

ADDICTIVE BEHAVIOUR PATTERNS AND THEIR ASSOCIATION WITH SENSATION-SEEKING TRAITS AMONG UNDERGRADUATE MEDICAL STUDENTS: A CROSS-SECTIONAL STUDY

Psychiatry

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ABSTRACT

Background: Addictive behaviours in medical students may involve both substance-related and behavioural patterns and may be influenced by sensation-seeking traits. **Objective:** To determine the prevalence of selected addictive behaviours among undergraduate medical students and examine their association with sensation seeking. **Methods:** This cross-sectional study included 100 MBBS students aged ≥ 18 years at Dr. Balasaheb Vikhe Patil Rural Medical College, Loni. After informed consent, participants completed validated instruments assessing alcohol use (AUDIT), internet addiction (IAT), problematic pornography use (PPCS-6), exercise dependence (EDS-21), nicotine dependence (FTND), and sensation seeking (SSS). Descriptive statistics and Spearman rank correlations were used; $p < 0.05$ was considered significant. **Results:** Of 100 participants, 62 were male and 38 female; mean age was 20.96 ± 2.06 years. On AUDIT, 40% were low risk, 17% hazardous and 6% severe, while 37% did not consume alcohol. Mild and moderate internet addiction were observed in 70% and 16%, respectively. Possible problematic pornography use was present in 11%. Nicotine dependence was very low in 90%, low in 7% and moderate in 3%. Sensation seeking was very low in 36%, low in 15%, average in 35%, high in 7% and very high in 7%. Sensation seeking correlated positively with FTND ($r = 0.1982$, $p = 0.048$) and EDS-21 ($r = 0.2142$, $p = 0.0324$), but not with AUDIT, IAT or PPCS-6. **Conclusion:** Nicotine and exercise dependence showed small but statistically significant positive associations with sensation-seeking traits. Direct dopamine measurement was not performed; therefore, sensation seeking should not be interpreted as a biochemical measure of dopamine.

KEYWORDS

addictive behaviour; medical students; sensation seeking; nicotine dependence

INTRODUCTION

Addiction involves persistent engagement with a substance or behaviour despite adverse consequences and is strongly linked to reward, reinforcement and motivated behaviour. Dopaminergic pathways, particularly mesolimbic projections from the ventral tegmental area to the nucleus accumbens, are central to reward learning and reinforcement. 1-4 Repeated exposure to addictive substances can also be associated with alterations in dopamine receptor availability and frontal regulatory circuits. 4,5

College students may exhibit multiple forms of addictive behaviour, including alcohol and tobacco use, excessive internet use, gambling and other behavioural addictions. 6-9 Personality traits such as impulsivity and sensation seeking may contribute to vulnerability. 10,11 Sensation seeking is defined as the tendency to pursue novel, complex and intense experiences and has been associated with several risk behaviours. 10,12 The present study assessed multiple addictive-behaviour domains in undergraduate medical students and examined their associations with sensation-seeking scores. Importantly, the study did not directly measure dopamine concentration or dopamine release.

AIM AND OBJECTIVES

The aim was to assess addictive behaviour patterns among undergraduate medical students and examine their relationship with sensation-seeking traits. The objectives were to describe alcohol use, internet use, problematic pornography use, exercise dependence and nicotine dependence, and to determine correlations between these measures and SSS scores.

MATERIALS AND METHODS

This cross-sectional study was conducted at Dr. Balasaheb Vikhe Patil Rural Medical College, Loni, over two months following study approval. One hundred MBBS students were included. Eligible participants were aged > 18 years, capable of informed consent, willing to provide information, and without a known medical condition considered likely to substantially influence addictive behaviours or dopamine-related processes. Students unwilling or unable to provide the required information were excluded.

After written informed consent, participants completed demographic details and pre-validated questionnaires: Alcohol Use Disorders Identification Test (AUDIT), Internet Addiction Test (IAT), Problematic Pornography Consumption Scale-6 (PPCS-6), Exercise Dependence Scale-21 (EDS-21), Fagerström Test for Nicotine Dependence (FTND), and Sensation Seeking Scale (SSS). The project report described SSS as an indirect indicator related to dopamine-linked reward seeking; however, no biochemical or neuroimaging measure of dopamine was obtained.

Descriptive statistics summarized distributions. Spearman rank correlation assessed associations between SSS and AUDIT, IAT, PPCS-6, EDS-21 and FTND. Statistical significance was set at $p < 0.05$.

RESULTS

Table 1. Participant characteristics and distribution of addictive-behaviour measures

Measure/category	n	%
Male sex	62	62
Female sex	38	38
Mean age, years	20.96 ± 2.06	—
AUDIT: does not consume	37	37
AUDIT: low risk	40	40
AUDIT: hazardous	17	17
AUDIT: severe	6	6
IAT: normal	14	14
IAT: mild	70	70
IAT: moderate	16	16
PPCS-6: possible problematic use	11	11
PPCS-6: not significant	89	89
FTND: very low	90	90
FTND: low	7	7
FTND: moderate	3	3
SSS: very low	36	36
SSS: low	15	15
SSS: average	35	35
SSS: high	7	7
SSS: very high	7	7

EDS-21 scores were distributed as follows: 41–45 in 34%, 46–50 in 27%, 51–55 in 24%, 56–60 in 8%, and 61–63 in 7% of participants.

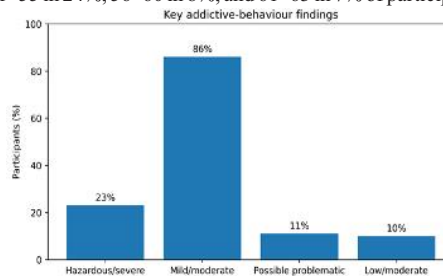


Figure 1. Key Prevalence Findings for Selected Addictive-behaviour Domains.

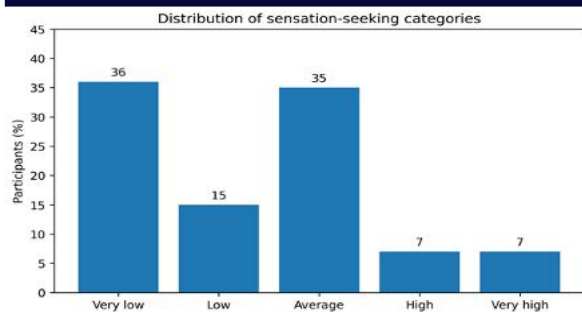


Figure 2. Distribution of Sensation-seeking Categories among Participants.

Table 2. Spearman Rank Correlations between Sensation Seeking Scale and Addictive-behaviour Measures

Variables	Spearman r	p value	Interpretation
FTND and SSS	0.1982	0.048	Significant
AUDIT and SSS	-0.1509	0.1339	Not significant
IAT and SSS	0.02868	0.777	Not significant
PPCS-6 and SSS	-0.02239	0.825	Not significant
EDS-21 and SSS	0.2142	0.0324	Significant

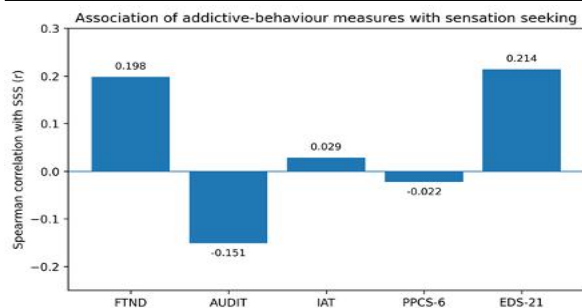


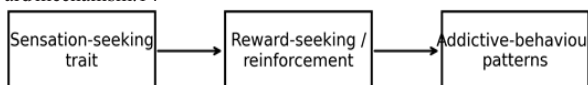
Figure 3. Spearman Correlations of Addictive-behaviour Measures with Sensation Seeking Scale (sss).

DISCUSSION

This study identified a broad spectrum of addictive-behaviour patterns among medical students. Alcohol use was absent in 37%, whereas 23% fell in hazardous or severe AUDIT categories. Internet-related difficulties were common, with 70% classified as mild and 16% as moderate on IAT. Possible problematic pornography use occurred in 11%, while nicotine dependence was predominantly very low.

Sensation-seeking scores showed small positive correlations with nicotine dependence and exercise dependence. The nicotine finding is consistent with literature linking sensation seeking and substance-use vulnerability, including tobacco use.^{10,11} Dopamine-related reward pathways are relevant to nicotine reinforcement, but the present results cannot establish a dopaminergic mechanism because dopamine was not directly measured.^{4,5} Exercise can influence central neurotransmission, including dopamine,¹³ yet a correlation between EDS-21 and sensation seeking likewise does not prove altered dopamine function.

No significant relationships were observed between SSS and alcohol use, internet addiction or problematic pornography use. The predominance of low-risk/non-drinking participants and the relatively small sample may have reduced the ability to detect associations. Behavioural addictions are heterogeneous and may reflect interacting psychological, social and neurobiological influences rather than a single reward mechanism.¹⁴



Dopaminergic reward pathways are biologically relevant, but dopamine was not directly measured in this study.

Conceptual interpretation only — not a measured causal pathway

Figure 4. Conceptual Relationship between Sensation Seeking, Reward Processes and Addictive Behaviours.

LIMITATIONS

The cross-sectional design precludes causal inference. The sample was limited to 100 students from one medical college, reducing generalizability. Measures were self-reported and may be affected by recall and social-desirability bias. Most importantly, dopamine was not measured directly by biochemical testing, neuroimaging or another objective method; SSS is a personality measure and should not be presented as a direct measure of dopamine surge.

CONCLUSION

Addictive-behaviour patterns were common in this medical-student sample, particularly mild internet addiction and low-risk alcohol use. Sensation seeking had small but statistically significant positive associations with nicotine and exercise dependence, while associations with alcohol use, internet addiction and problematic pornography use were not significant. Larger multicentre longitudinal studies incorporating objective neurobiological measures are needed to clarify mechanisms.

Ethical Considerations

Written informed consent was obtained. The study report states that Institutional Ethics Committee approval was obtained before commencement and that confidentiality and participant rights were maintained in accordance with the Declaration of Helsinki.

Conflict of Interest: The authors declare no conflict of interest.

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REFERENCES

- Berridge, K. C., & Robinson, T. E. (2003). Parsing reward. *Trends in Neurosciences*, 26(9), 507–513.
- Dikici, G. R. (2020). Ethology of addiction and dopamine. *Journal of Experimental and Basic Medical Sciences*, 1(1), 28–31.
- Gavurova, B., Ivankova, V., Rigelsky, M., & Mudarri, T. (2022). Internet addiction in socio-demographic, academic, and psychological profile of college students during the COVID-19 pandemic in the Czech Republic and Slovakia. *Frontiers in Public Health*, 10, 944085.
- George, S., Jaisoorya, T., Nair, S., et al. (2016). A cross-sectional study of problem gambling and its correlates among college students in South India. *BJPsych Open*, 2(3), 199–203.
- Grant, J. E., Potenza, M. N., Weinstein, A., & Gorelick, D. A. (2010). Introduction to behavioral addictions. *The American Journal of Drug and Alcohol Abuse*, 36(5), 233–241.
- Kawahara, Y., Ohnishi, Y. N., Ohnishi, Y. H., Kawahara, H., & Nishi, A. (2021). Distinct role of dopamine in the PFC and NAc during exposure to cocaine-associated cues. *International Journal of Neuropsychopharmacology*, 24(12), 988–1001.
- Koob, G. F., & Le Moal, M. (2008). Addiction and the brain antireward system. *Annual Review of Psychology*, 59, 29–53.
- Leeman, R. F., Hoff, R. A., Krishnan-Sarin, S., Patock-Peckham, J. A., & Potenza, M. N. (2014). Impulsivity, sensation-seeking, and part-time job status in relation to substance use and gambling in adolescents. *Journal of Adolescent Health*, 54(4), 460–466.
- Meeusen, R., & De Meirleir, K. (1995). Exercise and brain neurotransmission. *Sports Medicine*, 20(3), 160–188.
- Musyoka, C. M., Mwayo, A., Donovan, D., & Mathai, M. (2020). Alcohol and substance use among first-year students at the University of Nairobi, Kenya: Prevalence and patterns. *PLOS ONE*, 15(8), e0238170.
- Volkow, N. D., Fowler, J. S., Wang, G. J., Swanson, J. M., & Telang, F. (2007). Dopamine in drug abuse and addiction: Results of imaging studies and treatment implications. *Archives of Neurology*, 64(11), 1575–1579.
- Wise, R. A., & Robble, M. A. (2020). Dopamine and addiction. *Annual Review of Psychology*, 71, 79–106.
- Yen, J. Y., Ko, C. H., Yen, C. F., Chen, C. S., & Chen, C. C. (2009). The association between harmful alcohol use and Internet addiction among college students: Comparison of personality. *Psychiatry and Clinical Neurosciences*, 63(2), 218–224.
- Zuckerman, M., Kolin, E. A., Price, L., & Zoob, I. (1964). Development of a sensation-seeking scale. *Journal of Consulting Psychology*, 28(6), 477–482.