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Prevalence of Impostor Syndrome: Associations with Personality Traits and Social Comparison Among Undergraduate Students of a Medical College of Kolkata

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Abstract

Background: Impostor syndrome (IS) is a persistent, internalized fear of being exposed as a fraud, despite objective indicators of success. It is common in high-achieving academic settings, particularly among medical students, where it may impair mental health and academic performance.

Objective: To assess the prevalence of impostor syndrome among medical students and examine its associations with personality traits, social comparison tendencies, and anxiety.

Methods: A cross-sectional study was conducted among 132 MBBS students selected through stratified random sampling. Participants completed validated instruments: the Clance Impostor Phenomenon Scale (CIPS), Beck Anxiety Inventory (BAI), NEO-Five Factor Inventory (NEO-FFI), and Social Comparison Scale (SCS). Descriptive statistics, t-tests, Kruskal-Wallis H tests, Spearman's correlation, and multiple linear regression were conducted using SPSS v29.

Results: Clinically significant impostor syndrome (CIPS ≥ 61) was present in 46.3% of participants. Neuroticism (r = 0.58) and anxiety (r = 0.52) were positively correlated with IS, while conscientiousness (r = -0.41), extraversion (r = -0.38), and favorable social comparison (r = -0.49) were negatively associated. Regression analysis identified neuroticism, anxiety, and social comparison as significant predictors ($R^2 = 0.526$, $p < 0.001$). Female and senior students reported higher IS levels.

Conclusion: IS is prevalent among medical students and is strongly linked to neuroticism, anxiety, and negative social comparison. Targeted psychological interventions focusing on emotional regulation and social evaluation may reduce IS-related distress and promote student well-being.

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Introduction

Impostor syndrome (IS), also known as the impostor phenomenon, is characterized by chronic self-doubt and the fear of being exposed as intellectually fraudulent despite clear evidence of competence and success.[1,2] This psychological pattern is prevalent in high-achieving populations, particularly among medical students, who often internalize their accomplishments as undeserved or attributed to luck.[2,3]

The demanding and competitive environment of medical education may exacerbate impostor-related experiences. Academic pressure, frequent eval-

uations, and a culture of perfectionism contribute to psychological stress, potentially diminishing students' confidence and well-being. Persistent impostor feelings have been associated with adverse outcomes, including anxiety, depression, poor academic performance, and burnout.[4,5]

Previous research has identified links between impostor syndrome and certain personality traits—most notably, high neuroticism and low conscientiousness.[6,7] Additionally, perfectionistic tendencies and negative social comparison have been found to reinforce impostor thoughts.[1,8] However, these associations remain underexplored in the Indian context, particularly among medical undergraduates. Furthermore, how impostor experiences and anxiety evolve across different years of training is not well understood.

This study addresses these gaps by examining the prevalence of impostor syndrome in medical students and exploring its relationships with personality traits, anxiety, and social comparison. The findings aim to inform targeted interventions that enhance students' emotional resilience and academic adjustment.

Methods

Study Design and Setting

This was an observational, cross-sectional study conducted among MBBS undergraduate students at a medical college in Kolkata, India. The study aimed to investigate the prevalence of impostor syndrome and its associations with personality traits, anxiety, and social comparison.

Study Duration

The study was conducted over three months from August to October 2024. Data collection occurred during the first two months, while analysis and manuscript preparation were completed in the final month.

Participants and Sampling

The study population consisted of MBBS students from the first to final year. A stratified random sampling technique was employed, with proportional representation from each academic year. A complete enrollment list was obtained from the academic office, and each student was assigned a unique ID. Participants were selected using a random number generator within each stratum.

Inclusion Criteria

- Currently enrolled MBBS students
- Provided informed written consent
- Not currently undergoing psychiatric treatment or on psychotropic medication

Exclusion Criteria

- Declined participation
- Ongoing psychiatric treatment or chronic psychotropic drug use (self-reported during consent and verified through a brief screening checklist based on DSM-5 symptom criteria)

Sample Size Calculation

The required sample size was estimated using the formula:

$n=Z2\cdot P(1-P)d2n=d2Z2\cdot P(1-P)$

where:

- Z = 1.96 for 95% confidence level
- P = 0.243 (based on a previous study of impostor syndrome prevalence among Indian medical students)[8]
- d = 0.08 (margin of error)

The calculated sample size was 111. To account for non-response, 132 students were recruited.

Data Collection Tools and Procedure

Data were collected through a pre-tested, semi-structured, anonymised questionnaire consisting of five sections:

- Sociodemographic Information – age, gender, academic year, family income
- Personality Traits – assessed using the NEO-Five Factor Inventory (NEO-FFI)[9]
- Impostor Syndrome – measured using the Clance Impostor Phenomenon Scale (CIPS), a 20-item self-report questionnaire on a 4-point Likert scale (0–3)[10]
- Anxiety – measured using the Beck Anxiety Inventory (BAI), a 21-item scale assessing

symptoms of anxiety over the past week[12]
- Social comparison – assessed using the Social Comparison Scale (SCS), where higher scores indicate more favorable self-evaluation relative to others[11]

The questionnaire was administered physically in classrooms and collected in sealed envelopes to ensure anonymity. Participants were instructed not to include identifying information.

Data Quality and Reliability

Internal consistency for each scale was assessed using Cronbach's alpha:
- CIPS: $\alpha = 0.89$
- BAI: $\alpha = 0.92$
- NEO-FFI subscales: $\alpha > 0.75$
- SCS: $\alpha = 0.86$

Incomplete forms were excluded from the analysis. Responses were double-entered into Microsoft Excel and cross-checked for accuracy before importing into SPSS v29.

Ethical Considerations

Ethical approval was obtained from the Institutional Ethics Committee of Medical College Kolkata (Ref No: MC/KOL/IEC/NON-SPON/2578/07/2024). All participants provided written informed consent. Participation was voluntary, and students were informed of their right to withdraw at any point without consequence.

Statistical Analysis

Descriptive statistics were used to summarize sociodemographic characteristics and psychometric scores. Categorical variables were expressed as frequencies and percentages; continuous variables were summarized as means ± standard deviations.
- Group differences (e.g., by gender, academic year) were analyzed using t-tests or one-way ANOVA; when normality assumptions were not met, Kruskal-Wallis H tests were used.
- Spearman's rank-order correlation was used to assess the associations between impostor scores and personality traits, anxiety, and social comparison.
- Multiple linear regression identified predictors of impostor syndrome (CIPS score), with all five personality traits, BAI score, SCS score, gender, and academic year entered as predictors.

Multicollinearity was assessed using variance inflation factors (VIF). Post-hoc power analysis using G*Power 3.1 confirmed adequate power (0.92) to detect medium effect sizes in the regression model ($f^2 = 0.15$, $\alpha = 0.05$, $N = 132$).

Data Availability

The anonymized dataset and analysis code used for this study are available from the corresponding author upon reasonable request. Supplementary materials, including the full questionnaire, are provided as appendices.

Results

Participant Characteristics

Out of 145 students approached, 132 participated (response rate: 91.0%). The sample included 72 males (54.5%) and 60 females (45.5%), with a mean age of 21.3 years (SD = 1.8). The distribution by academic year was approximately even (1st year: 24.2%, 2nd year: 25.8%, 3rd year: 26.5%, final year: 23.5%).

Prevalence of Impostor Syndrome

Based on the Clance Impostor Phenomenon Scale (CIPS):
- 46.3% (n = 61) of students reported clinically significant impostor experiences (CIPS ≥ 61).
  - *Intense*: 13.8% (CIPS > 80)
  - *Frequent*: 32.5% (CIPS 61–80)
  - *Moderate*: 38.6% (CIPS 41–60)
  - *Few*: 15.1% (CIPS 20–40)

Gender Differences in Impostor Syndrome

- Female students had significantly higher impostor scores (M = 62.9, SD = 13.2) compared to male (M = 55.3, SD = 11.5), $t(130) = 3.01$, $p = 0.003$, Cohen's $d = 0.62$ [95% CI: 2.6–12.4] (Figure 1).

Impostor Syndrome by Academic Year

The analysis revealed a progressive increase in impostor syndrome scores across academic years.

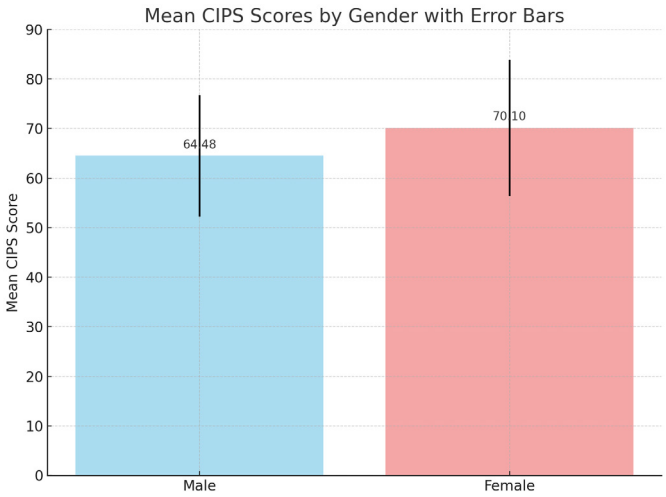

Figure 1: Gender differences in impostor syndrome scores

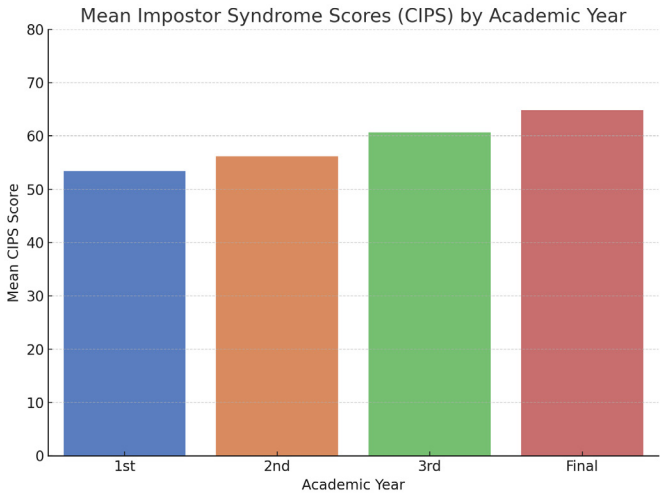

Figure 2: Mean impostor syndrome scores (CIPS) by academic year

First-year students had the lowest mean CIPS scores (M = 53.4, SD = 11.2), while final-year students reported the highest (M = 64.8, SD = 14.1). The difference was statistically significant, H(3) = 8.17, p = 0.043 (Kruskal-Wallis test), suggesting that advancing through medical school may heighten impostor feelings due to increasing clinical responsibility and evaluative pressure (Table 1, Figure 2).

Personality Traits and Impostor Syndrome

Significant correlations were observed between impostor syndrome and several personality dimensions. Neuroticism had a strong positive correlation (ρ = 0.58, p < 0.001), indicating that emotionally reactive individuals were more prone to impostor feelings. In contrast, conscientiousness (ρ = -0.41, p < 0.001) and extraversion (ρ = -0.38, p < 0.001) were negatively associated, suggesting protective effects. Agreeableness showed a weaker negative correlation (ρ = -0.21, p = 0.015), while openness to experience was not significantly correlated (ρ = -0.09, p = 0.291) (Table 2).

Table 1: Mean CIPS scores increased with academic progression

Year	*Mean CIPS (SD)*
1st year	53.4 (11.2)
2nd year	56.2 (12.4)
3rd year	60.7 (13.3)
Final year	64.8 (14.1)

Kruskal-Wallis test: $H(3) = 8.17$, $p = 0.043$, $\eta^2 = 0.063$ (small-moderate effect).

Table 2: Spearman correlations revealed

Trait	*Correlation (ρ)*	*p-value*
Neuroticism	0.58	< 0.001
Conscientiousness	-0.41	< 0.001
Extraversion	-0.38	< 0.001
Agreeableness	-0.21	0.015
Openness	-0.09	0.291

Neuroticism showed the strongest positive correlation with IS, while conscientiousness and extraversion were moderately protective.

Anxiety Prevalence and Relationship with IS

- Overall, 64.4% of participants reported some level of anxiety:
  - Mild: 28.8%
  - Moderate: 21.2%
  - Severe: 14.4%
- Participants with IS (CIPS ≥ 61) reported significantly higher anxiety scores (M = 19.7, SD = 9.3) than those without IS (M = 9.2, SD = 7.6), $t(130) = 7.24$, $p < 0.001$, Cohen's $d = 1.28$ [95% CI: 7.7 to 13.1].
- Anxiety correlated strongly with impostor syndrome (ρ = 0.52, p < 0.001).

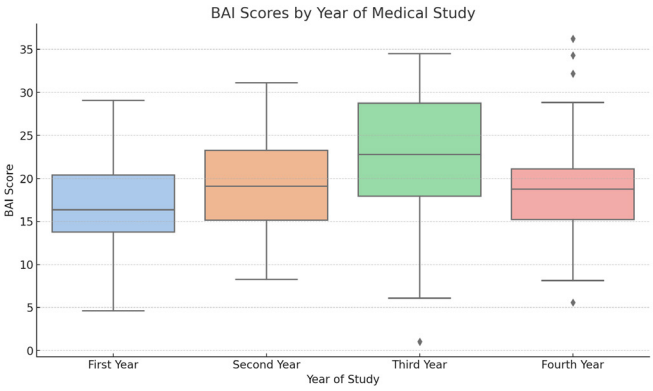

Figure 3: Beck's anxiety inventory (BAI) scores by year of medical study

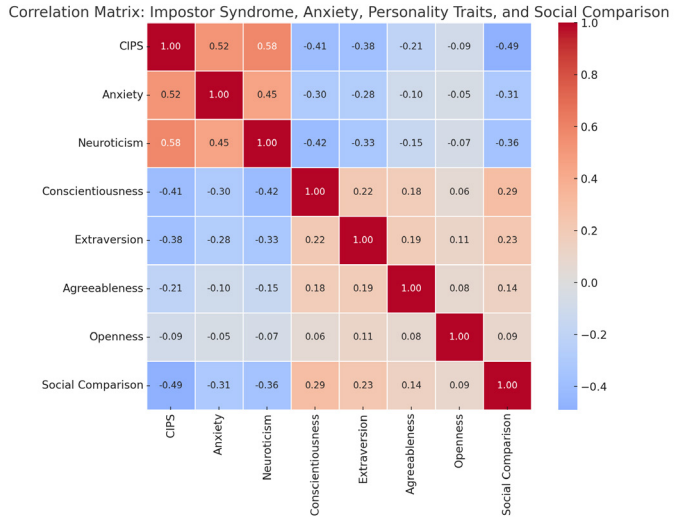

Figure 4: Heat map displaying correlation coefficients between impostor syndrome (CIPS), anxiety, personality traits, and social comparison

Social Comparison and Impostor Syndrome

- Social comparison scores were negatively associated with CIPS scores ($\rho = -0.49$, $p < 0.001$), indicating that more favorable social self-evaluations predicted lower impostor feelings.

Multiple Linear Regression Analysis

A multiple regression model was conducted with impostor scores (CIPS) as the dependent variable and personality traits (NEO-FFI), anxiety (BAI) (Figure 3), social comparison (SCS), gender, and academic year as predictors (Table 3 and Figure 4).

- Multicollinearity check: All VIFs < 2

Discussion

This study reveals a high prevalence of impostor syndrome (46.3%) among medical students, consistent with findings from similar educational settings worldwide.[4,13] The significant gender difference observed—with female students reporting markedly higher impostor scores—aligns with previous research on gender-based disparities in self-perception and attribution styles.[14] This pattern may reflect broader sociocultural factors that influence how achievements are internalized differently across genders within competitive academic environments.

The strong positive correlation (r = 0.58) between neuroticism and impostor syndrome provides compelling evidence that emotional vulnerability serves as a fundamental psychological substrate for impostor experiences (Figure 5). Individuals scoring

Table 3: Multiple linear regression analysis

Predictor	*β (Standardized)*	*95% CI*	*p-value*
Neuroticism	0.42	[0.28, 0.56]	< 0.001
Conscientiousness	-0.25	[-0.40, -0.11]	0.002
Social Comparison	-0.24	[-0.39, -0.10]	0.001
Anxiety (BAI score)	0.30	[0.16, 0.43]	< 0.001
Gender (female = 1)	0.17	[0.03, 0.31]	0.017
Academic Year	0.11	[-0.02, 0.25]	0.093 (ns)

Model Summary: $R^2 = 0.526$, $F(6, 125) = 23.16$, $p < 0.001$

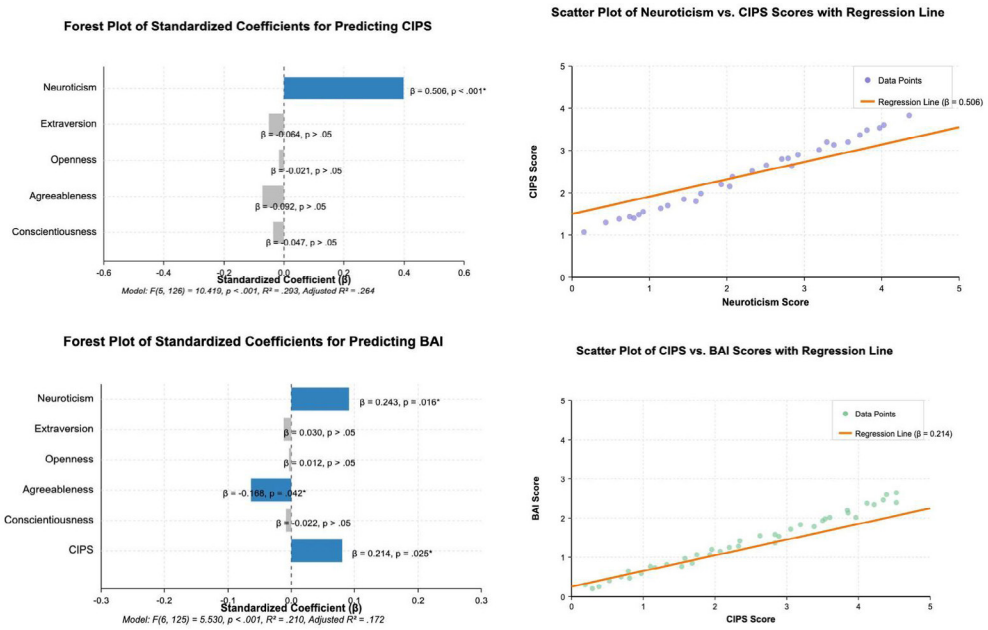

Figure 5: Forest plot showing neuroticism as the only significant predictor of impostor syndrome (CIPS) (β = 0.506, p < .001), with a regression model explaining 29.3% of variance and neuroticism (β = 0.243, p = .016), agreeableness (β = -0.198, p = .042), and CIPS scores (β = 0.214, p = .025) as significant predictors of anxiety (BAI), with accompanying scatter plots demonstrating these relationships

high on neuroticism tend to experience heightened emotional reactivity and negative affect, creating fertile ground for self-doubt even when faced with objective success.[15] This finding extends previous work identifying neuroticism as the personality trait most strongly associated with impostor beliefs across various professional and academic contexts.

Conscientiousness emerged as a significant protective factor (β = -0.25, p = 0.002), suggesting that goal-directed behavior, organization, and persistence may buffer against impostor feelings. This protective effect likely operates through enhanced self-regulation and increased confidence in task completion, allowing conscientious individuals to internalize their achievements as the result of legitimate effort rather than chance.[6] The negative association with extraversion (r = -0.38) further suggests that social engagement and positive emotionality may mitigate impostor experiences, possibly through increased opportunities for positive feedback and social validation.

Our findings demonstrate a bidirectional relationship between anxiety and impostor syndrome each potentially reinforcing the other in a maladaptive cycle. The significant correlation (r = 0.52) and regression coefficient (β = 0.30) suggest that interventions targeting either construct may yield benefits for both. This relationship is particularly concerning in medical education, where performance anxiety is already prevalent and may compound impostor-related distress.

The progressive increase in impostor scores across academic years represents a counterintuitive finding that warrants careful interpretation. While one might expect increased competence to reduce impostor feelings, our data suggest that cumulative exposure to the evaluative pressures of medical training may instead intensify them. This trend aligns with the "competence-difficulty gap" theory, wherein increasing responsibilities and performance expectations outpace students' subjective sense of competence growth.[16] The transition to clinical training in later years, with its heightened stakes and observational assessment, may particularly exacerbate impostor experiences.

Social comparison emerged as a significant predictor of impostor syndrome (β = -0.24, p = 0.001), highlighting how interpersonal evaluative processes shape self-perception. Medical education's inherently competitive atmosphere may facilitate

unfavorable comparisons, especially when students selectively compare themselves to perceived high achievers while overlooking contextual factors that affect performance.[11] The strength of this association suggests that interventions promoting realistic social comparisons and emphasizing individual growth trajectories could substantially reduce impostor experiences.

Our regression model explains a substantial proportion of variance in impostor scores ($R^2 = 0.526$), indicating that the identified psychological factors collectively provide meaningful insight into the etiology of impostor syndrome among medical students. This multifactorial understanding suggests that comprehensive interventions addressing personality vulnerabilities, anxiety management, and social comparison tendencies would be more effective than narrowly focused approaches.

Clinical and Educational Implications

These findings have several practical implications for medical education. First, screening for impostor syndrome and associated factors during early medical training could identify at-risk students, enabling timely supportive interventions. Second, curriculum developers should consider incorporating resilience-building and cognitive reframing techniques specifically targeting impostor beliefs and anxiety management. Third, faculty development programs should raise awareness about impostor syndrome to help educators recognize and address it sensitively during feedback and mentoring.

Group-based interventions that normalize impostor experiences may be particularly valuable, as they can disrupt the isolation that often accompanies impostor feelings. Cognitive-behavioral approaches focusing on evidence-based self-evaluation and challenging cognitive distortions have shown promise in reducing impostor symptoms[17] and could be adapted specifically for medical students.

The gender difference in impostor experiences suggests that gender-sensitive approaches may be beneficial, potentially addressing unique socialization factors that contribute to heightened vulnerability among female medical students. Similarly, the progressive increase in impostor feelings across academic years indicates that interventions should be tailored to specific training stages, with intensified support during transitions to clinical responsibilities.

Limitations and Future Directions

Several limitations warrant consideration when interpreting our findings. The cross-sectional design precludes causal inferences about the relationships observed. Longitudinal studies tracking individual students throughout their medical education would better elucidate how impostor experiences evolve over time and interact with other psychological factors. Additionally, our single-institution sample from an Indian medical college may limit the generalizability of our findings to different cultural or educational contexts.

Self-report measures, although validated, may be subject to social desirability bias, particularly when assessing psychologically threatening constructs, such as impostor feelings. Future studies could strengthen methodology by incorporating behavioral measures, observer ratings, or implicit assessment techniques.

The relationship between impostor syndrome and academic performance outcomes was not directly examined in this study. Future research should investigate how impostor experiences impact objective performance metrics, clinical competence development, and career decision-making. Additionally, exploring protective factors and resilience mechanisms could inform more effective interventions.

Further investigation into the neurobiological correlates of impostor syndrome, such as stress hormone profiles and attentional biases, could deepen our understanding of its physiological underpinnings and connections to anxiety. Ultimately, intervention studies that test targeted approaches for reducing impostor experiences in medical education are needed to translate these findings into effective support strategies.

Conclusion

Impostor syndrome represents a significant psychological challenge for medical students, affecting nearly half of our sample and showing strong associations with neuroticism, anxiety, and negative

social comparison. Its prevalence increases throughout medical training and disproportionately affects female students. The substantial psychological burden imposed by this phenomenon underscores the importance of comprehensive, targeted interventions addressing personality vulnerabilities, anxiety management, and healthy social comparison processes. By addressing impostor syndrome proactively, medical educators can potentially enhance student well-being, reduce psychological distress, and foster more confident, resilient future physicians.

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References

1. Henning K, Ey S, Shaw D. Perfectionism, the impostor phenomenon and psychological adjustment in medical, dental, nursing and pharmacy students. *Med Educ*. 1998;32(5):456–64. doi:10.1046/j.1365-2923.1998.00234.x
2. Prata J, Gietzen JW. The imposter phenomenon in physician assistant graduates. *J Physician Assist Educ*. 2007;18(4):33–6. doi:10.1097/01367895-200718040-00007
3. Craddock S, Birnbaum M, Rodriguez K, Cobb C, Zeeh S. Doctoral students and the impostor phenomenon: Am I smart enough to be here? *J Student Affairs Res Pract*. 2011;48(4):429–42. doi:10.2202/1949-6605.6321
4. Bravata DM, Watts SA, Keefer AL, Madhusudhan DK, Taylor KT, Clark DM, et al. Prevalence, predictors, and treatment of Impostor Syndrome: A systematic review. *J Gen Intern Med*. 2019;35(4):1252–75. doi:10.1007/s11606-019-05364-1
5. Neureiter M, Traut-Mattausch E. An inner barrier to career development: Preconditions of the impostor phenomenon and consequences for career development. *Front Psychol*. 2016;7:article 48. doi:10.3389/fpsyg.2016.00048
6. Rohrmann S, Bechtoldt MN, Leonhardt M. Validation of the impostor phenomenon among managers. *Front Psychol*. 2016;7:article 821. doi:10.3389/fpsyg.2016.00821
7. Pourhoseingholi MA, Vahedi M, Rahimzadeh M. Sample size calculation in medical studies. *Gastroenterol Hepatol Bed Bench*. 2013;6(1):14–7.
8. Sawant N, Kamath Y, Bajaj U, Ajmera K, Lalwani D. A study on impostor phenomenon, personality, and self-esteem of medical undergraduates and interns. *Ind Psychiatry J*. 2023;32:136.
9. Costa PT, McCrae RR. Normal personality assessment in clinical practice: The NEO Personality Inventory. *Psychol Assess*. 1992;4:5–13.
10. Clance PR. Clance Impostor Phenomenon Scale. *PsycTESTS Dataset*. 1985. doi:10.1037/t11274-000
11. Allan S, Gilbert P. A social comparison scale: Psychometric properties and relationship to psychopathology. *Pers Individ Dif*. 1995;19:293–9.
12. Beck AT, Epstein N, Brown G, Steer RA. An inventory for measuring clinical anxiety: Psychometric properties. *J Consult Clin Psychol*. 1988;56:893–7.
13. Villwock JA, et al. Impostor syndrome and burnout among American medical students. *Int J Med Educ*. 2016;7:364–9.
14. Clance PR, Imes SA. The imposter phenomenon in high achieving women: Dynamics and therapeutic intervention. *Psychother Theory Res Pract*. 1978;15(3):241–7.
15. Li S, et al. Neuroticism and imposter syndrome among students: The mediating role of self-esteem. *Psychol Rep*. 2022;125(3):1505–23.
16. LaDonna KA, Ginsburg S, Watling C. "Rising to the level of your incompetence": What physicians' self-assessment reveals about the impostor syndrome. *Acad Med*. 2018;93(5):763–8. doi:10.1097/ACM.0000000000002046
17. Chassangre K, Callahan S. "J'ai réussi, donc je suis chanceux": Le phénomène de l'imposteur et les attributions du succès. *J Ther Comport Cogn*. 2017;27(1):32–40. doi:10.1016/j.jtcc.2016.06.002