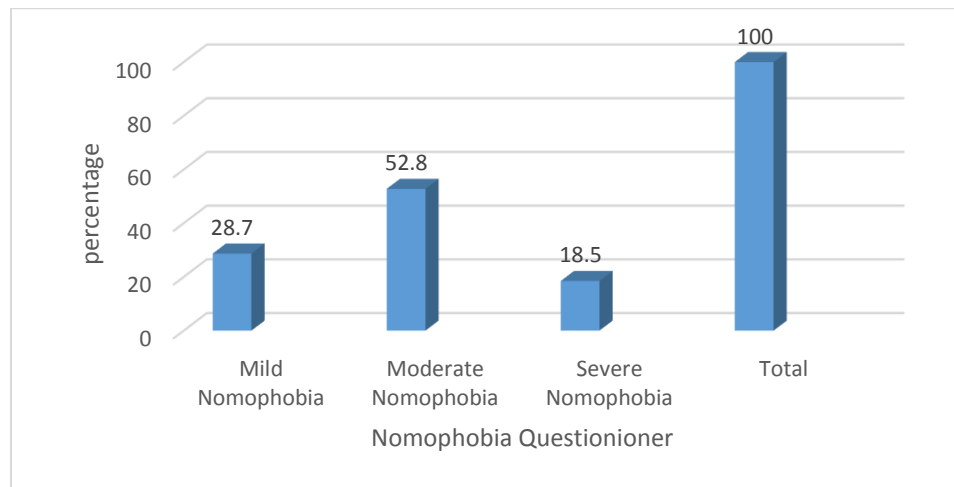
Ti-PEM	Frequency	Percent
Mild Malaise	151	42.9
Moderate Malaise	179	50.9
Severe Malaise	22	6.3
Total	352	100.0



**Figure-03 :Tech Induced Post Exertional Malaise (Ti-PEM) of Participants**

**Table-04: Nomophobia of Participants**

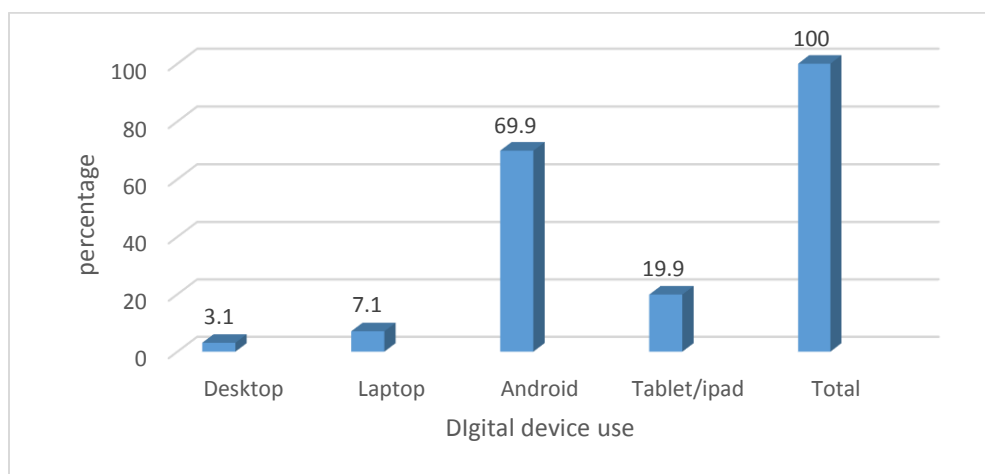
Nomophobia	Frequency	Percent
Mild Nomophobia	101	28.7
Moderate Nomophobia	186	52.8
Severe Nomophobia	65	18.5
Total	352	100.0



**Figure-04: Nomophobia of Participants**

**Table-05: Digital Device use among Participants**

Digital Device	Frequency	Percent
Desktop	11	3.1
Laptop	25	7.1
Android	246	69.9
Tablet/ipad/iphone	70	19.9
Total	352	100.0



**Figure-05: Digital Device use among Participants**

## DISCUSSION

The current study found that young people had a high incidence of both nomophobia and technology-induced post-exertional malaise (TI-PEM), with most of them having moderate levels of each condition. Long-term device use, smartphone dominance, and extended screen time were prevalent trends. Regression analysis showed that only the usage of entertainment-related devices substantially predicted nomophobia, despite descriptive findings suggesting a link between greater screen time and increased nomophobia and TI-PEM. These results show that young adults' psychological reliance on digital technology and the weariness that goes along with it are a significant source of concern.

This study's moderate nomophobia prevalence of 52.8% is in line with earlier research on university students around the world. Similar patterns have been noted, with mild and severe forms of nomophobia following the most prevalent group of moderate nomophobia [1, 2, 3]. This consistency implies that young adults from a variety of backgrounds are increasingly experiencing nomophobia as a behavioral issue. Excessive smartphone use has also been linked to psychological reliance and physical symptoms as eye strain and sleep difficulties, according to prior research [4,5]. These results corroborate the existing findings, which show that screen time increases are linked to problems with both physical and mental health.

Additionally, the prolonged device usage patterns found in this study are consistent with previous research that links prolonged screen time to ocular strain, poor posture, and musculoskeletal discomfort [6-8]. Long-term exposure dangers and habitual reliance are highlighted by the large percentage of participants who use devices for more than six hours a day and for more than four years. Studies looking at digital behavior across age groups have found similar results, indicating that early exposure eventually develops into sustained and independent usage behaviors [9].

The results pertaining to TI-PEM also show significant similarities with disorders associated with fatigue that have been documented in the

literature. Research on chronic fatigue syndrome (ME/CFS), where continuous exertion, whether physical, cognitive, or technological, results in persistent weariness and decreased functional capacity, is comparable with the moderate levels of fatigue described in our study [10-12]. The symptoms of TI-PEM, such as cognitive tiredness, sleep disturbance, and decreased quality of life, are similar to those of chronic diseases, suggesting that excessive digital involvement may contribute to fatigue patterns similar to those observed in these conditions, even if TI-PEM is not a clinical diagnostic.

The study has a number of advantages. It fills a significant gap in the field of digital health research by being one of the few studies examining the association between nomophobia, digital device use, and TI-PEM. The reliability of the results is improved by using validated instruments and a sizable sample size. The study also offers useful baseline data for further investigation in this developing field.

But there are some restrictions to take into account. Self-reported data may include recollection or response bias, and the cross-sectional form restricts causal inference. Convenience sampling may have an impact on generalizability, and participants' comprehension of the questionnaire may have been affected by language obstacles. Additionally, the degree of connections may have been affected by individual differences in motivation and digital habits.

The results emphasize how critical it is to raise young adults' knowledge of digital health and implement behavioral treatments. To lessen psychological dependence and exhaustion, educational institutions can encourage ergonomics, digital well-being techniques, and balanced screen time. To reduce negative health effects, structured rules for managing screen usage and taking regular breaks should be promoted.

In order to establish causal linkages and investigate other psychological and behavioral factors impacting nomophobia and TI-PEM, future research should employ longitudinal approaches. To improve generalizability, more research involving a variety of demographics is

advised. To encourage better internet usage habits, educators and policymakers should incorporate digital wellness initiatives into educational settings.

### Conclusion

This study concludes that nomophobia and technology-induced post-exertional malaise are highly prevalent among young adults, particularly those exposed to prolonged daily screen time and long-term digital device use. Moderate levels of psychological dependence and fatigue were most common, underscoring the growing health burden associated with excessive digital engagement. As digital devices remain integral to academic and daily life, targeted preventive strategies are essential to promote healthier technology use and reduce associated psychological and physical consequences.

### REFERENCES

- Rahmah AA, Mustikawati IF, Septianawati P, Immanuel G. Analysis of factor causing nomophobia in adolescents: a meta-analysis study. *Jurnal Health Sains*. 2024 Apr 30;5(4):237-44.
- Bahkir FA, Grandee SS. Impact of the COVID-19 lockdown on digital device-related ocular health. *Indian journal of ophthalmology*. 2020 Nov 1;68(11):2378-83.
- Xie Y, Szeto G, Dai J. Prevalence and risk factors associated with musculoskeletal complaints among smartphone users in China. *Int J Environ Res Public Health*. 2020;17(21):E8447.
- Meng, S.Q., Cheng, J.L., Li, Y.Y., Yang, X.Q., Zheng, J.W., Chang, X.W., Shi, Y., Chen, Y., Lu, L., Sun, Y. and Bao, Y.P., 2022. Global prevalence of digital addiction in general population: A systematic review and meta-analysis. *Clinical psychology review*, 92, p.102128.
- Bhattacharya S, Bashar MA, Srivastava A, Singh A. Nomophobia: No mobile phone phobia. *Journal of family medicine and primary care*. 2019 Apr 1;8(4):1297-300.
- Humood, A., Altooq, N., Altamimi, A., Almoosawi, H., Alzafiri, M., Bragazzi, N.L., Husni, M. and Jahrami, H., 2021. The prevalence of nomophobia by population and by research tool: a systematic review, meta-analysis, and meta-regression. *Psych*, 3(2), pp.249-258.
- Kashyap, A., Singh, A., Mehta, P., Mautong, H., Mahendru, D., Kumari, U., Atulkar, A., Padte, S., Arshad, Z., Nawaz, F.A. and Surani, S.R., Global 3P (Providers' Phone-Lessness Phobia) Nomophobia Among Medical Students: A Cross-Sectional Study from 41 Countries.
- Schwaiger, E. and Tahir, R., 2020. Nomophobia and its predictors in undergraduate students of Lahore, Pakistan. *Heliyon*, 6(9).
- Sandström M, Wilen J, Hansson Mild K, Oftedal G. Mobile phone use and subjective symptoms. Comparison of symptoms experienced by users of analogue and digital mobile phones. *Occupational Medicine*. 2001 Feb 1;51(1):25-35.
- Meng, S.Q., Cheng, J.L., Li, Y.Y., Yang, X.Q., Zheng, J.W., Chang, X.W., Shi, Y., Chen, Y., Lu, L., Sun, Y. and Bao, Y.P., 2022. Global prevalence of digital addiction in general population: A systematic review and meta-analysis. *Clinical psychology review*, 92, p.102128.

- Stussman, B., Williams, A., Snow, J., Gavin, A., Scott, R., Nath, A. and Walitt, B., 2020. Characterization of post-exertional malaise in patients with myalgic encephalomyelitis/chronic fatigue syndrome. *Frontiers in neurology*, 11, p.1025.
- Sarikahya, S.D., Akçam, A., Kanbay, Y., Özbay, Ö. and Özbay, S.Ç., 2024. Predictive Effects of Nomophobia, Netlessphobia, and Sleepiness on Fatigue. *Addicta: The Turkish Journal on Addictions*, 11(1).
- Vagka E, Gnardellis C, Lagiou A, Notara V. Nomophobia and self-esteem: a cross sectional study in Greek university students. *Int J Environ Res Public Health*. 2023;20(4):2929.
- Deshmukh G, Abhilipsa PK, Nagulkar J. Prevalence of nomophobia using nomophobia questionnaire among health science students. 2024.
- Aldhahir AM, Bintalib HM, Alhotye M, et al. Prevalence of nomophobia and its association with academic performance among physiotherapy students in Saudi Arabia: a cross-sectional survey. *J Multidiscip Healthc*. 2023;2091-2100.
- Khilnani AK, Thaddanee R, Khilnani G. Prevalence of nomophobia and factors associated with it: a cross-sectional study. *Int J Res Med Sci*. 2019;7(2):468-472.
- Jahrami H, Abdelaziz A, Binsanad L, et al. The association between symptoms of nomophobia, insomnia and food addiction among young adults. *Int J Environ Res Public Health*. 2021;18(2):711.
- Myint WW, Saimon R, Majid NNN, et al. Relationship between usage of digital devices and musculoskeletal symptoms among university students. *Int J Online Biomed Eng*. 2021;17(9).
- Mahmoud NA, Abu Raddaha AH, Zaghmir DE. Impact of digital device use on neck and low back pain intensity among nursing students. *Healthcare*. 2022;10(12):2424.
- Ichhpujani P, Singh RB, Foulsham W, et al. Visual implications of digital device usage in school children. *BMC Ophthalmol*. 2019;19(1):76.
- Nathan T, Muthupalaniappen L, Muhammad NA. Digital device use among preschool children: a cross-sectional study. *Malays Fam Physician*. 2022;17(3):114.
- Orji N, Campbell JA, Wills K, et al. Prevalence of ME/CFS in Australian primary care patients. *BMC Public Health*. 2022;22(1):1516.
- Eaton-Fitch N, Johnston SC, Zalewski P, et al. Health-related quality of life in ME/CFS patients. *Qual Life Res*. 2020;29(6):1521-1531.
- Twomey R, DeMars J, Franklin K, et al. Chronic fatigue and post-exertional malaise in long COVID. *Phys Ther*. 2022;102(4):pzac005.