Distribution of imposter syndrome among medical students of Bangladesh: a cross-sectional study [version 1; peer review: awaiting peer review]

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Abstract
Background: Imposter syndrome (IS), suffering from self-doubt and fear, despite clear accomplishment and competencies, is often detected in medical students and adversely affects the well-being of the student. This study aimed at assessing the prevalence of IS among public and private medical students in Bangladesh.

Methods: This study was a cross-sectional design among medical students in Bangladesh. Data were collected between February to July 2020 through snowball sampling technique across medical colleges in Bangladesh. Relative risk ratios (RRRs) with 95% CI were calculated to investigate the magnitude of association between imposter syndrome exposure and explanatory variables.

Results: A total of 500 students participated in this study with approximately 47% and 53% of students studying at public and private medical colleges, respectively. Around 32% of medical students were exposed to IS (47% of public and 53% of private medical college students). Medical students were the most significantly associated with IS for third (RR: 1.487, CI: 1.068-2.071) and fourth-year students (RR: 1.493, CI: 1.043-2.136). Overall, we found that respondents aged 22 to 25 were 3.6% (RR:1.036, CI:0.801-1.339) more likely to be suffering from IS than their younger counterparts.

Conclusion: Third and fourth-year medical students, in particular,
require more care than others; teachers and authorities should provide them with proper guidance and care, encourage them, and thus grow their self-reliance and confidence.

**Keywords**
Imposter Syndrome, Bangladesh, Medical College, Young Imposter Scale, Self-doubt.
Introduction
Imposter syndrome (IS) is characterized by a feeling of not belonging, out-of-placeness, and the belief that one’s perceived competence and success by others is undeserved. Usually, this is considered an individual problem that should be addressed by keeping a record of accomplishments as a reminder of progress (Breeze, 2018; Mak et al., 2019; Hendriksen, 2015). In late 1978, clinical psychologists Pauline Clance and Suzanne Imes first cited the IS which arbitrates the relationship between perfectionism and anxiety and partially influences perfectionism and depression (Clance & Imes, 1978).

A more recent systemic review conducted in the U.S. in 2020 found that the prevalence of IS ranged from 9% to 82% in the general population (Bravata et al., 2020), while another review conducted in the U.S. in 2020 found that it ranged from 22% to 60% among physicians and from 33% to 40% among trainee physicians (Gottlieb et al., 2020). In the United States, recent studies on IS have found that 57% of pharmacy students (Sullivan & Ryba, 2020) and 15% of medical students have IS (Holliday et al., 2020). Indeed, IS is becoming a growing public health issue both globally and regionally. For instance, the prevalence of IS among medical students has been found to be 30% in the US (Villwock et al., 2016), 45.7% in Malaysia (Ikbaal & Salim Musa, 2018), and 47% in Pakistan (Qureshi et al., 2017).

Several studies suggest that IS has a strong correlation with general psychological distress (Bravata et al., 2020; Sullivan & Ryba, 2020; Wang et al., 2019) and demographic and personal characteristics, including age (Bravata et al., 2020; Holliday et al., 2020; Sullivan & Ryba, 2020), gender (Gottlieb et al., 2020; Holliday et al., 2020; Rosenstein et al., 2020), and academic year (Gottlieb et al., 2020; Ikbaal & Salim Musa, 2018; Qureshi et al., 2017).

The evidence indicates that medical students experienced moderated-to-strong IS (Levant et al., 2020), which has psychological and academic consequences (Ikbaal & Salim Musa, 2018; Qureshi et al., 2017; Villwock et al., 2016). The move to the clinical phases of study can be particularly challenging and cause students to suffer from low confidence during this time (Burstein et al., 1980; Niemi & Vanniomäki, 2006). In addition, many studies confirmed that IS often negatively affects medical students’ physical and academic well-being (Ikbaal & Salim Musa, 2018; Levant et al., 2020; Villwock et al., 2016). Thus, they may miss out on opportunities because they do not recognize their potential.

There have been many studies on IS among medical students conducted across the world. However, no study has yet been published on IS among medical students in Bangladesh. Therefore, this study aims to draw attention to the growing need for more mental health research within Bangladesh. The current study focused on evaluating the prevalence of IS, exploring the frequency distribution of IS in different institutions, and assessing the factors contributing to IS among public and private medical college students. The survey provides insight into areas of commonality and differences between IS in students.

Methods
Ethical approval
Ethical approval was obtained from the Institutional Review Board (IRB) at North South University, Dhaka, Bangladesh. The study objectives were explained to each participant and confidentiality, and anonymity was assured, and written informed consent was obtained from respondents before proceeding.

Study design and settings
This study was conducted using a cross-sectional survey assessing the presence of IS among medical college students in Dhaka city. Data were collected from medical colleges (public and private) in Dhaka between February 2020 and July 2020. Our study did not include any students studying in medical colleges located outside of Dhaka city, Bangladesh. We collected more samples than the recommended minimum sample size for better accuracy and results. So, throughout our survey, we collected a sample size of 500 students selected from public and private medical colleges in Dhaka. Our survey was conducted using a snowball sampling method (a non-probability sampling method) to achieve the desired sample size. The medical colleges chosen for the study are attended by students from across the country, allowing this study to provide an understanding of the prevalence of IS among medical students across Bangladesh. Participants of the study were the students of both public and private medical colleges ranging from 1st to 5th year of study. Initially, we identified some potential IS cases among our respondents and asked them to recommend other people for the study. After this, we contacted them via email or mobile phone and collected data through face-to-face interviews. The eight items from the Young Imposter Syndrome (YIS) scale (Villwock et al., 2016) were used to assess whether the participant had IS or not. The scale was in the form of eight questions, and a student was considered to have IS if they answered 5 or more questions as “Yes”.
Public and private medical colleges represent the whole community of medical students, and our study aimed to find out the underlying risk of having IS among medical college students. This condition is less discussed in Bangladesh, so we aimed to reveal such mental conditions and associated risks within the study group.

**Measures**

**Dependent variable**

In our study, we used IS as the dependent variable. The dependent variable contains two categories, “Yes” (has IS) and “No” (does not have IS). We defined them as follows:

\[ Y = \begin{cases} 
1; & \text{Yes} \\
0; & \text{No} 
\end{cases} \]

In our survey, we used Young Imposter Syndrome (YIS) scale to assess the presence of IS. The scale was in the form of eight questions. A student was considered to have IS if they answered 5 or more questions as “Yes” in the YIS scale, otherwise considered “No”.

**Independent variables**

Participants’ sociodemographic factors and some academic data were considered as independent variables. The sociodemographic variables included gender (male, female), age group (18-21, 22-25 years), smoking status (current, past, never), and living with family (yes, no). Body Mass Index (BMI) was categorized using the WHO BMI standard scale (Nuttall, 2015). The economic condition was determined by the monthly family income (MFI) of the respondents. The MFI was categorized as ≤20,000 BDT (approximately US$237), 21,000-30,000 BDT, 31,000-40,000 BDT, ≥41,000 BDT. This MFI interval was a self-imposed category. The academic year was categorized as first, second, third, fourth, or fifth, and the reasons for studying in medical college were classified as own preference, family preference, failing to qualify for another department or better job opportunities. Each response was dichotomized (yes, no). All relevant information was directly collected from each participant.

**Survey procedures**

In our study, we collected the desired data through snowball sampling. This sampling method was used because of the lack of a sampling frame and the unavailability of targeted samples. Using the (Israel, 1992) formula (i), we obtained the minimum sample size required for the study.

\[ n_0 = \frac{z^2pq}{d^2} \]  

Where, \( n_0 \) is the initial sample size, \( z \) is the standard normal variate, and \( p \) is the (estimated) proportion of the population with the attribute in the question, i.e., \( p + q = 1 \). \( d \) is the allowed maximum error in estimating a population proportion. Considering the degree of accuracy, \( d = 0.05 \) and \( p \) as the approximate proportion of YIS (\( p = 0.47 \)), taken from a related study conducted in Pakistan (Qureshi et al., 2017). So, the calculated sample size was 382; however, we targeted more subjects to be included than the required sample size. Finally, we collected complete information from 500 unique samples for our study, and incomplete questionnaires were not considered for analysis.

**Design of the study**

Data were collected through a face-to-face interview. Participants were reassured that all the information collected would be kept strictly confidential and would not be used for anything other than research purposes. Written consent was taken for the study from the participants. After this, we briefly introduced the student to our research and presented them with the questionnaire. The response was scribed immediately. The collected data was compiled for further processing and analysis. After cleaning the raw data, we had 500 complete observations for our study.

**Statistical analysis**

Statistical analysis was performed with Statistical Package for Social Science (SPSS) version 26 (IBM Corporation, Armonk, NY, USA). And Stata 16.0 for windows (Stata Corp LP, 4905 Lakeway Drive College Station, USA). Throughout our study, we collected only the completed questionnaire and discarded any incomplete questionnaire. To observe the background of the study, we used frequency distribution which is presented in Table 3. For the bivariate study, we used a relative risk ratio (RRR) with a 95% confidence interval to determine the risk of having IS, as presented in Table 4.
Results
We selected 500 students among the medical colleges, and the questionnaires were collected from each individual during face-to-face meetings. Therefore, the response rate was 100%. Out of the 500 participants, 233 (46.6%) were public, and 267 (53.4%) were private medical college students. Detailed information on how respondents addressed all eight questions (Villwock et al., 2016) is displayed in Table 1.

The students who answered “Yes” for five or more out of eight questions were considered positive for IS. In total, 61 (32.2%) out of 500 students answered “Yes” for five or more questions, and 339 (67.8%) answered “No” according to the definition of the YIS scale. A breakdown of YIS scores in relation to the institution is given in Table 2.

Univariate analysis
For univariate analysis, we used frequency distributions and percentages to compare the variables within the study, as presented in Table 3.

Table 1. Answers to imposter syndrome questions by medical college students according to the Young Imposter Syndrome (YIS) scale.

| No. | Questions                                                                 | Answer (Yes/No) | Medical college | Public (n, %) | Private (n, %) |
|-----|---------------------------------------------------------------------------|-----------------|-----------------|--------------|---------------|
| 1   | Do you secretly worry that others will find out that you are not as bright and capable as they think you are? | Yes | 138 (59.2) | 123 (46.1) |
|     |                                                                           | No              | 95 (40.8)       | 144 (53.9)   |
| 2   | Do you sometimes shy away from challenges because of a nagging self-doubt? | Yes | 137 (58.8) | 105 (39.0) |
|     |                                                                           | No              | 96 (41.2)       | 163 (61.0)   |
| 3   | Do you tend to chalk your accomplishments up to being a fluke no big deal or the fact that people just like you? | Yes | 114 (48.9) | 127 (47.6) |
|     |                                                                           | No              | 119 (51.1)       | 140 (52.4)   |
| 4   | Do you hate making a mistake, being less than fully prepared or not doing things perfectly? | Yes | 115 (49.4) | 144 (53.9) |
|     |                                                                           | No              | 118 (50.6)       | 123 (46.1)   |
| 5   | Do you tend to feel crushed even by constructive criticism, seeing it as an evidence of your ineptness? | Yes | 119 (51.1) | 142 (53.2) |
|     |                                                                           | No              | 114 (48.9)       | 125 (46.8)   |
| 6   | When you do succeed, do you think, “Phew” I fooled them this time but I may not be that lucky next time? | Yes | 103 (44.2) | 113 (42.3) |
|     |                                                                           | No              | 130 (55.8)       | 154 (57.7)   |
| 7   | Do you believe that other people (students, colleagues, competitors) are smarter and more capable than you? | Yes | 113 (48.5) | 158 (59.2) |
|     |                                                                           | No              | 120 (51.5)       | 109 (40.8)   |
| 8   | Do you live in fear of being found out, discovered or un-masked?           | Yes | 111 (47.6) | 105 (39.3) |
|     |                                                                           | No              | 122 (52.4)       | 162 (60.7)   |

Table 2. Institution and YIS scores.

| Imposter score | Medical college | Public (n, %) | Private (n, %) | Total (n, %) |
|----------------|-----------------|--------------|---------------|-------------|
|                |                 | Public (n, %) | Private (n, %) | Total (n, %) |
| 0              |                 | 0 (0.0)       | 6 (2.2)        | 6 (1.2)      |
| 1              |                 | 8 (3.4)       | 8 (3.0)        | 16 (3.2)     |
| 2              |                 | 33 (14.2)     | 37 (13.9)      | 70 (14.0)    |
| 3              |                 | 44 (18.9)     | 49 (18.4)      | 93 (18.6)    |
| 4              |                 | 65 (27.9)     | 89 (33.3)      | 154 (30.8)   |
| 5              |                 | 30 (12.9)     | 46 (17.2)      | 76 (15.2)    |
| 6              |                 | 39 (16.7)     | 25 (9.4)       | 64 (12.8)    |
| 7              |                 | 12 (5.2)      | 5 (1.9)        | 17 (3.4)     |
| 8              |                 | 2 (0.9)       | 2 (0.7)        | 4 (0.8)      |
### Table 3. Frequency distribution of study variables.

| Variables                        | Frequencies (n) | Percentages (%) |
|----------------------------------|-----------------|-----------------|
| **Dependent variable**           |                 |                 |
| Imposter syndrome                |                 |                 |
| Yes                              | 161             | 32.2            |
| No                               | 339             | 67.8            |
| **Independent variables**        |                 |                 |
| Type of medical college          |                 |                 |
| Public                           | 233             | 46.6            |
| Private                          | 267             | 53.4            |
| Age (years)                      |                 |                 |
| 18-21                            | 290             | 58.0            |
| 22-25                            | 210             | 42.0            |
| Sex of the participants          |                 |                 |
| Male                             | 269             | 53.8            |
| Female                           | 231             | 46.2            |
| Body mass index (BMI)            |                 |                 |
| Underweight                      | 26              | 5.2             |
| Normal                           | 191             | 38.2            |
| Overweight                       | 159             | 31.8            |
| Obese                            | 124             | 24.8            |
| Academic year                    |                 |                 |
| 1st year                         | 218             | 43.6            |
| 2nd year                         | 37              | 7.4             |
| 3rd year                         | 96              | 19.2            |
| 4th year                         | 73              | 14.6            |
| 5th year                         | 76              | 15.2            |
| Reason for study choice          |                 |                 |
| Own preference                   | 208             | 41.6            |
| Family preference                | 197             | 39.4            |
| Failing to quality for interesting department | 47 | 9.4 |
| Have better job opportunities    | 48              | 9.6             |
| Monthly family income (MFI)      |                 |                 |
| ≤20000 BDT                       | 7               | 1.4             |
| 21000-30000 BDT                  | 18              | 3.6             |
| 31000-40000 BDT                  | 151             | 30.2            |
| ≥41000 BDT                       | 324             | 64.8            |
| Smoking status                   |                 |                 |
| Current smoker                   | 81              | 16.2            |
| Past smoker                      | 58              | 11.6            |
| Never smoker                     | 361             | 72.2            |
| Living with family               |                 |                 |
| Yes                              | 194             | 38.8            |
| No                               | 306             | 61.2            |

Note: BMI = body mass index; BDT = Bangladeshi Taka.
In our study, 161 (32.2%) out of 500 observations were suffering from YIS, while the rest of the respondents (339; 67.8%) were students without YIS. This indicates that around one-third of our total respondents were experiencing symptoms of YIS. Approximately 53% of our respondents were from private, and 47% were from public medical colleges. Most of the

| Table 4. Relative risk of having YIS. |
|--------------------------------------|
| Factors                              | Imposter syndrome | RRR | 95% CI       |
|                                      | Yes (n, %)         |     |             |
|                                      | No (n, %)          |     |             |
| Type of medical college              |                    |     |             |
| Public                               | 83(35.6)           | 1.219 | 0.946-1.572 |
| Private                              | 78(29.2)           | 1   |             |
| Age (years)                          |                    |     |             |
| 18-21                                | 92 (31.7)          | 1   |             |
| 22-25                                | 69(32.9)           | 1.036 | 0.801-1.339 |
| Sex of the participants              |                    |     |             |
| Male                                 | 85 (31.6)          | 1   |             |
| Female                               | 76 (32.9)          | 1.041 | 0.807-1.343 |
| Body mass index (BMI)                |                    |     |             |
| Underweight                          | 10 (38.5)          | 1.096 | 0.649-1.849 |
| Normal                               | 67 (35.1)          | 1   |             |
| Overweight                           | 55 (34.6)          | 0.986 | 0.739-1.315 |
| Obesity                              | 29 (23.4)          | 0.666 | 0.459-0.967 |
| Academic year                        |                    |     |             |
| 1st year                             | 58 (26.6)          | 1   |             |
| 2nd year                             | 7 (18.9)           | 0.711 | 0.352-1.435 |
| 3rd year                             | 38 (39.6)          | 1.487 | 1.068-2.071 |
| 4th year                             | 29 (39.7)          | 1.493 | 1.043-2.136 |
| 5th year                             | 29 (38.2)          | 1.434 | 0.999-2.058 |
| Reason for study choice              |                    |     |             |
| Own preference                       | 70 (33.7)          | 1   |             |
| Family preference                    | 65 (33)            | 0.980 | 0.744-1.291 |
| Failing to qualify for interested department | 18 (38.3) | 1.137 | 0.755-1.714 |
| Have better job opportunities        | 8(16.7)            | 0.495 | 0.255-0.958 |
| Monthly family income (MFI)          |                    |     |             |
| ≤20000 BDT                           | 3 (42.9)           | 1.102 | 0.392-3.096 |
| 21000-30000 BDT                      | 7 (38.9)           | 1   |             |
| 31000-40000 BDT                      | 53 (35.1)          | 0.902 | 0.486-1.675 |
| ≥41000 BDT                           | 98 (30.2)          | 0.777 | 0.425-1.420 |
| Smoking status                       |                    |     |             |
| Current smoker                       | 29 (35.8)          | 1.133 | 0.816-1.575 |
| Past smoker                          | 18 (31)            | 0.982 | 0.650-1.484 |
| Never smoker                         | 114 (31.6)         | 1   |             |
| Living with family                   |                    |     |             |
| Yes                                  | 64 (33)            | 1.041 | 0.803-1.349 |
| No                                   | 97 (31.7)          | 1   |             |

Note: RRR=relative risk ratio; CI= confidence interval; 1: reference; BDT: Bangladesh Taka.
According to Eva et al., private medical college students were more relaxed and confident than public medical college students (Eva et al., 2015). However, our study suggested that both public and private medical college students lacked confidence and suffered from IS. Indeed, in our study, 60.7% of private and 52.4% of public medical college students answered “yes” to the question “Do you live in fear of being found out, discovered, or un-masked?”.

An earlier study conducted in the U.S. in 2016 showed that almost 25% of male and nearly 50% of female students analysed had IS and that IS was significantly associated with burnout or dropout (Villwock et al., 2016). Every year, many students drop out or burn out and suffer from anxiety and other psychological problems (Eva et al., 2015).
According to the findings of Maqsood et al. (2018) the fourth-year medical students suffered more severely with IS than others, reflecting our own findings. They also found that 27.41% of the third year and 46.31% of fourth-year medical students had moderate IS and that 64.51% of the third year and 47.36% of fourth-year students had severe IS (Maqsood et al., 2018). In 2003, a survey of the mental health of medical students in Iran examined the age and health status of the respondents and using the 12-item General Health Questionnaire (GHQ-12) (Montazeri et al., 2003). 30.6% of first-year and 30.6% of fourth-year medical students were suffering psychological distress (Hendriksen, 2015).

A study conducted in 2012 among medical college students in Malaysia observed that 14.8% of total students were underweight (12.2% males and 17.0% females), 14.8% were overweight (males 13.7% and females 15.7%), 15.9% were pre-obese (BMI≥30kg/m²) (18.3% of males and 13.8% of females), and 5.2% were found to be obese (males 9.2% and 1.9% females) (Hameed et al., 2019). Our study has identified similar findings; 5.2% of total respondents were underweight (BMI < 18.5 kg/m²), 38.2% were normal weight (BMI = 18.5 – 24.9 kg/m²), overweight and pre-obese made up 31.8% (BMI = 25 – 29.9 kg/m²) and 24.8% were found to be obese (BMI = 30& > 30 kg/m²). We also noticed that 38.5% of total underweight students had a positive IS score (IS score ≥ 5), the largest among the different BMI classes. In contrast, only 23.4% of total obese students had IS.

The generalisability of our findings on IS among medical college students studying in Dhaka, to other city students is unknown. Studying only medical college students in Dhaka, may have resulted in an underestimation of the coverage of IS. Similarly, investigating the underlying causes was beyond the scope of our study. Our study presents the risk of IS at the time of our assessment, however, the situation in Bangladesh has likely further deteriorated because of the COVID-19 pandemic. Given that the COVID-19 situation has forced Bangladesh’s education system to close for nearly two years, there is a greater need that ever to conduct surveys to monitor mental health issues such as IS amongst students. Our presented data and our risk analysis showed higher BMI, and higher MFI coincided with lower risk of IS. So, ensuring appropriate diet and proper socio-economic improvement, may help reduce the risk of IS and other mental health problems among medical students. The hope is that this study will encourage more research on this topic and a greater understanding of the impact of IS on various aspects of the social, academic, and daily life of those who suffer from it.

Strength and limitations
This study advances knowledge in several ways. This research is among the first to examine the risk of IS among medical college students in Bangladesh, which is not a commonly discussed syndrome within this country. This research also addresses further need for inquiries into the psychological predictors of IS, helping to understand the reasons and the causes behind IS. IS is an increasingly prevalent psychological syndrome. However, it's possible, when looking for participants for a mental health study, potential volunteers might be hesitant to participate due to the personal nature of the topic. As a result, snowball sampling was utilized in this study to reach the population, because it is difficult to collect samples using other sampling methods.

While this study makes several contributions to IS research, there are some limitations. This study used the snowball sampling method, which is a non-probability type sampling method. The researchers had little control over the sampling approach. We only interviewed those who were recommended by the previous respondents. Therefore, the sampling approach was limited and subjective. There might be some sampling bias present in this study because of the nature of the sampling method. Because of the sampling bias, our samples might not represent the true distribution of the population. Similarly, our study only sampled Dhaka city; it would’ve been better if we’d studied the entire country. Consequently, we would have been able to get a better picture of the distribution of IS and the underlying factors that influence it.

Conclusion
Our analysis revealed a serious public health issue for medical college students in Bangladesh. As a result, students may suffer from depression and, in some cases, even commit suicide (Qureshi et al., 2017). Public and private medical institutions should take that matter seriously and establish various programs, organizations, counseling teams, and other activities to help identify students suffering from IS and support them. It is evident that students, especially those in their third and fourth year of medical college, need more care than others to ensure they stay focused on their goals. Faculty and fellow students should guide, mentor, and encourage IS suffers to produce self-confident and self-sufficient students.

Data availability
Underlying data
Mendeley: Shahjalal, Md et al., 2021 Imposter Syndrome Data Set. http://doi.org/10.17632/znb42mw6fy.3 (Shahjalal, Md et al., 2021a)
This project contains the following underlying data:
- Date file 1. (Complete survey responses, XLSX format)

Extended data
Mendeleoy: Shahjalal, Md et al., 2021 Distribution of imposter syndrome (IS) among medical students of Bangladesh: A cross-sectional study: Copy of questionnaire.

http://doi.org/10.17632/znb42mw6fy.3 (Shahjalal, Md et al., 2021b)

This project contains the following extended data:
- Copy of questionnaire used in study

Data are available under the terms of the Creative Commons Attribution 4.0 International license (CC-BY 4.0).

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