

Original Research Article

Associations between internet addiction, grit, perceived stress and academic performance in medical students

Nusrat Aziz^{1*}, Sheema Fatima Khan², Shaik Simra Qatoon¹, Maryam Siddiqui¹,
Zainab¹, Shams Fatima Khan²

¹Department of Physiology, Dr VRK Womens Medical College Teaching Hospital and Research Centre, Aziznagar, Telangana, India

²Department of Medicine, Shadan Institute of Medical Sciences Teaching Hospital and Research Centre, Peeracheru, Telangana, India

Received: 23 August 2024

Revised: 14 October 2024

Accepted: 15 October 2024

*Correspondence:

Dr. Nusrat Aziz,

E-mail: drnusrataziz@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: Medical students require high academic performance and dedicated training with focus, optimism and a growth mindset. Our study aims to analyse the associations between internet addiction, Grit, perceived stress with academic performance in 1st year medical students.

Methods: First year female medical students with convenience sampling of 100 had been asked to self-administer the Young's internet addiction test, Cohen's perceived stress scale and grit scale by Duckworth after giving informed consent. Association between the above parameters and their effect on academic performance was studied and analysed.

Results: Prevalence of internet addiction in medical students was as high as 90% including 20% moderate and 70% mild internet addiction. 31% of students showed high perceptible stress, 59% moderate and 10% low stress. The mean grit estimated was 3.04 (SD-0.65062). Student's perceptible stress was positively correlated with internet addiction. Higher internet addiction score showed lesser academic grades. Students with more grit showed less internet addiction and better academic performance having a significant positive correlation. Students with moderate stress showed better academic grades than low or high stressed students.

Conclusions: In light of the above findings, it is important that once the students enter medical school, they must be given study tips and guidance to develop mindset for more grit, stress management and made aware of ill effects of spending more hours on internet for purposes other than learning. This will help them to concentrate better strive towards attainment of their long-term goals, avoid overstress and achieve higher academic grades.

Keywords: Academic performance, Grit, Internet Addiction, Medical students, Perceived stress

INTRODUCTION

All medical students have to deal with vast curriculum and have lesser liberty of excess leisure time. Procurement of skill and knowledge with rigorous training is crucial in medical education. Any distraction or procrastination can make the matters difficult. One such parameter is internet use. The internet usage can be

beneficial for information seeking or remote learning, however, many a times, a person tends to get distracted and end up spending more time compulsively on other websites. Many internet users are on social media platforms like Instagram, WhatsApp or Facebook and YouTube etc. with high usage most of the time.¹ Our study is aimed at analyzing the association of the internet addiction with perceptible stress and grit, their relation

with each other and how it impacts academic performance in medical students. Internet addiction (IA) is the term used for excessive, compulsive and obsessive use of internet. It causes an individual to experience a sense of entertainment. Though it has not been classified as an addiction by the diagnostic and statistical manual of mental disorders, fifth edition or DSM-5 due to insufficient evidence, it appears to show many of the features of an addictive disorder. Internet usage seems to release dopamine in brain reward centers similar to other addictions.^{2,3}

A person, once introduced to the internet tends to spend increasing time on it in expense social engagement causing lesser offline social interactions. Internet addiction may also include online gambling addiction, cybersex addiction, video game addiction and social media addiction.⁴ IA has been shown to be negatively correlated with mental health in medical students which affect their perceived stress levels and finally their academic performance.⁵ Excessive online engagement may decrease overall wellbeing by affecting the sleep pattern and exacerbating social isolation.

Perceived stress

The magnitude to which a person perceives events in their life as stressful, unexpected, and uncontrollable is known as perceived stress.^{6,7} Higher perceived stress has been correlated to more incidence of depressive symptoms with neural changes in left superior frontal gyrus.⁸ Perceived stress is an individual's impression of life's events as highly overwhelming. It can lead to developing a physiological stress response. The major source of stress in medical students is academic.⁹ High grade of stress can lead to academic decline by affecting the cognition in terms of retention, recall and reproducing during an assessment.

Grit

Grit is a trait which gives the ability of a person to pursue and work tirelessly towards long term goals and enduring any difficulties which might come in the way. It indicates the passion courage resilience and conscientiousness towards a person's goals.¹⁰ It is something which hold a trainee from dropping out of the course. It is a noncognitive character driving us to persevere against the odds to reach our goal or finish the task. Grit is one of those characters, which, along with self-confidence, self-discipline, hope and optimism keeps the student going to achieve academic and professional success. The goal focused optimistic personality also gives protection against suicidal tendencies.¹¹

To determine the prevalence of internet addiction in the medical students. To determine the level of grit and perceived stress in 1st year medical students. To study the correlation between Grit, internet addiction and perceived stress. To analyses the association between the level of

perceived stress, grit and internet addiction with academic performance.

METHODS

Study place

A cross-sectional study was done in medical students of 1st year, in their 2nd semester of Dr VRK Women's Medical College, Teaching Hospital and Research Centre.

Study duration

The study period was from May 2023 to October 2023.

Sample size

There were 100 female students who participated in the study. Convenience sampling size of 100 was taken due to admission of 100 students each year. The participants were informed and explained about the study and its future advantages and signed consent was taken.

Inclusion criteria

The inclusion criteria where the participant should be student of 1st year medicine.

Exclusion criteria

The exclusion criteria comprised of students with diagnosed mental disorder and those who did not give consent. They were asked to self-administer the questionnaires on internet addiction, perceived stress and grit.

Their academic performance was analyzed from the common internal assessment exam done in the college. 94 students had attended the internal assessment done in 1st week of May 2023 in the subject of Physiology.

Research tools

Internet addiction test

Internet addiction test by Kimberly Young (1996) was used to find out the prevalence of internet addiction.¹² It consists of 20 questions with Likert score of 1-5. The maximum score is 100. Higher scores show increasing usage.

Score between 31-49 is taken as mild with average use, 50-79 as moderate internet addiction and 80-100 as severe internet addiction.¹³ Moderate internet addiction may experience some impact of increased usage but severe addiction has shown significant problems in their daily life due to high internet use. It shows high degree of internal reliability of 0.92.^{14,15}

Perceived stress scale

Perceived stress scale devised by Sheldon Cohen was used to check the level of perceived stress.⁶ It is 10 item questionnaire covering feelings and thoughts experienced in the last one month. A score between 0-13 is taken as low stress, 14-26 as moderate stress and 27-40 as high stress. It has good reliability with Cronbach's alpha of >0.7.⁸

GRIT scale

GRIT scale given by Angela Duckworth has 10 questions enquiring about passion and perseverance.¹⁰ The sum of the Likert scores is divided by 10 to get final score for interpretation. The maximum score is 5. The higher the score the higher the grit.

Statistical analysis

Statistical analysis was done with Statistical package for social sciences 20 (SPSS-20). Descriptive statistics, correlational studies and regression analysis was done to find the association between internet addiction levels, perceived stress, grit and academic performance.

RESULTS

Analysis of the results obtained from the internet addiction test, perceived stress scale and grit scale and the academic performance was done. Descriptive statistics showing the mean age of participants, mean Grit score, mean internet addiction score and mean perceived stress score is shown below (Table 1). The prevalence of internet addiction in medical students was as high as 90% which includes 20% with moderate internet addiction and 70% mild internet addiction and 10% showing no internet addiction. None showed severe internet addiction. The perceived stress score showed 10% with low stress, 59% moderate stress and 31% scored high stress. On analysis by Pearson's bivariate correlation the level of perceived stress was positively correlated with the grade of internet addiction showing statistical significance at $p < 0.05$ (Table 2). Grit scores had negative correlation with internet addiction scores having significance at $p < 0.05$ level (Table 3). The mean academic score was observed to decrease with increasing grade of internet addiction. The mean academic score was higher for moderate stress compared to low and high perceived stress as shown in (Table 4). Linear regression analysis showed significant positive effect of grit on academic performance at $p < 0.05$.

Table 1: Descriptive statistics age, grit, perceived stress and internet addiction of participants.

	N	Minimum	Maximum	Mean	Standard deviation
Age	100	18.00	21.00	19.3600	0.75905
Grit	100	.00	4.30	3.0478	0.65062
Internet addiction	100	11.00	67.00	40.1800	10.89099
Perceived stress	100	7.00	40.00	23.8900	5.95250
Valid N (listwise)	100				

Table 2: Correlational study between level of perceived stress and internet addiction grade.

	Level of perceived stress	Internet addiction grade
Level of perceived stress	Pearson correlation	1
	Sig. (2-tailed)	0.212*
	N	100
Internet addiction grade	Pearson Correlation	0.212*
	Sig. (2-tailed)	0.034
	N	100

*Correlation; * $p=0.034$ which shows correlation is statistically significant.

Table 3: Correlation between Grit and perceived stress.

	Grit	Internet addiction
Grit	Pearson Correlation	1
	Sig. (2-tailed)	-.249*
	N	100
Internet addiction	Pearson Correlation	-.249*
	Sig. (2-tailed)	.013
	N	100

*Correlation; * $p=0.013$ which correlation is statistically significant

Table 4: Mean academic score with level of internet addiction and perceived stress.

Internet addiction level	N	Mean academic score	Standard deviation
No addiction	10	46.400	19.94548
Mild	64	44.1094	16.25503
Moderate	20	39.3500	14.80851
Perceived stress level			
1.00	10	34.8000	14.64999
2.00	54	45.8704	16.36961
3.00	34	41.6333	16.13196

DISCUSSION

Our study showed 70% of mild and 20% moderate IA which is higher compared to similar study done in India in 2015 reporting 51.42% mild, and 7.45% moderate.¹⁶ This effect might probably be due to increased and easy availability of high-speed internet and smart phones. A meta-analysis reported 30.1% of internet addiction among medical students.¹⁷ Pearson's correlation study between the grade of internet addiction showed moderate positive correlation with level of perceptible stress at significance of $p < 0.05$ similar to recent systematic review by Melca et al and other studies.^{18,19} Pearson's correlation showed significant negative correlation between grit and internet addiction. This shows that students having higher grit are less likely to have internet addiction.

The main objective of a student or a teacher is to get academic excellence. Many factors might facilitate or hinder attainment of high grades. In our study we found that academic performance is under considerable effect of internet addiction, grit and perceptible stress. Our study has shown that grit scores have significant positive correlation with academic performance at $p = 0.03$. Students with more grit tend to perform better in medical studies including clinical subjects.^{20,21} The grit scale by Duckworth takes into consideration the passion towards attaining long term goals and maintaining the motivation and dedication to work towards it in spite of any hurdles and drawbacks.¹⁰

Therefore, its scores are a marker of resilience, unending optimism, self-confidence and focus on the task. Low grit is shown to have risk of mental disorders and higher perceived stress.²²⁻²⁴ Encouraging optimism and an attitude towards continuous progress can increase grit.²⁵ Internet addiction had a negative impact on academic performance showing declining score with increasing internet addiction grade similar to Nath et al and Haroon et al.^{26,27} In terms of perceptible stress, participants with moderate stress levels were having higher academic score than those with low or high perceptible stress. This is most probably due to optimum stress levels delivering better performance as aptly shown by Yerkes Dodson law which analyzes pressure and performance to state that "Performance increases with physiological or mental arousal, but only up to a point".²⁸

The study has limitations like a larger sample size and inclusion of both the genders would have yielded better insight to the study.

CONCLUSION

The medical field is an ever-growing area with new research and information added frequently with newer topics constantly being added to the medical curriculum. As a result, the syllabus has become very vast. For the procurement of sufficient skills and knowledge, students should be taught to remove distractors and increase facilitators of learning. Internet addiction or high stress can create hurdles in the attainment of these goals. Grit in recent times has come out as a significant facilitator for determination towards learning. Our study clearly shows academic performance is better with lesser internet usage, more grit and optimal stress levels. Steps should be taken to make students aware of the magnitude of ill effects of excessive internet usage for purposes other than for learning, on their academic goals. They should be educated about the detrimental effect of internet addiction on perceived stress and grit which can hinder achievement of scholastic excellence. More research should be done to understand the complexities of these factors affecting the academic performance and appropriate measures should be formulated to counteract their effects.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

- Basuroy T. India: Social Media Penetration 2022. Statista. Published March 29, 2023. Available at <https://www.statista.com/statistic>. Accessed on 13 August 2024.
- Ko C-H, Liu G-C, Hsiao S. Brain activities associated with gaming urge of online gaming addiction. *J Psychiatr Res*. 2009;43(7):739-47.
- Bai YM, Lin CC, Chen JY. Internet addiction disorder among clients of a virtual clinic. *Psychiatr Serv*. 2001;52(10):1397.

4. Addiction resource editorial staff. Internet addiction: Causes, effects, and treatments. Addiction Resource. Published November 9, 2023. <https://www.addictionresource.net>. Accessed on 13 August 2024
5. Lební JY, Toghrolí R, Abbas J. A study of internet addiction and its effects on mental health: A study based on Iranian University Students. *J Educ Health Promot.* 2020;9:205.
6. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav.* 1983;24(4):385-396.
7. Lee E. Review of the psychometric evidence of the perceived stress scale. *Asian Nurs Res.* 2012;6(4):121-127.
8. Wang S, Zhao Y, Zhang L. Stress and the brain: Perceived stress mediates the impact of the superior frontal gyrus spontaneous activity on depressive symptoms in late adolescence. *Hum Brain Mapp.* 2019;40(17):4982-93.
9. Batabyal A, Bhattacharya A, Thaker M, Mukherjee S. A longitudinal study of perceived stress and cortisol responses in an undergraduate student population from India. *PLoS One.* 2021;16(6):252579.
10. Duckworth AL, Peterson C, Matthews MD, Kelly DR. Grit: Perseverance and passion for long-term goals. *J Pers Soc Psychol.* 2007;92(6):1087-101.
11. Clement DN, Wingate LR, Cole AB, et al. The common factors of grit, hope, and optimism differentially influence suicide resilience. *Int J Environ Res Public Health.* 2020;17(24):9588.
12. Young KS. Internet addiction: The emergence of a new clinical disorder. *Cyberpsychol Behav.* 1998;1(3):237-44.
13. Abdel-Salam DM, Alrowaili HI, Albedaiwi HK, Alessa AI, Alfayyadh HA. Prevalence of internet addiction and its associated factors among female students at Jouf University, Saudi Arabia. *J Egypt Public Health Assoc.* 2019;94:21.
14. Spoorthy MS, Singh LK, Tikka SK, Hara SH. Exploratory factor analysis of Young's Internet Addiction Test among professionals from India: An online survey. *Indian J Psychol Med.* 2021;43(1):65-9.
15. Moon SJ, Hwang JS, Kim JY, Shin AL, Bae SM, Kim JW. Psychometric properties of the Internet Addiction Test: A systematic review and meta-analysis. *Cyberpsychol Behav Soc Netw.* 2018;21(8):473-84.
16. Chaudhari B, Menon P, Saldanha D, Tewari A, Bhattacharya L. Internet addiction and its determinants among medical students. *Ind Psychiatry J.* 2015;24(2):158-62.
17. Zhang MWB, Lim RBC, Lee C. Prevalence of internet addiction in medical students: A meta-analysis. *Acad Psychiatry.* 2018;42(1):88-93.
18. Melca IA, Teixeira EK, Nardi AE, King AL. Association of internet addiction and mental disorders in medical students. *Prim Care Companion CNS Disord.* 2023;25:3.
19. Sserunkuuma J, Kaggwa MM, Muwanguzi M. Problematic use of the internet, smartphones, and social media among medical students and relationship with depression: An exploratory study. *PLoS One.* 2023;18(5):286424.
20. Kumar A, Meratwal G, Tandon P. Mediation effect of sleep quality and internet addiction on depression among Indian medical graduate students: A cross-sectional study. *J Prim Care Spec.* 2023;4(2):72.
21. Miller-Matero LR, Martinez S, MacLean L, Yaremchuk K, Ko AB. Grit: A predictor of medical student performance. *Educ Health.* 2018;31(2):109.
22. Calo M, Judd B, Chipchase L, Blackstock F, Peiris CL. Grit, resilience, mindset, and academic success in physical therapist students: A cross-sectional, multicenter study. *Phys Ther.* 2022;102(6):38.
23. Musumari PM, Tangmunkongvorakul A, Srihanaviboonchai K. Grit is associated with lower level of depression and anxiety among university students in Chiang Mai, Thailand: A cross-sectional study. *PLoS One.* 2018;13(12):209121.
24. Pyo D, Kwak K, Kim Y. The mediating effect of growth mindset in the relationship between adolescents' optimism and grit. *Curr Psychol.* 2024;43:19153-61.
25. Kannagara CS, Allen RE, Waugh G. All that glitters is not grit: Three studies of grit in university students. *Front Psychol.* 2018;9:15-39.
26. 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(2):10.
27. Haroon MZ, Zeb Z, Javed Z, Awan Z, Aftab Z, Talat W. Internet addiction in medical students. *J Ayub Med Coll Abbottabad.* 2018;30(4):659-63.
28. Wikipedia contributors. Yerkes–Dodson law. Wikipedia. Available at <https://en.wikipedia.org>. Accessed on 23rd August 23, 2024.

Cite this article as: Aziz N, Khan SF, Qatoon SS, Siddiqui M, Zainab, Khan SF. Associations between internet addiction, grit, perceived stress and academic performance in medical students. *Int J Res Med Sci* 2024;12:4152-6.