



How Impostor Syndrome Affects Academic Performance and Leadership Virtues among Undergraduate Clinical Year Medical Students

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

Article Information

DOI: 10.9734/AJMAH/2022/v20i1030517

Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/89765>

Original Research Article

Received 02 June 2022
Accepted 05 August 2022
Published 10 August 2022

ABSTRACT

Impostor syndrome is described as a series of experiences in which an individual is uncertain about their true capability, skills, or achievements. Impostor syndrome may have a negative impact on medical students' life, especially in the context of their academic performance and leadership virtues. Therefore, we aimed to study the prevalence, factors associated with impostor syndrome, and the association of impostor syndrome and academic performance, as well as leadership virtues. A cross-sectional study among the undergraduate clinical year medical students was carried out in a private medical university in Malaysia. Purposive sampling was used to enrol students for this study, the data were collected by the distribution of an online questionnaire and a total of 90 participants responded. We calculated the independent t-test using Epi info software. Among the students, 47.8% of students were suffering from impostor syndrome. Factors such as gender, ethnicity, nationality, intention to pursue fellowship, and parents' occupation had an insignificant association with impostor syndrome. There is a significant association between impostor syndrome and subjective academic achievement and the students who did not have the syndrome perceived they performed well academically. The students without impostor syndrome had better leadership skills than the students who had impostor syndrome, however, it was not

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significant. In summary, impostor syndrome is quite common among students who are pursuing the medical course, thus more attention should be given to this issue. We recommend the education institution to introduce more motivational programmes to increase the confidence level of the students.

Keywords: *Impostor syndrome; academic performance; leadership; medical student; cross-sectional study.*

1. INTRODUCTION

Impostor syndrome, impostor phenomenon, impostorism, fraud syndrome or the impostor experience is described as a series of experiences in which an individual is uncertain about their true expertise, talents, or accomplishments. They possess persevering internalized fear of being manifested as a "fraud". Regardless of the known exterior evidence regarding their competency, those experiencing this circumstance remain persuaded that they are frauds and are not worthy of claiming their victory and triumph [1]. People are known to be suffering from impostor syndrome when they feel that their success might be unjustified that because of that they are scared they might be revealed as a fraud [2]. Impostor syndrome or phenomenon is not a mental disorder, instead, it is an experience that transpires in an individual and changes their persona.

In 1978, Pauline RC and Suzanne AI had published an article in which the term "impostor phenomenon" was introduced. According to this, Clance designated the first scale to measure the characteristics of the impostor phenomenon in 1985 which is known as the "clance impostor phenomenon scale (CIPS)". This scale was created to determine the idea that individuals have a false perception of distinctive ineptitude despite being victorious by exterior merit [1]. A model encompassing six dimensions of the impostor phenomenon was created by Clance in her research paper whereby it stated that at least two criteria from the six dimensions have to be present for a person to be diagnosed with having Impostor Phenomenon or Syndrome. Other scales to measure impostor syndrome are as follows: (1) harvey impostor scale (HIPS) founded in 1981 by Harvey (3) perceived fraudulence scale (PFS) founded in 1991 by Kolligian and Sternberg (4) leary impostorism scale (LIS) founded in 2000 by Leary (5) young impostor scale (YIS) founded in 2003 by Dr.Valerie Young [3]. In our current study, utilised the young impostor scale (YIS) to assess the existence of impostor syndrome dichotomously.

This scale is one of the latest and widely used to determine the presence or absence of impostor syndrome in many of the previous studies [3].

The research did, later on, prove that impostor syndrome may affect both men and women, and it could also be associated with anxiety, stress, depression, and/or rumination [1]. Furthermore, previous studies showed that impostor syndrome is a very common issue among undergraduate students. The study done among chiropractic students in the United States showed that 46% of the female students and 32% of the male students had persistent feelings of impostor syndrome [4]. Another study done in the United States showed that 57% of computer science students had met the criteria of impostor syndrome [5]. In a previous study carried out among Pakistani undergraduate medical students, 47.5% of the participants experienced impostor syndrome, among them female students 58.7% had a higher risk of experiencing impostor syndrome compared to male students which were 41.3% [6]. Another earlier study carried out among American medical students showed that 49.4% of female students had impostor syndrome and they were more likely to exhibit it than male students; only 23.7% of male students had the same phenomenon [7].

Moreover, the earlier studies carried out on the prevalence of impostor syndrome and its factors associated among undergraduate medical students in Malaysia found that 47.5% of the participants were having impostor syndrome with no significant differences between the male students (48%) and the female students (44.2%) [8]. However, a study on how impostor syndrome affects academic performance and leadership virtues among undergraduate clinical medical students is yet to be studied.

Impostor syndrome may have an impact on medical students' life, especially in terms of their academic performance and leadership virtues. Students with impostor syndrome do not feel worthy of the praise they receive based on their academic or professional accomplishments [9].

Instead of acknowledging their accomplishments as achievements that they deserved and earned, students with imposter syndrome perceive these achievements as overestimations of their gifts and talents [10,11]. They are highly motivated and always well-prepared than required to ensure that no one will doubt their competency [12]. In comparing themselves to whom they deem as authentic academics or professionals, students notice differences and begin to feel like counterfeits. This feeling activates the dangerous cycle of students attempting to forecast others' perceptions of them and then performing behaviours based on those assumed perceptions [13-15]. Even though they are performing well academically, it does not change their belief, and this may lead to constant depression, anxiety, and low self-esteem [15]. It also showed that the imposter syndrome is significantly linked with burnout, which is an exhausting reaction caused by enormous and lengthened periods of stress [7].

Impostor syndrome is often associated with leadership skills. Leaders are people who are capable of taking up responsibilities, giving inspiration to a group of people to work towards the same goal, and assigning the tasks appropriately [16,17]. Impostor Syndrome has been associated with fear of failure, lack of self-confidence, and indecisiveness in the leaders and when it happens on the organisational level, leaders that are having these characteristics will have difficulty in making important decisions that might help the organisation in moving forward, hence it will result in a negative result for both the individual and organisation [16].

We expected that our study results could help find out if one's academic performance and leadership virtues are affected positively or negatively by imposter syndrome among undergraduate medical students in Malaysia. The benefits of our study may help medical students who are facing imposter syndrome on how to improve their academic performance and leadership virtues. To the best of our knowledge, little is known about the relationship between imposter syndrome, academic performance, and leadership virtues among undergraduate medical students. In this context, we would like to further explore this topic and we aimed (1) to study the prevalence of imposter syndrome among undergraduate medical students, (2) to find out the associated factors of imposter syndrome, (3) to find out the association of imposter syndrome

and academic performance, and (4) to find out the association between imposter syndrome and leadership virtues.

2. METHODOLOGY

A cross-sectional study among the undergraduate clinical year medical students at Manipal University College Malaysia (MUCM) was carried out from December 2021 to January 2022. There are two campuses in MUCM, Melaka campus which provides studies in Bachelor of Medicine and Surgery (MBBS) for Semester 1,2,3,8,9 and 10, Bachelor of Dental Surgery (BDS) and Foundation in Science (FIS); the Muar, Johor campus which offers studies in MBBS for semesters 6 and 7.

We calculated the sample size using the formula for estimating a finite population proportion [18].

$$n = \frac{Np(1-p)z_{1-\frac{\alpha}{2}}^2}{d^2(N-1) + p(1-p)z_{1-\frac{\alpha}{2}}^2}$$

Where:

- N = population size (800 students)
- Z = 95% confidence level
- p = expected prevalence or proportion (prevalence of imposter syndrome is 74.5%) [8]
- d = desired width of the confidence interval (9%)

The estimated total population in our program was 800 students. We used 95% confidence interval, prevalence of imposter syndrome 74.5% [8], and precision 9%, the minimum sample size was 82. We also included the non-response rate of 10% and the final sample size was adjusted using the formula.

$$n(\text{final}) = \frac{n(\text{calculated})}{1 - (\text{non-response rate})}$$

We used the non-probability purposive sampling method to enrol students from the MBBS program in MUCM. Inclusion criteria for this study were 1) undergraduate medical students in MBBS Program, 2) voluntary informed consent, and 3) students of Manipal University College Malaysia (MUCM). We excluded the students who did not wish to participate in the study. The participants were given a choice to engage in our

study, therefore our data were attained by voluntary participation, and none were compelled to take part. Informed consent was included on the first page of the questionnaire, participants were told to sign the form before they start to answer, and they have the right to pull back their answer by any time without any reason. All data collected by us were kept private and confidential.

The data were collected by the distribution of an online questionnaire, Google Forms, to targeted undergraduate medical students in Manipal University College Malaysia (MUCM) which involved MBBS students. Data were collected using questionnaire designed in English incorporating closed-ended and multiple-choice questions. The questionnaire consisted of four parts. The first part included the collection of an individual's demographic profile which consists of age, gender, ethnicity, nationality, academic year, parent's occupation, and intention to pursue a fellowship in the future. The second part had eight items, young imposter scale (YIS) which was taken from a previous study to assess the imposter syndrome dichotomously, whether present or absent. It was in the form of questions and a student was considered positive for Imposter Syndrome if he or she answered 5 or more questions as "Yes " [6]. The third part included five items subjective academic achievement scale (SAAS) which had a rating scale ranging 1-5, where the value 1 indicated low, and the value 5 indicated high satisfaction with one's academic achievement [19]. The fourth part encompassed the leadership virtues questionnaire (LVQ) which had a total of four components as follows (1) Prudence, (2) Fortitude, (3) Temperance, and (4) Justice. The first component of LVQ is known to be having

prudence and it is inclusive of five items. Secondly, fortitude as a component is comprehensive of five items. Thirdly, the component of temperance has three items whilst the last one was justice which involved six items. The LVQ had a rating scale ranging from 1-5. The response scales are as follows: (1) not at all, (2) once in a while, (3) sometimes, (4) fairly often, and (5) frequently, if not always [20]. The students were provided with a time limit of 20 minutes to go through the participant information and provide their informed consent voluntarily to participate in this study.

We checked the reliability of the scales used by calculating Cronbach's alpha coefficient. The Cronbach's alpha coefficient of the young imposter scale (YIS) was 0.764, the subjective academic achievement scale (SAAS) was 0.606, and the leadership virtues questionnaire (LVQ) was 0.768.

Data collected were entered into Microsoft Excel. Data were then analysed using Epi Info version 7.2. In the study, frequency and percentage of qualitative variables such as age group, gender, ethnicity, nationality, academic year, parent's occupation, intention to pursue a fellowship in the future, and impostor syndrome were calculated. The range, the mean, and standard deviation of quantitative variables such as academic performance and leadership virtues were calculated. The level of significance that we set was 0.05. All the statistical tests that were used to find out the association between independent and dependent variables are described in Table 1. The independent variable in our study is imposter syndrome whilst the dependent variable includes academic performance and leadership virtues.

Table 1. Statistical tests used in the study

Independent variables	Dependent variables	Statistical tests
Age group	Impostor syndrome	Chi-square test
Gender	Impostor syndrome	Chi-square test
Ethnicity	Impostor syndrome	Chi-square test
Nationality	Impostor syndrome	Chi-square test
Academic Year	Impostor syndrome	Chi-square test
Parent's occupation	Impostor syndrome	Chi-square test
Intention to pursue fellowship	Impostor syndrome	Chi-square test
Impostor syndrome	Academic performance	Unpaired T-test
Impostor syndrome	Leadership virtues	Unpaired T-test

3. RESULTS

A total of 90 undergraduate students participated in this study and the response rate was 93.8%. Table 2 shows the demographic characteristics of the participants. Among the students, 65.6% were females while 34.4% were males. In terms of ethnicity, the highest response group came from Chinese and Indian with both having the same response which is 38.9%. Since this study was carried out in a private institution, we had a total response of 81 (90%) Malaysian students and 9 (10%) International students [Table 2].

Table 2. Demographic characteristics among medical students (n=90)

Variable	Frequency (%)
Gender	
Male	31 (34.4)
Female	59 (65.6)
Ethnicity	
Chinese	35 (38.9)
Indian	35 (38.9)
Malay	6 (6.7)
Others	14 (15.6)
Fellowship	
Yes	63 (70.0)
No	6 (6.7)
Undecided	21 (23.3)
Nationality	
Malaysian	81 (90.0)
International Students	9 (10.0)
Parents occupation in the medical field	
Yes	16 (17.8)
No	74 (82.2)

Table 3 shows the prevalence of impostor syndrome among undergraduate medical students. There are 47.8% of undergraduate medical students are experiencing impostor syndrome whereas 52.2% of them did not have syndrome. The mean score of academic performance among undergraduate medical students is 15.0, while the mean score of leadership virtues is 67.9 [Table 3].

Table 4 shows the relationship between the sociodemographic profiles and the impostor syndrome (IP) among undergraduate clinical medical students. There were no significant association between gender, ethnicity, nationality, parents' occupation, intention to pursue fellowship and impostor syndrome [Table 4].

Table 5 shows the association between impostor syndrome, subjective academic achievement and leadership virtues among undergraduate medical students. There was significant difference of subjective academic achievement score between those who had impostor syndrome and those who did not. The students who have impostor syndrome has a mean score of 14.2 (SD=2.9) on the subjective academic achievement scale, which is lower than the students who do not have impostor syndrome with a mean score of 15.7 (SD=3.1); with the mean difference of 1.47 and 95% CI from 0.19 to 2.75. Whereas there is no significant association between impostor syndrome and leadership virtues in undergraduate medical students [Table 5].

Table 3. Prevalence of impostor syndrome among undergraduate medical students (n=90)

Variable	Frequency (%)
Impostor syndrome	
Present	43 (47.8)
Absent	47 (52.2)
Subjective academic achievement score (5-25)	
Mean (SD)	15.0 (±3.1)
Leadership virtues (19-95)	
Mean (SD)	67.9 (±9.3)

4. DISCUSSION

A cross-sectional study was conducted to study the association between impostor syndrome, academic performance and leadership virtues. The objective of this study was to study the prevalence of impostor syndrome among undergraduate clinical year medical students. Secondly, we determined the relationship between the demographic details involving gender, ethnicity, nationality, parent's occupation, and intention to pursue leadership with impostor syndrome. Thirdly, we assessed the relationship between impostor syndrome and subjective academic performance, and the association between impostor syndrome and leadership virtues. In our study, the prevalence of impostor syndrome was 47.8%, which was higher compared to the previous study conducted among undergraduate medical students in Malaysia which had a prevalence of 45.70% [8]. But our finding was similar to the study conducted among Pakistani medical students which showed the prevalence rate of 47.5% [6].

Table 4. Association between demographic characteristics and impostor syndrome (n=90)

Independent variables	Impostor syndrome		Odd's Ratio (OR)	P-value
	Present n (%)	Absent n (%)		
Gender				
Female	32(54.2)	27(45.8)	2.2(0.9, 5.3)	0.091
Male	11(35.5)	20(64.5)	Reference	
Ethnicity				
Chinese	17(48.6)	18(51.4)	0.9(0.2,5.3)	0.948
Indian	16(45.7)	19(54.3)	0.8(0.2,4.8)	0.846
Others	7(50.0)	7(50.0)	1.0(0.2,6.8)	0.999
Malay	3(50.0)	3(50.0)	Reference	
Nationality				
Malaysian	39(48.2)	42(51.9)	1.2(0.3,4.6)	0.833
Non-Malaysian	4(44.4)	5(55.6)	Reference	
Parent's occupation				
Non-medical field	35(47.3)	39(52.7)	0.9(0.3, 2.6)	0.844
Medical field	8(50.0)	8(50.0)	Reference	
Intention to pursue fellowship				
Yes	36(57.1%)	27(42.9%)	6.7(0.7,60.4)	0.058
Undecided	6(28.6%)	15(71.4%)	2.0(0.2,20.9)	0.557
No	1(16.7%)	5(83.3%)	Reference	

Table 5. Association between impostor syndrome, subjective academic achievement and leadership virtues among undergraduate medical students of MUCM (n=90)

Variables	Impostor syndrome		Mean difference (95% CI)	P value
	Present	Absent		
Subjective Academic Achievement	14.2(2.9)	15.7(3.1)	1.47 (0.19, 2.75)	0.024
Leadership Virtues	66.4(8.5)	69.4(9.8)	2.97 (-0.89, 6.83)	0.130

In this study we found out that there is no correlation noted between the gender and the impostor syndrome, among our female participants, 54.2% of them were found to have impostor syndrome while 35.5% of male participants were found to be having this syndrome. The earlier studies have shown mixed trends regarding gender distribution. Initially, impostor phenomenon was assumed to be predominant in high achieving women. However, further studies showed that this phenomenon is also quite frequent among males [21]. A study done among Austrian doctoral students concluded that the men scored higher mean impostor phenomenon value than women. However, it was still not significant enough to show the correlation as the previous studies based on gender ended with mixed results. Meanwhile, for the ethnicity, the majority of the respondents were noted to be Chinese, and Indians followed by other races and Malays respectively. And in Chinese students, the occurrence of Impostor Syndrome was noted to be at 48.6% compared to 45.7% occurrence in Indians. Even though there is a difference in the

percentage of occurrence, yet it was noted to be insignificant. This may coincide indirectly with other research on this title which was done in Korea where that the marginalised or the coloured people tend to get Impostor Syndrome [22]. It was also noted that Korean citizens from the marginalised community have been affected mostly with this impostor syndrome. The results from our study may be insignificant as there was no marginalised community in our country, Malaysia and thus the occurrence cannot be associated with a specific ethnic group. The same results can be reflected in the variable of nationality as 48.2% of total Malaysian respondents had been admitted to having impostor syndrome while 44.4% of non-Malaysian students were suffering from this syndrome as well. Once again, the results turned out to be insignificant, as there might be little or no discrimination against foreign students in Malaysia, the learning environment is conducive for learning and does not affect the students' mental health. In our study, it was also shown that there was no significant association between parents' occupation and impostor syndrome. In a

previous study conducted among medical students in a private college in Malaysia, it was also found that there was no significant association between close relatives as doctor and impostor syndrome [8]. Lastly, we also concluded that the intention to pursue fellowship was insignificant to this syndrome.

Academic performance is the outcome or achievement of students based on their effort. It is important to perform well academically as it brings a positive impact to their future, especially in medical students as they will be dealing with people lives after graduating. In our studies, the subjective academic achievement scale (SAAS) was used to measure the academic performance of undergraduate clinical medical students. The SAAS was created to evaluate the subjective achievement of students concerning their peers' accomplishments, personal ambition, and academic performance [19]. Upon analysing our data, we found that there was a significant association between impostor syndrome and subjective academic performance among undergraduate clinical medical students. The undergraduate clinical year medical students who were not having impostor syndrome had a higher mean score in subjective academic performance compared to the students who are suffering from impostor syndrome. This might be due to the fact that students with impostor syndrome are thinking that they are academically unprepared and, doubting their achievement [23]. Strategic interventions should be adopted to enhance their abilities to cope with diverse cultures, promote their resilience in facing academic difficulties, boost their self-achievement, and foster their sense of school-belonging [24]. A previous study conducted in Kentucky, USA, showed there was no significant association between impostor syndrome and academic performance among medical students. However, 80% of the respondents with moderate or frequent impostor syndrome did not score well in their exams compared to students without impostor syndrome [25]. People with impostor syndrome often doubt their ability and lack confidence, and this was shown in a study done in Pakistan. The study showed that university students who have lower confidence perform worse in their academics [26].

Good medical leadership is essential in creating high-quality healthcare [27]. Moreover, the healthcare system nowadays is slowly changing to a team-based care or a multidisciplinary

approach. Hence, leadership is vital for undergraduate clinical medical students to prepare them for these roles in the future [28]. In our study, we used the leadership virtues questionnaire (LVQ) to evaluate the leadership virtues among undergraduate clinical medical students. The leadership virtues questionnaire (LVQ) was proven to be highly associated with transformational leadership, authentic leadership, and ethical leadership. The leadership virtues questionnaire (LVQ) which have the different virtues approach to ethical leadership is a good tool to assess the leadership virtues and ethics of the participants [20]. Even though the undergraduate clinical year medical students who do not have impostor syndrome had a higher leadership score compared to the those who had impostor syndrome, the association between these two was not significant. Research carried out in Turkey studied the effects of feeling of worthiness, competence, and self-acceptance among students of sports management department on their leadership orientation. It has been proved that the students who felt worthy, competent and have a feeling of self-acceptance had a significant effect on the leadership orientation of the students. The students with high leadership orientation will also be more committed to their tasks and will have a higher level of success [17].

5. LIMITATION

There were few limitations in this study. As per known in general, since the exposure and disease are measured at the same point in time in a cross-sectional study, thus it is not possible to establish the temporal relationship between exposure or causative factor and the onset of the outcome. In this context, the exposure studied was the impostor syndrome while the outcomes were the academic performance and leadership virtues. The causal relationship between the impostor syndrome, academic performance and leadership virtues cannot be reflected in our study. Besides that, we were not able to study the incidence rate of impostor syndrome among undergraduate clinical year medical students. Thirdly, the study conducted has increased bias potential regarding the selection of population in our cross-sectional study which encompasses only undergraduate clinical year medical students from one private medical institution only. As a consequence, the study cannot be generalized to other populations or settings. Moreover, any changes or difference overtime could not be observed.

6. CONCLUSION

Among undergraduate clinical year medical students in our study, 47.8% had impostor syndrome. Only subjective academic achievement of the students was found to be significantly associated with impostor syndrome. On the other hand, leadership virtues were shown to have no significant association with impostor syndrome. It is always better to prevent the occurrence of impostor syndrome, especially among medical students. This can be done by having the education institutions host motivating programs and talks frequently, and also to provide professional help to those students who need urgently. This study suggests that future study will focus on the coping mechanism of this syndrome as well as the role of peer and social support in impostor syndrome among medical learners.

CONSENT

As per international standard or university standard, Participants' written consent has been collected and preserved by the author(s).

ETHICAL APPROVAL

The Research Ethics Committee, Faculty of Medicine, Manipal University College Malaysia (MUCM), Malaysia has given the approval to us to conduct the study (MUCM/FOM/Research Ethics Committee – 9/2021).

ACKNOWLEDGEMENT

The authors would firstly like to thank all volunteers who willingly participated in our study. We also wish to extend our heartfelt gratitude to the Dean of Manipal University College Malaysia (MUCM), Professor Dr. Jayakumar Gurusamy, Head of Department for Community Medicine (MUCM), Professor Dr. Soe Moe, our lecturers Professor Dr. Htoo Htoo Kyaw Soe, Associate Professor Dr. Sujata Khobragade and Assistant Professor Dr. Mila Nu Nu Htay from the Department of Community Medicine (MUCM) for their unending patience and guidance for us throughout the conduct of the research. We would also like to thank the Research Ethics Committee, Faculty of Medicine, MUCM, Malaysia for their approval and support of the study. Last but not least, we would like to thank Dr. Matthias Stadler, Assistant Professor, Department of Psychology, Ludwig-Maximilians-

University of Munich, and Prof. Ronald E. Riggio, Department of Psychology, Claremont McKenna College for giving us the permission to refer and use their questionnaire from their studies.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
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