RESEARCH ARTICLE

Distribution of imposter syndrome among medical students of Bangladesh: a cross-sectional study [version 1; peer review: 1 approved with reservations, 1 not approved]

Md. Shahjalal ^{1,2}, Md Nafiul Alam Khan ²⁻⁴, Faroque Md Mohsin ^{1,2}, Shahariar Rokan³, Riaz Rahman⁴, Mohammad Morshad Alam ^{1,2}, Rashidul Alam Mahumud^{5,6}

¹Department of Public Health, North South University, Dhaka, 1229, Bangladesh

²Research Rats, Dhaka, Bangladesh

³Applied Statistics and Data Science, Department of Statistics, Jahangirnagar University, Savar, Bangladesh

⁴Statistics Discipline, Science Engineering and Technology School, Khulna University, Khulna, Bangladesh

⁵Centre for Health Research, University of Southern Queensland, Toowoomba, Queensland, Australia

⁶NHMRC Clinical Trials Centre Faculty of Medicine and Health, The University of Sydney, Camperdown, NSW, 2006, Australia

V1 First published: 18 Oct 2021, 10:1059
<https://doi.org/10.12688/f1000research.55444.1>

Latest published: 18 Oct 2021, 10:1059
<https://doi.org/10.12688/f1000research.55444.1>

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,

Open Peer Review

Approval Status

	1	2
version 1 18 Oct 2021	view	view

1. **Md Zakirul Islam**, Eastern Medical College, Cumilla, Bangladesh
2. **Adam Neufeld** , University of Calgary, Calgary, Canada

Any reports and responses or comments on the article can be found at the end of the article.

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.

Corresponding author: Md. Shahjalal (md.shahjalal3@northsouth.edu)

Author roles: **Shahjalal M:** Conceptualization, Data Curation, Investigation, Methodology, Project Administration, Resources, Validation, Visualization, Writing – Original Draft Preparation, Writing – Review & Editing; **Khan MNA:** Data Curation, Formal Analysis, Software; **Mohsin FM:** Investigation, Resources; **Rokon S:** Software, Writing – Original Draft Preparation; **Rahman R:** Software, Writing – Review & Editing; **Alam MM:** Writing – Review & Editing; **Mahumud RA:** Conceptualization, Project Administration, Supervision, Validation, Visualization, Writing – Review & Editing

Competing interests: No competing interests were disclosed.

Grant information: The author(s) declared that no grants were involved in supporting this work.

Copyright: © 2021 Shahjalal M *et al.* This is an open access article distributed under the terms of the [Creative Commons Attribution License](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

How to cite this article: Shahjalal M, Khan MNA, Mohsin FM *et al.* **Distribution of imposter syndrome among medical students of Bangladesh: a cross-sectional study [version 1; peer review: 1 approved with reservations, 1 not approved]** F1000Research 2021, 10:1059 <https://doi.org/10.12688/f1000research.55444.1>

First published: 18 Oct 2021, 10:1059 <https://doi.org/10.12688/f1000research.55444.1>

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 arbitrated 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 & Vainiomäki, 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 socio-demographic 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.

$$n_0 = \frac{z^2 pq}{d^2} \quad (i)$$

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		Total (n, %)
	Public (n, %)	Private (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		
1 st year	218	43.6
2 nd year	37	7.4
3 rd year	96	19.2
4 th year	73	14.6
5 th year	76	15.2
Reason for study choice		
Own preference	208	41.6
Family preference	197	39.4
Failing to qualify 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)	150(64.4)	1.219	0.946-1.572
Private	78(29.2)	189(70.8)	1	1
Age (years)				
18-21	92 (31.7)	198(68.3)	1	1
22-25	69(32.9)	141 (67.1)	1.036	0.801-1.339
Sex of the participants				
Male	85 (31.6)	184 (68.4)	1	1
Female	76 (32.9)	155 (67.1)	1.041	0.807-1.343
Body mass index (BMI)				
Underweight	10 (38.5)	16 (61.5)	1.096	0.649-1.849
Normal	67 (35.1)	124 (64.9)	1	1
Overweight	55 (34.6)	104 (65.4)	0.986	0.739-1.315
Obesity	29 (23.4)	95 (76.6)	0.666	0.459-0.967
Academic year				
1 st year	58 (26.6)	160 (73.4)	1	1
2 nd year	7 (18.9)	30 (81.1)	0.711	0.352-1.435
3 rd year	38 (39.6)	58 (60.4)	1.487	1.068-2.071
4 th year	29 (39.7)	44 (60.3)	1.493	1.043-2.136
5 th year	29 (38.2)	47 (61.8)	1.434	0.999-2.058
Reason for study choice				
Own preference	70 (33.7)	138 (66.3)	1	1
Family preference	65 (33)	132 (67)	0.980	0.744-1.291
Failing to qualify for interested department	18 (38.3)	29 (61.7)	1.137	0.755-1.714
Have better job opportunities	8(16.7)	40(83.3)	0.495	0.255-0.958
Monthly family income (MFI)				
≤20000 BDT	3 (42.9)	4 (57.1)	1.102	0.392-3.096
21000-30000 BDT	7 (38.9)	11 (61.1)	1	1
31000-40000 BDT	53 (35.1)	98 (64.9)	0.902	0.486-1.675
≥41000 BDT	98 (30.2)	226 (69.8)	0.777	0.425-1.420
Smoking status				
Current smoker	29 (35.8)	52 (64.2)	1.133	0.816-1.575
Past smoker	18 (31)	40 (69)	0.982	0.650-1.484
Never smoker	114 (31.6)	247 (68.4)	1	1
Living with family				
Yes	64 (33)	130 (67)	1.041	0.803-1.349
No	97 (31.7)	209 (68.3)	1	1

Note: RRR=relative risk ratio; CI= confidence interval; 1: reference; BDT: Bangladesh Taka.

respondents were young; 58% were between 18 and 21 years old, and 42% were between 22 and 25 years old. Overall, 269 (53.8%) out of 500 respondents were male, and 231 (46.2%) were female. The majority of participants (191; 38.2%) of our study had a healthy BMI (between 18.5 and 24.9). Most of our respondents (208; 41.6%) replied that they study medical science because of their own preference, and 197 (39.4%) study because their family wanted them to. Most of our respondents (361; 72.2%), were non-smokers, and the rest were smokers or had smoked in the past. Most of our respondents (306; 61.2%) lived without family, and the rest lived with the family.

Bivariate analysis

In order to find out the risk of having YIS, we calculated relative risk along with 95% confidence interval, and this is presented in [Table 4](#).

In our study, respondents who study in public medical colleges were 1.21 times or 21% (RR: 1.219, CI: 0.946-1.572) more at risk of having IS than private medical colleges. Respondents aged 22 to 25 years are 3.6% (RR: 1.036, CI: 0.801-1.339) more at risk of having IS than their younger counterparts. Our study found that female respondents were 4.1% (RR: 1.041, CI: 0.807-1.343) more at risk of having IS than male respondents. Surprisingly, we found that students who had a lower than healthy BMI score (between 18.5 and 24.9) were 9.6% (RR: 1.096, CI: 0.649-1.849) more at risk of having IS. We also found that students whose BMI was higher than the healthy range were at lower risk (RR: 0.986, CI: 0.739-1.315 and RR: 0.666, CI: 0.459-0.967) of having IS. Students in their second year had a lower risk of having IS (RR: 0.711, CI: 0.352-1.435) than those in their first year. However, third, fourth, and fifth-year students have 48% (RR: 1.487, CI: 1.068-2.071), 49% (RR: 1.493, CI: 1.043-2.136), and 43% (RR: 1.434, CI: 0.999-2.058) greater risk of having IS than first-year students. Respondents who first choice was a subject other than medicine and had failed to qualify, had a 13% greater risk (RR: 1.137, CI: 0.755-1.714), of having IS than those who took medical science as their desired field of study. Students whose MFI was between 31000-40000 BDT had a 10% (RR: 0.902, CI: 0.486-1.675) reduction in risk of IS compared to those who had a MFI between 21000-30000 BDT. Furthermore, students whose MFI was ≥ 41000 BDT had a 23% (RR: 0.777, CI: 0.425-1.420) reduction in risk compared to those who had a MFI ranging from 21000-30000 BDT. In our study, we also found that students who smoked were 13% (RR: 1.133, CI: 0.816-1.575) more susceptible to IS than those who had never smoked, but past smokers had relatively low risk (RR: 0.982, CI: 0.650-1.484) of having IS, compared to those who have never smoked. Finally, respondents who lived with family were 4.1% (RR: 1.041, CI: 0.803-1.349) more at risk of having IS than those who didn't live with the family.

Discussion

IS affects medical students from all different medical colleges and circumstances. In this study, we found nearly one-third (32.2%) of the respondents have IS, 85 out of 184 were male, and 76 out of 155 were female students. Whereas, in a study conducted by Qureshi *et al.*, in 2017 in Pakistan, almost half (47.5%) of the participants had IS, among 143 students where 23 were males, and 45 were females (Qureshi *et al.*, 2017). Generally, female students were more likely to have IS. In some research, women were twice as likely to suffer from it than men (Farzana *et al.*, 2017; Maqsood *et al.*, 2018; Qureshi *et al.*, 2017). Our observations were also similar, and the female respondents had more IS (32.9%) than males (31.6%). The leading cause was that women tended to address IS by confronting their concerns and working harder to address the concerns, whereas men tended to avoid areas where they felt uneasy (Villwock *et al.*, 2016).

According to our study, fourth-year students were more likely to suffer from IS, with 39.7% meeting the criteria, the largest among all academic years. Most likely, fourth-year students faced more pressure than others because of the increased academic curriculum, worries about study and performance, and concerns about the future (Farzana *et al.*, 2017; Villwock *et al.*, 2016). A prior study of IS conducted in 2017 showed that among Pakistani medical college students, 23.1% of respondents had an IS score of 1 (IS score < 5 means does not possess IS, ≥ 5 means they might possess IS), with males making up 27.1%, and females 20.2%. In the same study, 4.9% of all the students had an IS score of 4, among which 5.1% were male, and 4.8% were female (Qureshi *et al.*, 2017). Similarly, in our study, the most frequented IS score was 4, with 30.8% of respondents scoring 4. Of those participants, 27.9% were public, and 33.3% were private medical college students. Only 0.8% of students scored 8 (meaning they might possess IS), with 0.9% from public and 0.7% from private medical schools.

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 ($BMI > 30 \text{ kg/m}^2$) (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 ($BMI < 18.5 \text{ kg/m}^2$), 38.2% were normal weight ($BMI = 18.5 - 24.9 \text{ kg/m}^2$), overweight and pre-obese made up 31.8% ($BMI = 25 - 29.9 \text{ kg/m}^2$) and 24.8% were found to be obese ($BMI = 30 \text{ kg/m}^2$ and $> 30 \text{ kg/m}^2$). 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 than 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 sufferers 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

Mendeley: 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).

References

- Bravata DM, Watts SA, Keefer AL, *et al.*: **Prevalence, Predictors, and Treatment of Impostor Syndrome: a Systematic Review.** *J Gen Intern Med.* 2020; **35**(4): 1252–1275.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- Breeze M: **Impostor Syndrome as a Public Feeling.** *Palgrave Studies in Gender and Education.* 2018; 191–219.
[Publisher Full Text](#)
- Burstein AG, Loucks S, Kobos J, *et al.*: **A longitudinal study of personality characteristics of medical students.** *J Med Educ.* 1980; **55**(9): 786–787.
[PubMed Abstract](#) | [Publisher Full Text](#)
- Clance PR, Imes SA: **The imposter phenomenon in high achieving women: Dynamics and therapeutic intervention.** *Psychotherapy: Theory Res Practice.* 1978; **15**(3): 241–247.
[Publisher Full Text](#)
- Eva EO, Islam MZ, Mosaddek ASM, *et al.*: **Prevalence of stress among medical students: A comparative study between public and private medical schools in Bangladesh.** *BMC Res Notes.* 2015; **8**(1): 327.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- Farzana N, Shahjahan M, Nayan SK: **Stress among Female Medical Students in selected Medical Colleges of Dhaka City in Bangladesh.** *Northern Int Med College J.* 2017; **8**(1): 181–184.
[Publisher Full Text](#)
- Gottlieb M, Chung A, Battaglioli N, *et al.*: **Impostor syndrome among physicians and physicians in training: A scoping review.** *Med Educ.* 2020; **54**(2): 116–124.
[PubMed Abstract](#) | [Publisher Full Text](#)
- Hameed R, Bhat A, Nowreen N: **Prevalence of Overweight and Obesity among Medical Students and its Correlation with Sleep Pattern and Duration.** *Int J Contemporary Med Res [IJCMR].* 2019; **6**(6).
[Publisher Full Text](#)
- Holliday AM, Gheihman G, Cooper C, *et al.*: **High Prevalence of Imposterism Among Female Harvard Medical and Dental Students.** *J Gen Internal Med.* 2020; **35**(8): 2499–2501.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- Ikbaal MY, Salim Musa N, 'Aqilah: **Prevalence of Impostor Phenomenon among Medical Students in a Malaysian Private Medical School.** *Int J Med Students.* 2018; **6**(2): 66–70.
[Publisher Full Text](#)
- Israel GD: **Determining Sample Size 1 The Level of Precision.** 1992. Retrieved August 11, 2021.
[Reference Source](#)
- Levant B, Villwock JA, Manzardo AM: **Impostorism in third-year medical students: an item analysis using the Clance impostor phenomenon scale.** *Perspectives Med Educ.* 2020; **9**(2): 83–91.
[Publisher Full Text](#)
- Mak KKL, Kleitman S, Abbott MJ: **Impostor phenomenon measurement scales: A systematic review.** *Front Psychol.* 2019; **10**(APR).
[Publisher Full Text](#)
- Maqsood H, Shakeel HA, Hussain H, *et al.*: **The descriptive study of imposter syndrome in medical students.** *Int J Res Med Sci.* 2018; **6**(10).
[Publisher Full Text](#)
- Montazeri A, Harirchi AM, Shariati M, *et al.*: **The 12-item General Health Questionnaire (GHQ-12): translation and validation study of the Iranian version.** *Health Qual Life Outcomes* 2003 **1**:1. 2003; **1**(1): 1–4.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Free Full Text](#)
- Niemi PM, Vainiomäki PT: **Medical students' distress - Quality, continuity and gender differences during a six-year medical programme.** *Med Teacher.* 2006; **28**(2): 136–141.
[PubMed Abstract](#) | [Publisher Full Text](#)
- Nuttall FQ: **Body Mass Index.** *Nutrition Today.* 2015; **50**(3).
[Publisher Full Text](#)
- Qureshi M, Taj J, Latif M, *et al.*: **Impostor Syndrome among Pakistani Medical Students.** *Annals King Edward Medical University.* 2017; **23**(2).
[Publisher Full Text](#)
- Rosenstein A, Raghu A, Porter L: **Identifying the prevalence of the impostor phenomenon among computer science students.** *Annual Conference Innovation Technology Computer Science Education. ITICSE;* 2020; 30–36.
[Publisher Full Text](#)
- Shahjalal M, Khan MNA, Mohsin FM, *et al.*: **Impostor Syndrome Data Set (Version v3.0) [Data set].** Mendeley. 2021a.
[Publisher Full Text](#)
- Shahjalal M, Khan MNA, Mohsin FM, *et al.*: **Distribution of imposter syndrome (IS) among medical students of Bangladesh: A cross-sectional study: Copy of questionnaire (Version v3.0).** Mendeley. 2021b.
[Publisher Full Text](#)
- Sullivan JB, Ryba NL: **Prevalence of impostor phenomenon and assessment of well-being in pharmacy residents.** *Am J Health-System Pharmacy.* 2020; **77**(9): 690–696.
[Publisher Full Text](#)
- Villwock JA, Sobin LB, Koester LA, *et al.*: **Impostor syndrome and burnout among American medical students: a pilot study.** *Int J Med Educ.* 2016; **7**.
[Publisher Full Text](#)
- Wang KT, Sheveleva MS, Permyakova TM: **Impostor syndrome among Russian students: The link between perfectionism and psychological distress.** *Personality Individual Differences.* 2019; **143**(February): 1–6.
[Publisher Full Text](#)

Open Peer Review

Current Peer Review Status: ? ✖

Version 1

Reviewer Report 23 January 2023

<https://doi.org/10.5256/f1000research.59020.r160903>

© 2023 Neufeld A. This is an open access peer review report distributed under the terms of the [Creative Commons Attribution License](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Adam Neufeld

University of Calgary, Calgary, Canada

Thank you for inviting me to review this study, which addresses a timely topic in medical education, in the impostor phenomenon. The authors used a cross-sectional survey-based approach to assess the prevalence of IP among a sample of year 1-5 medical students, and determined how various sociodemographic factors played a role. They found that 32% met criteria for IP and that gender, year of study, and several physical health factors (e.g., BMI, smoking) were predictive. The study has a reasonable methodological approach and findings contribute to the literature; however, the authors would need to do a better job of setting up their hypotheses, the introduction is lacking in updated research that has occurred on this topic in the last 2-3 years, there are statistical shortcomings and areas of unclarity about the survey and analysis, and the results are somewhat overstated and generic. I make my comments based on each section, to help them improve the manuscript.

Title: First, it is generally recommended to use terminology "impostor phenomenon" and not "imposter syndrome" based on Clance and Imes' specific recommendations in the literature (regardless of which IP scale is used). The word "distribution" might also be better replaced by prevalence, and there is no mention of demographic predictors in the title, which the study looks at.

Abstract: The background mentions nothing in its aim about determining predictive nature of demographics, yet the Methods does. The Conclusion is quite generic, as it could be argued that senior medical students require support and guidance, without even conducting this study.

Introduction: The authors draw on systematic reviews and studies that lend support to their ideas, but there is little detail provided or rationale for measuring things like 'living at home', 'BMI', or 'smoking'. Why would smoking be considered a risk factor for IP? Why would living at home do this? There is no explanations or hypotheses laid out, which makes these research pursuits unclear. The authors also don't touch on private versus public medical schools, and this is covered more in Discussion. The other concern is what studying gender (which is measured dichotomously) does, since targeting females differently is likely to be stigmatizing. The authors

would do well to more carefully consider why they are measuring what they are measuring, and what the implications of doing that are, for students in medical education. There is also a lot of studies on IP and aspects of motivation, academic performance, and well-being, that are not cited in this paper, which deserve citation (see works beyond 2020).

Methods: Please provide ethics number. The number of participants should be in Results. Measures section is largely redundant. BMI is also considered, in medicine, to be a poor predictor, given its strong reliance on height, which skews results (someone "obese" can be healthy and someone "normal" can be unhealthy). Reasons for studying medicine are not mentioned at all in Introduction. Survey procedures again repeats details from above and provides far more statistical jargon that is needed. Simply provide a reference and tell the reader what the method was.

Statistical Analysis: What does "incomplete" mean in terms of survey? Also, how is reliability of the YIS determined? Generally, Cronbach's alpha reliability estimates are needed for survey-based items; otherwise we don't know if they measured what they were supposed to measure, and thus, if results can be considered valid.

Results: The authors confusingly now use "YIS" instead of "IS" which should really just be "IP" throughout. They also unpack results here, "...this indicates that" and "In our study...", which is normally done in Discussion. Results should also be reported in past-tense.

Discussion: An important pattern I noticed throughout the Discussion section is that the authors simply re-state their findings, compare them to others, and move on. There is no attempt to understand *why* or explain what might be going. Why was it that smoking, or living at home, or having different BMI, etc., contributed? What are the implications? Why does this even matter? How will it guide interventions? The Discussion section should not simply be a regurgitation of the Results section and a comparison to other studies, since studies often look at things that probably have little weight or bearing. Looking at prevalence and demographic predictors is fine, but you can't change someone's gender or year of study. Are we going to instigate exercise programs? I feel a lot more work is needed here, and the Intro and Discussion require better synthesis.

The Strengths and Limitations is also lacking. There is no attempt to assess the YIS psychometrically, which should be done, and the YIS is among the least commonly used measures of IP, compared to the CIPS or HIPS. This also represents a shortcoming, since results are inevitably harder to interpret and compare across studies, due to this. Gender was also measured as a binary construct, which we know it is not, and this automatically stigmatizes and excludes those who may be gender-neutral, transgender, etc. There is also nothing wrong with sampling in one city; it's more how the sampling was done and how the analyses hold up statistically.

Conclusions: This is not the place to discuss risk for suicide, which is better placed in Introduction. Recommendations are also overstated and generic, since this study did not assess reasons why they found what they found, and senior medical students are known to be at higher risk for stress.

Is the work clearly and accurately presented and does it cite the current literature?

Partly

Is the study design appropriate and is the work technically sound?

Partly

Are sufficient details of methods and analysis provided to allow replication by others?

Partly

If applicable, is the statistical analysis and its interpretation appropriate?

Partly

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Medical education, self-determination, well-being, impostor phenomenon

I confirm that I have read this submission and believe that I have an appropriate level of expertise to state that I do not consider it to be of an acceptable scientific standard, for reasons outlined above.

Reviewer Report 21 January 2022

<https://doi.org/10.5256/f1000research.59020.r97308>

© 2022 Islam M. This is an open access peer review report distributed under the terms of the [Creative Commons Attribution License](#), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited. The author(s) is/are employees of the US Government and therefore domestic copyright protection in USA does not apply to this work. The work may be protected under the copyright laws of other jurisdictions when used in those jurisdictions.

Md Zakirul Islam

Department of Pharmacology, Eastern Medical College, Cumilla, Bangladesh

A major health issue is surveyed in this study which was not identified or given importance before. The number of references should be more. The article needs some graphical representation also. A detailed comparison between private and government medical college and among different years of medical college is also required. So this article can be indexed after required update.

Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Yes

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Pharmacology

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

The benefits of publishing with F1000Research:

- Your article is published within days, with no editorial bias
- You can publish traditional articles, null/negative results, case reports, data notes and more
- The peer review process is transparent and collaborative
- Your article is indexed in PubMed after passing peer review
- Dedicated customer support at every stage

For pre-submission enquiries, contact research@f1000.com

F1000Research