ORIGINAL RESEARCH

12. Emotional and Psychological Dependence of Medical Students on Artificial Intelligence Chatbots: A Cross-sectional study

Sheraz Qasim[1], Ali Hassan[2], Fatima Saleemi[3], Mirza Shaheer Hyder[4], Muhammad Ibrahim Khalil[1], Adeenah Irshad[5], Safia Bibi[6], Ali Sher, Ahsan Ali[7]

[1] Ameer-ud-Din Medical College Lahore
2 Allama Iqbal Medical College, Lahore
3 House Officer, Internal Medicine, Lahore General Hospital, Lahore, Pakistan
4 Dow University of Health Sciences. Karachi, Pakistan
[5]Liaquat University of Medical and Health Sciences Jamshoro
[6] Quetta Institute of Medical Sciences
[7] Bacha Khan medical College, Mardan

https://www.youtube.com/watch?v=hJIcIJ1w8oM&list=PLhqNq3xJClbafO0Y5bvBcgMmXpgzJxd44&index=5&t=2389s

Background: Artificial Intelligence (AI) chatbots are programs designed to simulate human-like conversations to provide information and parasocial interaction. Even though these tools may provide a sense of companionship-like bonds, overreliance risks conflating support with dependence. This raises critical questions regarding whether the very features that enhance chatbot engagement may, through repeated or emotionally charged interactions, inadvertently promote emotional dependence. Our study aimed to evaluate the emotional and psychological dependence on AI chatbots among medical students, a population group at higher risk of adopting such coping strategies due to intense stress and limited avenues for emotional support.

Methods: A national cross-sectional survey was conducted among medical students enrolled in various public and private institutions across Pakistan over a period from July to August 2025 through an online questionnaire with assured anonymity. The survey was voluntary, and all participants provided informed consent prior to enrollment. Ethical approval was obtained from Ethical Committee of Ameer-ud-Din Medical College. Data collectors were recruited from different provinces to ensure broad geographic representation, and the survey link was disseminated through institutional and student networks. The questionnaire comprised the following sections: demographics, chatbot usage patterns, emotional expression, psychological help, emotional and psychological dependence, relationship-style dependency, and satisfaction. Reverse coded items were included to minimize acquiescence bias. Dependence was classified as low, moderate, or high using mean ± SD thresholds. Data were analyzed in SPSS 27 using descriptive and inferential statistics, multivariable regression, and mediation–moderation analyses to address confounding and interaction effects, with significance set at $p \leq 0.05$. The study complied with STROBE guidelines.

Results: Of 1063 responses, 1045 were considered valid; 986 (94.4%) students reported using AI chatbots with 50.7% of users engaging with chatbots daily. The mean age was 21.7 ± 2.1 years, with 53.5% males. Most participants (≈68%) showed moderate overall dependence, while high emotional–psychological and relationship-style dependence were observed in 12.37% and 18.36%, respectively. Students with excellent academic performance reported significantly lower dependence scores than those with good performance ($p = 0.037$). A focused analysis on participants from Punjab revealed significant regional trend ($p = 0.009$), with private-institution students showing higher emotional dependence. All scales were strongly and positively intercorrelated (Spearman $p < 0.001$). Multiple regression identified satisfaction as the strongest predictor of both emotional ($\beta = 0.65$, $p < 0.001$) and relationship-style dependence ($\beta = 0.66$, $p < 0.001$), followed by psychological help-seeking and emotional expression. Mediation analysis confirmed an indirect effect of emotional expression on dependence via satisfaction ($\beta = 0.22$, $p < 0.001$), underscoring satisfaction as a central pathway in chatbot-related dependence.

Conclusion: Medical students show moderate dependence on AI chatbots, driven by satisfaction. The mental well-being of medical students is closely related to both their academic performance and future clinical practice, underscoring the importance of understanding these dynamics. These findings call for education and institutional policies to promote balanced, responsible AI use and safeguard students' mental well-being. Future research should explore the long-term impact of chatbot dependence on students' learning, professional development, and psychological well-being.

ISSN 2076-6327

This journal is published by Pitt Open Library Publishing