



**St. Paul's Hospital
Millennium Medical College**
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**PREVALENCE AND ASSOCIATED FACTORS OF IMPOSTOR
SYNDROME AMONG UNDERGRADUATE MEDICAL
STUDENTS OF SPHMMC**

INVESTIGATOR: BIFTU TOLA (MEDICAL INTERN)

DATE: MARCH, 2026

ADDISABABA, ETHIOPIA

SAINT PAUL'S HOSPITAL

MILLENNIUM MEDICAL COLLEGE

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A STUDENT RESEARCH TO BE SUBMITTED TO THE SCHOOL OF
PUBLIC HEATH, SPHMMC IN PARTIAL FULFILLMENT OF THE
REQUIRMENTS FOR THE DEGREE OF DOCTOR OF MEDCINE.

DATE: MARCH, 2026

ADDISABABA, ETHIOPIA

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ABSTRACT

Background: Impostor Syndrome (IS) is a psychological phenomenon characterized by persistent self-doubt and fear of being exposed as incompetent despite evident achievements. Evidence regarding IS among medical students in Ethiopia remains limited.

Objective: To assess the prevalence of Impostor Syndrome and its associated factors among undergraduate medical students at St. Paul's Hospital Millennium Medical College (SPHMMC), Addis Ababa, Ethiopia.

Methods: An institution-based cross-sectional study was conducted among undergraduate medical students at SPHMMC in 2025. A total of 224 students participated in the study selected using stratified random sampling. Data were collected using a structured, pretested self-administered questionnaire via Google Forms, incorporating the Clance Impostor Phenomenon Scale (CIPS). Data were analyzed using SPSS version 21. Both bivariate and multivariable logistic regression analyses were performed to identify factors associated with IS, with statistical significance set at $p < 0.05$.

Results: The prevalence of Impostor Syndrome was 26.8%. Most students reported frequent Impostor feelings (57.1%), followed by intense (23.7%) and moderate levels (19.2%) based on the Clance Impostor Phenomenon Scale (CIPS). Academic dissatisfaction (AOR = 3.11, $p = 0.007$) and low self-esteem (AOR = 0.63, $p = 0.001$) were significantly associated. Students from rural backgrounds had higher odds of IS (AOR = 6.35, $p = 0.021$). Year of study was also significant, with senior students showing lower odds compared to juniors. Age, sex, cumulative GPA, and anxiety were not independently associated after adjustment.

Conclusion: Impostor Syndrome is relatively common among medical students and is more strongly associated with subjective academic and psychological factors than objective academic performance.

Recommendations: Interventions targeting self-esteem and academic satisfaction are recommended. Further longitudinal and multi-institutional studies are needed.

Keywords: Impostor Syndrome, medical students, prevalence, self-esteem

Acronyms and Abbreviations

- **IS:** Impostor Syndrome
- **CIPS:** Clance Impostor Phenomenon scale
- **SPHMMC** - St. Paul Hospital Millennium Medical School
- **MH:** Mental Health
- **SES** : Socioeconomic status
- **PHQ-9** : Patient Health Questionnaire
- **GAD-7:** Generalized Anxiety Disorder scale
- **RSES** : Rosenberg Self-Esteem Scale
- **CGPA:** Cumulative Grade Point Average
- **SD:** Standard Deviation
- **SPSS:** Statistical Package For The Social Sciences

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1. Introduction

1.1 Background of the study

Impostor Syndrome (IS), also known as the Impostor phenomenon, is a psychological experience characterized by persistent self-doubt, fear of being exposed as incompetent, and difficulty internalizing personal achievements despite clear evidence of ability. First described by Clance and Imes in 1978, IS has since been widely recognized for its adverse effects on mental health, academic performance, and professional development, particularly in high-achieving environments such as medicine (1,12). Individuals with IS often attribute their successes to luck, external circumstances, or others' misjudgments rather than their own competence, resulting in anxiety, low self-esteem, and avoidance of opportunities (2,6).

Medical education creates a fertile ground for Impostor feelings due to its rigorous demands. The heavy academic workload, competitive learning environment, frequent evaluations, and the pressure to meet both personal and institutional expectations can heighten perfectionism, self-doubt, and fear of failure (3,4).

Manifestations of IS among medical students and interns include procrastination, excessive preparation, reluctance to seek feedback, and withdrawal from learning opportunities all of which negatively impact learning and well-being. Over time, IS has been linked to burnout, depression, poor coping strategies, and reduced professional confidence (5,6).

Global evidence suggests that IS is widespread among medical trainees. Studies report prevalence estimates ranging from **22% to 60%** in medical students, with consistent associations to psychological distress, maladaptive coping, and academic burnout (5,8).

Certain demographic and academic groups appear more vulnerable. Female students frequently report higher Impostor feelings than males, likely influenced by gender biases, societal expectations, and differences in mentorship experiences (7). Students from minority or socioeconomically disadvantaged backgrounds also face higher risk, partly due to systemic inequities and under representation (8). Training stage is another determinant: interns and early

year students often report higher Impostor scores than senior students, attributed to limited clinical experience and frequent peer comparison (6,8).

In Africa, although research remains limited, growing evidence highlights the significance of IS among health professional students. Studies in Nigeria, South Africa, and Ghana report prevalence rates of around **40–45%**, with strong associations to academic stress, poor mental health, and low self-esteem (10). These findings suggest that IS may be an under recognized contributor to psychological distress in African medical education.

In Ethiopia, however, the phenomenon remains largely unexplored. While some studies have addressed mental health concerns such as depression and anxiety among university students, no published data currently document the prevalence of IS among Ethiopian medical students or interns. Yet, Ethiopian medical trainees face unique pressures: high patient loads, limited clinical resources, inadequate mentorship, and socioeconomic challenges. Cultural norms such as the expectation of modesty, stigma surrounding mental health, and hierarchical dynamics in medical education may further exacerbate Impostor experiences and reduce willingness to seek help (6). Anecdotal reports suggest that interns frequently struggle with fears of committing errors, unfavorable peer comparisons, and feelings of inadequacy, but systematic evidence is lacking.

Given these gaps, it is both necessary and timely to look into the prevalence of Impostor Syndrome and its contributing factors among SPHMMC interns and medical students. Such data will help identify vulnerable subgroups, clarify how IS appears in the Ethiopian medical training context, and guide the development of focused interventions. In the end, IS must be addressed in order to improve psychological health, promote academic success, and create a skilled and self-assured healthcare workforce that benefits the trainees as well as the larger health system.

1.2 Statement of the Problem

Impostor Syndrome (IS) is highly prevalent among medical trainees worldwide, with estimates ranging from 22% to 82% and consistent associations with burnout, anxiety, depression, and impaired academic performance. In Africa, studies report prevalence rates around 40–45%, underscoring its widespread impact on trainee well-being and professional development.

Despite this, no empirical data exist on IS among medical students and interns in Ethiopia, including at SPHMMC, where trainees face unique stressors such as heavy clinical workloads, limited mentorship, resource constraints, and cultural stigma around mental health. Without local evidence, the scale and determinants of IS remain unknown, leaving institutions unable to design effective, context-specific interventions.

Understanding the prevalence and associated factors of IS in this population is therefore essential to inform targeted support systems, strengthen trainee resilience, and safeguard the development of a competent future healthcare workforce.

1.3 Significance of the Study

Impostor Syndrome (IS) is a widely recognized psychological challenge among medical trainees worldwide. However, there is no published research on this issue in Ethiopia, including at St. Paul's Hospital Millennium Medical College (SPHMMC).

Medical education is demanding, and Ethiopian students and interns face unique stressors, such as limited clinical resources, strict training structures, and cultural stigma related to mental health. Understanding the prevalence and factors related to IS in this context is both timely and important.

This study will provide the first systematic evidence on the prevalence and factors linked to Impostor Syndrome among Ethiopian medical students and interns. This evidence is crucial for addressing the gap in national and regional research. By identifying demographic and academic factors associated with higher risk, the study will also point out subgroups of trainees who are especially vulnerable. This knowledge can help inform the creation of targeted support programs.

At the institutional level, the findings will give useful insights to SPHMMC leadership to improve support systems for medical trainees. These may include structured mentorship programs, accessible counseling services, and curriculum changes that include mental health education and coping strategies. Such measures can help build resilience, self-confidence, and professional development among students and interns, ultimately enhancing their personal well-being and academic success.

In addition to its significance for SPHMMC, the study will contribute to the global conversation about Impostor Syndrome in medical education by providing specific insights from Ethiopia. It will also lay the groundwork for future long-term and intervention studies. These studies can enable cross-cultural comparisons and help create more effective support models.

Overall, addressing Impostor Syndrome is crucial not only for protecting the mental health and academic achievement of medical trainees but also for ensuring the sustainability and quality of Ethiopia's healthcare workforce.

2. LITERATURE REVIEW

2.1. Conceptualization of Impostor Syndrome

Impostor Syndrome (IS), also known as the Impostor Phenomenon, is a psychological condition defined by ongoing self-doubt, fear of being exposed as a fraud, and an inability to accept achievements even when there is clear evidence of competence. People with IS tend to dismiss praise or accomplishments and credit their successes to outside factors like timing, chance, or lower expectations, rather than their own skills (14).

The concept was first introduced by Clance and Imes (1978) in their landmark study on high-achieving women. They noted that many capable individuals believed they were intellectually dishonest (15). Clance (1985) later refined the definition, describing IS as an "internal experience of intellectual phoniness" that continues over time and across different settings (16).

Since then, IS has been recognized as a source of psychological distress, although it is not classified as a mental illness. It affects people from a variety of backgrounds, professions, and educational levels.

IS commonly links to unhelpful thought patterns like excessive self-criticism, perfectionism, and fear of failing (17). Two unproductive coping strategies are often seen in people with IS: procrastination, which reinforces Impostor beliefs when success occurs despite little preparation, and over-preparation, characterized by excessive effort to evade failure (18). Completing tasks may provide temporary relief, but IS typically returns with the next evaluation task, creating a harmful cycle of distress.

2.2. Theoretical Perspectives Underpinning Impostor Syndrome

Various psychological theories attempt to explain how IS arises and persists. Social comparison theory suggests that people assess their abilities in relation to others. In competitive academic environments, upward comparisons can intensify feelings of inadequacy (19).

Attribution theory explains that individuals with IS internalize failure while externalizing success to uphold their distorted self-views (20).

From a cognitive-behavioral perspective, IS is thought to arise from deep-seated beliefs about one's competence and value, combined with worries about being negatively judged (21). These beliefs often develop early in life through family relationships, academic experiences, and perfectionist standards. Self-determination theory also indicates that Impostor feelings can arise when basic psychological needs, particularly autonomy and competence, are not fully satisfied (22).

Professional identity formation theory shines light on the issue in medical education. Medical students must take on professional roles early in their training, even as they are still building their confidence and skills. This mismatch between their self-perception and expected performance can lead to feelings of Impostor Syndrome (23).

2.3 Impostor Syndrome in Medical Education and Healthcare

Healthcare settings are naturally hierarchical, evaluative, and high-stakes. Medical students and interns are particularly vulnerable to Impostor Syndrome (IS) due to heavy academic workloads, frequent evaluations, clinical uncertainty, and constant peer comparisons (1). The culture in medicine often stigmatizes vulnerability and psychological distress, while promoting perfectionism, resilience, and selflessness (24).

Before medical trainees fully gain confidence in their clinical skills, they often face public evaluations, critical feedback, and make life-or-death decisions. This environment can intensify feelings of being an Impostor, especially during transitions like starting clinical years or internships (25). IS affects patient safety and workforce sustainability; it has been linked to burnout, anxiety, depression, decreased job satisfaction, and impaired learning (6,26).

2.4 Global Prevalence of Impostor Syndrome Among Medical Trainees

IS has been widely documented among medical students, interns, residents, and practicing physicians around the world. According to a systematic review and meta-analysis in 2025 involving 30 studies and 11,483 healthcare professionals, the pooled prevalence of IS was found to be 62% (5). Despite variations among studies, consistent links were found between IS and psychological distress, including anxiety, depression, burnout, and low self-esteem.

In studies among Swedish medical students in Europe, IS prevalence rates exceeded 58%. Female students had significantly higher Impostor scores and lower resilience (11,12). The finding that resilience acts as a protective factor suggests psychological resources might help reduce IS.

In India, between 50% and 60% of medical interns and undergraduates experienced IS, which was strongly linked to neuroticism, perfectionism, and low self-esteem (2,6). Similar findings were reported in Pakistan and Nepal, where academic stress and competitive environments contributed to feelings of being an Impostor (27).

Research from the US, Canada, and Brazil consistently shows high IS prevalence among medical trainees in the Americas. Brazilian studies found strong links between IS, depression, anxiety, and burnout. However, many of these studies did not include interns, limiting generalizations (8). Smaller studies, such as one conducted in Goa, India, found moderate to high levels of IS among interns, despite limitations in sampling and sample size (2).

2.5 Impostor Syndrome in Africa: Emerging Evidence

While research on IS is increasing globally, few studies have been conducted in Africa. Available data suggests IS is a serious but underexplored issue among African medical students.

In a large multi-center study in Egypt involving 1,572 nursing students, nearly half reported moderate to severe feelings of being an Impostor, strongly linked to depression, anxiety, and perceived stress (3). Research among medical undergraduates in Nigeria

showed a negative relationship between IS, age, and self-esteem. Younger students and those with lower psychological resilience were found to be more vulnerable (5).

Qualitative research indicates that IS is common among medical students in South Africa, with structural injustices, past academic exclusion, and competitive training environments playing significant roles (8). Although few students understood IS as a recognized psychological concept, they reported using coping strategies like peer support, counseling, mentoring, and self-care.

2.6 Psychological and Academic Correlates of Impostor Syndrome

Numerous psychological factors have been consistently associated with IS. Low self-esteem is a strong predictor; people with low self-worth are more likely to feel like Impostors (28). There is also a strong correlation between IS and anxiety and depression, although cross-sectional studies have not yet clarified their relationships (29). Academic factors, such as dissatisfaction with studies, perceived under-performance, and fear of failure, increase vulnerability to IS (30). Notably, some studies show that high-achieving students may be more susceptible to IS, indicating objective success does not shield individuals from these feelings (31).

Social factors are also relevant, including perceived social support, rural-urban differences, and family background. Students from disadvantaged educational backgrounds may feel more like Impostors when transferring to prestigious universities (32).

2.7 Methodological Limitations in Existing Literature

Despite the growing body of research, several methodological issues persist. Causal inference is limited due to the cross-sectional designs used in many studies. High reliance on single-institution studies and small sample sizes diminishes the ability to generalize findings. Most of the research occurs in high-income countries, resulting in little representation from low and middle-income settings (5).

Comparing findings is further complicated by variations in measurement techniques, cut-off scores, and instruments across studies. Few studies address coping mechanisms, institutional responses to Impostor experiences, or awareness of IS.

2.8 Rationale for the Current Study in Ethiopia

Research on IS among medical students in Ethiopia is almost non-existent. Ethiopian medical students and interns face unique challenges, including high patient loads, hierarchical training systems, a lack of clinical resources, and the stigma surrounding mental illness. These factors could increase feelings of being an Impostor and discourage individuals from seeking help.

As one of Ethiopia's largest medical schools, SPHMMC provides an important opportunity to study IS. Understanding the prevalence and contributing factors of IS among medical students and interns will fill a crucial knowledge gap. This information can guide educational policies, mental health interventions, and institutional support systems.

2.9 Conceptual Framework

The literature review identifies main factors as socio-demographic variables, academic-related factors, and psychological factors.

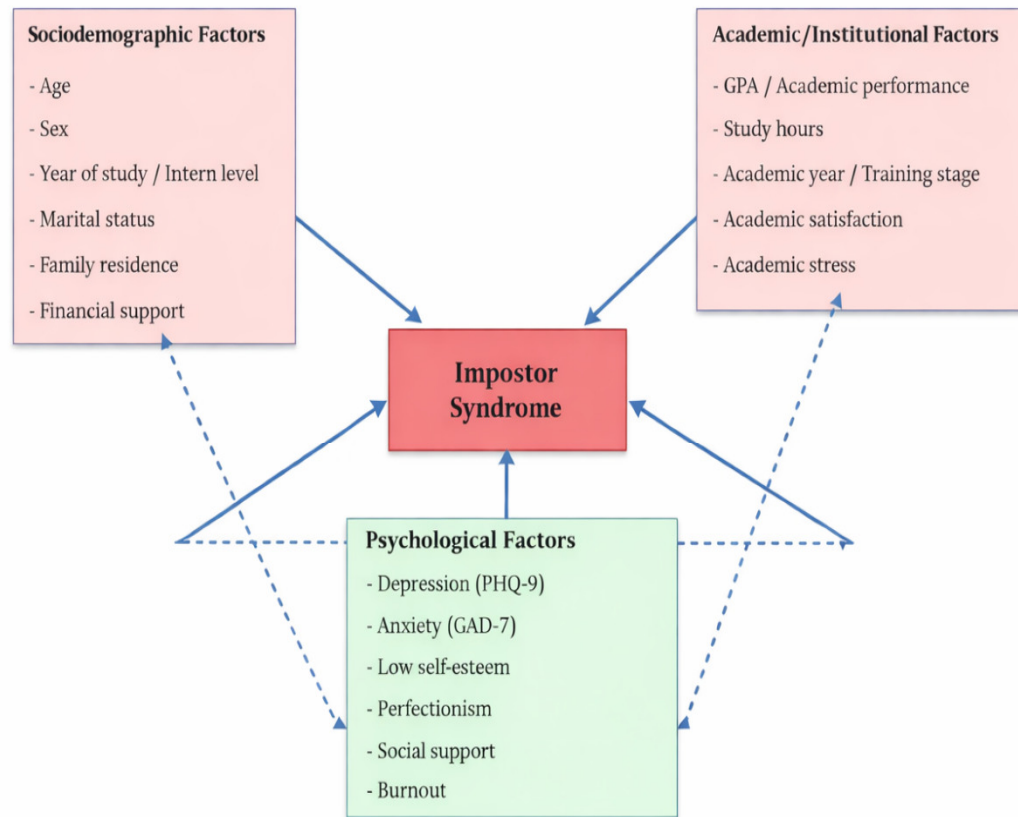


Figure 1. Conceptual framework of impostor syndrome and associated factors among undergraduate medical students at Saint Pauls Hospital Millennium Medical College (SPHMMC), Addis Ababa, Ethiopia, 2025 G.C.

3. Objectives

3.1 General Objective

To assess the prevalence and associated factors of Impostor Syndrome among undergraduate medical students at St. Paul's Hospital Millennium Medical College (SPHMMC).

3.2 Specific Objectives

- 1.To determine the prevalence of Impostor Syndrome among undergraduate medical students at SPHMMC.
2. To assess the severity of Impostor Syndrome among undergraduate medical students of SPHMMC
3. To identify factors associated with Impostor Syndrome among undergraduate medical students of SPHMMC.

4. Methodology

4.1. Study Setting & period

The study was conducted at SPHMMC, in Addis Ababa, Ethiopia. SPHMMC is one of the largest public hospitals in the country, providing academic, research, and medical services. The college provides BSc and MSc degrees, training for public health and nursing in different areas as well as in medicine, as a first degree and as specialties in many clinical fields (eg, surgery, radiology). The total numbers of medical interns and medical students currently enrolled at SPHMMC is 435 . The study was conducted from October and December 2025 GC.

4.2 Study Design:

An **institution-based cross-sectional study** was conducted among undergraduate medical students at **St. Paul's Hospital Millennium Medical College (SPHMMC)** between October and December 2025 GC.

4.3 Source population

All undergraduate medical students at SPHMMC during the study period.

4.4 Study population

All undergraduate medical students who fulfill inclusion criteria.

4.5 Inclusion and exclusion criteria

Inclusion Criteria:

- All medical students who were registered in the office of the registrar and were attending their classes during the study period at St. Paul's hospital millennium medical college
- All medical students who were willing to participate in the research.

Exclusion Criteria:

- Those who were not willing to participate in the research
- Those students who left the college due to withdrawal or academic dismissal are excluded from the study.
- Students who were severely ill and had difficulties to respond the questionnaires.

4.6 Study variables

4.6.1 Independent variables

Independent variables in this study are

4.6.1.1 Sociodemographic Factors

- Age
- Sex
- Year of study / Intern status
- Marital status
- Monthly allowance or financial support
- Place of residence (on-campus/off-campus)

4.6.1.2 Academic/Institutional Factors

- Cumulative GPA or academic performance
- Study hours per week
- Academic year
- Satisfaction with academic experience
- Perceived workload or academic stress

4.6.1.3 Psychological Factors

- Depression symptoms — e.g., PHQ-9 score (continuous) and categorical (cutoffs).

- Anxiety symptoms — e.g., GAD-7 score.
- Self-esteem (e.g., Rosenberg Self-Esteem Scale
- Perfectionism
- Level of social support
- Burnout or emotional exhaustion

4.6.2 Dependent variables

Dependent variable in this study are

- Impostor Syndrome

4.7 Sampling size determination and sampling technique

4.7.1 Sampling size calculation

In this research the sample size was determined using the single population formula. based on the following assumptions:

Sample proportion (**p**) = 50% or 0.5.

Margin of error (**w**) = 5% or 0.05

Confidence interval = 95%, which is **Z** = 1.96

Total students in the collage, which is **N** = 435

Sample size is then calculated as the following:

$$n = Z^2 p (1-p) / w^2$$

$$n = (1.96)^2(0.5*0.5)/(0.05)^2$$

$$n = 0.9604/0.0025=384.16 \approx 385$$

Then, by using reduction formula:

$$n = n / (1+(n/N))$$

$$n = 385 / (1+(385/435))$$

If the non-response rate was assumed to be 10%, then 10% of 204 was $20.4 \approx 20$.

Therefore, the total sample size was the sum of the calculated sample size and the non-response rate.

$$n = 204 + 20 = 224$$

4.7.2 Sampling technique

A stratified random sampling technique was employed. Undergraduate medical students were stratified according to year of study, and random samples were selected from each stratum to ensure adequate representation. Students were invited through official communication channels, coordinated by batch representatives. The survey was distributed electronically via Google Forms, ensuring convenience and timely participation.

4.8 Data Collection Procedures

Primary data was collected using standardized questioners filled by participants. The questionnaire consisted of four sections:

- 1. Demographic factors**
- 2. Academic/Institutional Factors**
- 3. Psychological Factors**
- 4. Impostor Syndrome (Clance Impostor Phenomenon Scale – CIPS)**

There was written consent for every questioner given. The questionnaire took approximately 10–15 minutes to complete.

4.9 Operational Definitions

Operational Definition: In this study, Impostor Syndrome was measured using the Clance Impostor Phenomenon Scale (CIPS). A CIPS score ≥ 62 was considered indicative of the presence of Impostor Syndrome.

- **Measurement Tool: Clance Impostor Phenomenon Scale (20 items; Likert scale)**

- Categories:

- 41–60: Moderate Impostor feelings

- 61–80: Frequent Impostor feelings

- 80: Intense Impostor phenomenon

- For analysis, a score ≥ 62 was categorized as “having IS”, and <62 as “not having IS.”

Self-Esteem

- Definition: A person’s overall sense of self-worth or personal value.

- Operational Definition: Self-esteem was measured using a shortened version of the Rosenberg Self-Esteem Scale with a total score ranging from 0 to 5. Since no standardized cut-off exists for this shortened format, scores were dichotomized based on distribution and conceptual meaning: 0-2 indicating low self-esteem and 3-5 indicating normal self-esteem, consistent with approaches used in similar abbreviated psychometric scales.

Depression Symptoms (PHQ-9): Assessed using the Patient Health Questionnaire-9.

Total score 0–27 : Score ≥ 10 = 1 (Presence of depressive symptoms), Score <10 = 0 (Absent)

Anxiety Symptoms (GAD-7): Assessed using the Generalized Anxiety Disorder-7 scale.

Total score 0–21: Score ≥ 10 = 1 (Presence of anxiety symptoms), Score <10 = 0 (Absent)

Perfectionism: Tendency to set excessively high standards. Yes = 1, No = 0.

Social Support: Perceived support from family, friends, or peers. Low/inadequate support = 1, Adequate support = 0.

Burnout / Emotional Exhaustion: Feelings of emotional depletion due to academic workload. Yes = 1, No = 0.

4.10 Data Processing & Analysis

After data collection, the data was entered into ready-made Google forms. The extracted data was cleaned and sorted using Microsoft Excel. The data was then analysed using SPSS software. Simple frequency calculations, cross-tabulations and relevant associations between each independent and dependent variable was done to clean the data. The result was expressed in the form of descriptive statistics i.e ; texts, tables and graphs.

4.11 Ethical Considerations

The data collection process was initiated after obtaining an official support letter from the Department of Public Health at St. Paul's Hospital Millennium Medical College (SPHMMC), which outlined the purpose and objectives of the study. Ethical clearance was obtained from St. Paul's Millennium Medical College, ensuring that the study adhered to ethical standards and guidelines for research involving human participants.

Confidentiality was maintained for all information gathered from the students. Participants were informed that the data collected would be used solely for the purposes of this study and would not impact their academic evaluation. Additionally, the identities of participants were not disclosed in any reports, publications, or presentations resulting from the study, ensuring their privacy and anonymity.

4.12 Dissemination of results

Research findings will be presented to SPHMMC, department of public health and school of medicine. Attempts will be made to publish the work on a scientific journal to make accessible to all individuals who may want to use it.

5. Results

The investigation of Impostor Syndrome (IS) among undergraduate medical students at SPHMMC yielded several significant findings from preliminary bi-variate analyses and later multi-variable logistic regression.

5.1 Descriptive analysis

A. Sociodemographic characteristics of participants

A total of 224 undergraduate medical students participated in this study. The mean age of participants was 23.93 years (SD = 2.16), with a median age of 24 years.

More than half of the respondents were female (56.7%), while 43.3% were male. Most participants were single (98.7%).

Participants were distributed across all years of study, with the largest group being 7th-year students (34.8%), followed by 3rd-year (17.0%) and 4th-year students (13.8%).

Most participants came from urban areas (68.8%), followed by semi-urban (25.0%) and rural (6.3%) backgrounds. The majority reported middle socioeconomic status (69.6%). Regarding financial support, 35.3% reported moderate support, while 33.5% reported low support.

Table 1- Sociodemographic characteristics of students in SPHMMC 2018 E.C (n=224)

Variable	Category	Frequency	Percent
Age	Median/SD	24 years/2.162	
Sex	Male	97	43.3
	Female	127	56.7
Year of study	1st year	5	2.2
	2nd year	23	10.3
	3rd year	38	17.0
	4th year	31	13.8
	5th year	21	9.4

	6th year	28	12.5
	7th year	78	34.8
Marital status	Single	221	98.7
	Married	3	1.3
Family place of residence	Urban	154	68.8
	Semi-urban	56	25.0
	Rural	14	6.3
Family socioeconomic status	Low	41	18.3
	Middle	156	69.6
	High	27	12.1
Financial support	High	32	14.3
	Moderate	79	35.3
	Low	75	33.5
	No regular support	38	17.0

B. Academic characteristics of students

The findings show that most students have a heavy academic workload. Specifically, 61.2% report experiencing high levels of workload, while 35.3% report a medium workload and only 3.6% report a low workload. This indicates that academic demands are generally intense for many students.

In terms of satisfaction with their academic experience, over half of the students (57.1%) are dissatisfied, while 42.9% feel satisfied. This imbalance suggests that the high workload may lower students' overall satisfaction.

Looking at academic performance measured by GPA, the largest group of students (37.9%) falls within the 3.00 to 3.49 range. Next, 29.0% are in the 2.50 to 2.99 category. Higher GPA ranges are less common, with only 16.5% achieving between 3.50 and 3.74 and 12.5% scoring at least 3.75. This pattern shows that most students perform at a moderate academic level, and fewer achieve the highest distinctions.

On average, students report studying 22.02 hours per week, with a relatively large standard deviation of 16.69 hours. This points to significant differences in study habits, with some students studying much more or less than the average.

In summary, the data reveals that students face considerable academic pressure, maintain moderate academic performance, and generally report lower satisfaction levels.

Table 2- Academic characteristics of students

Variable	Category	Frequency	Percent
Academic workload	High	137	61.2
	Medium	79	35.3
	Low	8	3.6
Academic satisfaction of students	Satisfied	96	42.9
	Dissatisfied	128	57.1
GPA	≥ 3.75	28	12.5
	3.50 – 3.74	37	16.5
	3.00 – 3.49	85	37.9
	2.50 – 2.99	65	29.0
Average study hr	Mean/SD	22.018/16.6865 hrs	

C. Psychological factors of students

The results show a high rate of mental health issues among students. A large majority, 75.9%, report experiencing anxiety, highlighting that anxiety is common in this group.

Even more alarming is the prevalence of depression. A staggering 97.8% of students report symptoms of depression, while only 2.2% say they do not experience any. This indicates a very high level of psychological distress that may need immediate attention.

Regarding self-esteem, most students, 66.5%, have normal self-esteem. However, 33.5% report low self-esteem. While most fall within the normal range, a significant number still struggle with low self-worth.

For Impostor Syndrome, 26.8% of students report experiencing it, while 73.2% do not. This means that about one-quarter of students deal with feelings of inadequacy despite their accomplishments.

Perfectionism is observed in 25.0% of students, whereas 75.0% do not show perfectionism traits. This implies that perfectionism affects a notable minority of students.

In summary, the psychological data reveals a troubling mental health landscape marked by high levels of anxiety and depression, as well as significant rates of low self-esteem, Impostor Syndrome, and perfectionism. These findings highlight the need for focused mental health support and interventions for students.

Table 3. Psychological factors of students

Variable	Frequency	Percent
Anxiety - No	54	24.1
Anxiety - Yes	170	75.9
Depression - No	5	2.2
Depression - Yes	219	97.8

Self-esteem - Normal	149	66.5
Self-esteem - Low	75	33.5
Impostor Syndrome - No	164	73.2
Impostor Syndrome - Yes	60	26.8
Perfectionism - No	168	75.0
Perfectionism - Yes	56	25.0
Burnout - No	166	74.1
Burnout - Yes	58	25.9
Social support - Inadequate	88	39.3
Social support - Adequate	136	60.7

5.2 Prevalence and Severity of Impostor Syndrome

The prevalence of Impostor Syndrome among the study participants was **26.8% (n = 60)**, while **73.2% (n = 164)** did not experience Impostor Syndrome.

This indicates that approximately **one in four students** experienced significant Impostor feelings.

Prevalence of Impostor Syndrome among Students

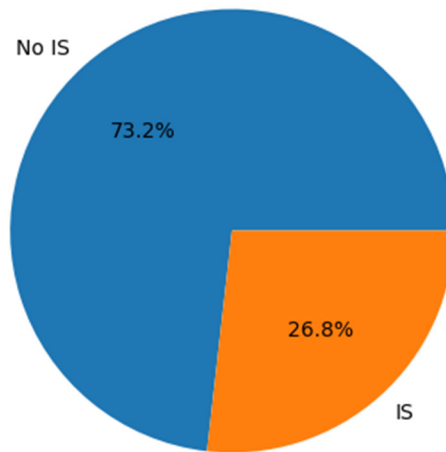


Figure 2 : Prevalence of Impostor Syndrome among students

The distribution of Impostor Syndrome severity was assessed using the Clance Impostor Phenomenon Scale (CIPS) across all participants. The majority of students reported frequent impostor feelings (57.1%), followed by intense (23.7%) and moderate levels (19.2%).

This suggests that impostor experiences are present along a continuum, with a substantial proportion of students experiencing recurrent or high levels of impostor feelings even if they do not meet the threshold for classification as having Impostor Syndrome.



Impostor Syndrome Severity Distribution (Counts & %)

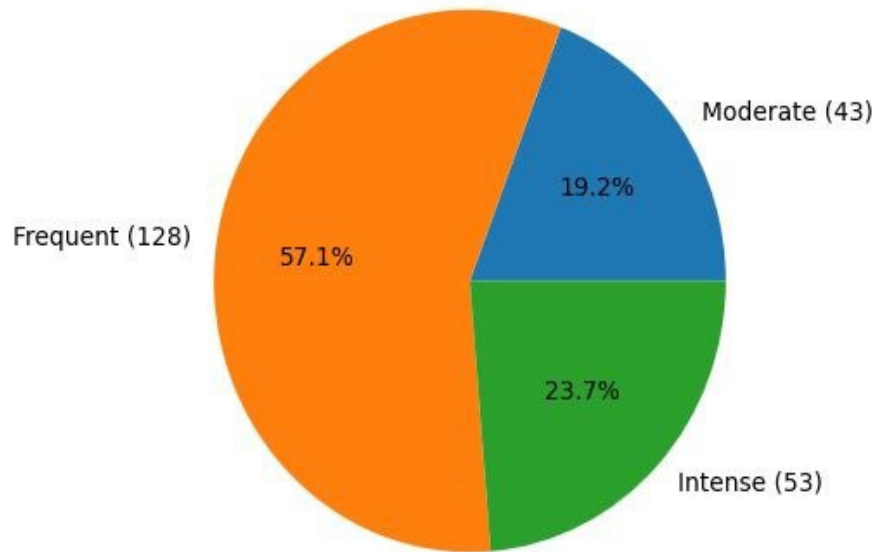


Figure 3 : Impostor Syndrome severity distribution

5.3 Bivariate analysis of factors Associated with Impostor Syndrome

5.3.1 . Demographic factors and Impostor Syndrome

Sex, age, and family residence were significantly associated with Impostor Syndrome. Female students reported a higher prevalence (34.6%) than male students (16.5%), with a significant difference ($\chi^2(1, N = 224) = 9.24, p = 0.002$). Age also showed a significant association ($\chi^2(11, N = 224) = 30.71, p = 0.001$), indicating variation across age groups. Family residence was significant as well ($\chi^2(2, N = 224) = 7.05, p = 0.029$), with the highest prevalence among rural students (42.9%), followed by urban (29.9%) and semi-urban (14.3%).

In contrast, marital status ($\chi^2(1, N = 224) = 0.07, p = 0.797$) and family socioeconomic status ($\chi^2(2, N = 224) = 2.26, p = 0.323$) were not significantly associated with Impostor Syndrome, despite slightly higher prevalence in low (29.3%) and middle (28.2%) SES groups compared to high SES (14.8%).

Table 4: Demographic Factors and Impostor Syndrome

Variable	Category	No IS n (%)	Yes IS n (%)	Total	$\chi^2(df)$	p-value	Significance
Sex	Female	83 (65.4%)	44 (34.6%)	127	9.239(1)	0.002	Significant
	Male	81 (83.5%)	16 (16.5%)	97			
Age	Multiple			224	30.707(11)	0.001	Significant
Family Residence	Rural	8 (57.1%)	6 (42.9%)	14	7.053(2)	0.029	Significant
	Semi-urban	48 (85.7%)	8 (14.3%)	56			
	Urban	108 (70.1%)	46 (29.9%)	154			

Marital Status	Married	2 (66.7%)	1 (33.3%)	3	0.066(1)	0.797	Not Sig.
	Single	162 (73.3%)	59 (26.7%)	221			
Family SES	High	23 (85.2%)	4 (14.8%)	27	2.262(2)	0.323	Not Sig.
	Middle	112 (71.8%)	44 (28.2%)	156			
	Low	29 (70.7%)	12 (29.3%)	41			

5.3.2 Academic Factors and Impostor Syndrome

Regarding academic factors, perceived academic workload and stress were not significantly associated with Impostor Syndrome ($\chi^2(2, N = 224) = 0.90, p = 0.638$), suggesting that the volume of academic work alone may not be a primary contributor to Impostor feelings.

In contrast, academic satisfaction showed a significant association with Impostor Syndrome ($\chi^2(1, N = 224) = 8.77, p = 0.003$). Students who reported dissatisfaction with their academic experience were more than twice as likely to experience Impostor Syndrome (34.4%) compared to those who were satisfied (16.7%).

Despite the majority of students reporting high academic workload (61.2%), no significant association was found with Impostor Syndrome ($p = 0.638$). This suggests that objective workload alone may not contribute to impostor feelings, and that subjective perceptions of academic experience may play a more critical role.

Furthermore, cumulative GPA was also significantly associated with Impostor Syndrome ($\chi^2(4, N = 224) = 12.81, p = 0.012$). Notably, students with higher GPAs, particularly those with a GPA of 3.75 or above, reported a higher prevalence of Impostor Syndrome (42.9%) compared to those with lower GPAs (e.g., 11.1% among students with GPA

below 2.50). This finding highlights the internalized nature of Impostor Syndrome, where even high-achieving students may experience persistent feelings of inadequacy.

Table 5: Academic Factors and Impostor Syndrome (N = 224)

Variable	Category	No IS n (%)	Yes IS n (%)	Total	$\chi^2(df)$	p-value	Significance
Year of Study	Multiple			224	29.177(6)	0.000	Significant
cGPA	<2.50	8 (88.9%)	1 (11.1%)	9	12.809(4)	0.012	Significant
	2.50–2.99	56 (86.2%)	9 (13.8%)	65			
	3.00–3.49	56 (65.9%)	29 (34.1%)	85			
	3.50–3.74	28 (75.7%)	9 (24.3%)	37			
	≥ 3.75	16 (57.1%)	12 (42.9%)	28			
Academic Satisfaction	Satisfied	80 (83.3%)	16 (16.7%)	96	8.772(1)	0.003	Significant
	Dissatisfied	84 (65.6%)	44 (34.4%)	128			
Academic Stress	Low	7 (87.5%)	1 (12.5%)	8	0.897(2)	0.638	Not Significant.
	Medium	58 (73.4%)	21 (26.6%)	79			
	High	99 (72.3%)	38 (27.7%)	137			
Allowance Level	High	22 (68.8%)	10 (31.3%)	32	3.483(3)	0.323	Not Significant.
	Moderate	62 (78.5%)	17 (21.5%)	79			

	Low	56 (74.7%)	19 (25.3%)	75			
	No support	24 (63.2%)	14 (36.8%)	38			

5.3.3 Psychological Factors and Impostor Syndrome

Examining psychological dimensions, it's found that a significant association between generalized anxiety symptoms and IS ($\chi^2(1, N=224)=5.20, p=.023$). Students with anxiety symptoms were significantly more likely to report IS (30.6%) than those without (14.8%), suggesting a close interplay between anxiety and Impostor feelings.

However, depression status did not significantly correlate with IS ($\chi^2(1, N=224)=0.46, p=.50$). Similarly, bivariate analysis indicated no significant association between self-esteem level ($\chi^2(1, N=224)=1.56, p=.21$), perfectionism ($\chi^2(1, N=224)=1.09, p=.30$), burnout ($\chi^2(1, N=224)=0.25, p=.61$), or social support ($\chi^2(1, N=224)=0.56, p=.45$) and Impostor Syndrome. While lower self-esteem was descriptively associated with higher IS prevalence, this difference did not reach statistical significance in the initial analysis.

Table 6 : Psychological Factors and Impostor Syndrome (N = 224)

	Category/Comparison	χ^2 (df)	p- value	Prevalence of IS (%)	Interpretation
Anxiety	Present vs. Absent	5.20 (1)	0.023	30.6% vs. 14.8%	Significant association; .
Depression	Present vs. Absent	0.46 (1)	0.50	—	No significant association with IS.
Self-esteem	Low vs. High	1.56 (1)	0.21	Higher (descriptive)	Not statistically significant despite higher IS in low self-esteem group.

Perfectionism	Yes vs. No	1.09 (1)	0.30	—	No significant association.
Burnout	Yes vs. No	0.25 (1)	0.61	—	No significant association.
Social support	Low vs. High	0.56 (1)	0.45	—	No significant association.

5.4 multivariable Logistic Regression Analysis of Factors Associated with Impostor Syndrome

Table 7 : multivariable Logistic Regression Analysis of Factors Associated with Impostor Syndrome among SPHMMC Students (N = 224)

Variable	Category	AOR (Exp(B))	95% CI	p-value	Interpretation
Age	Continuous	0.78	0.56 – 1.08	0.136	Not significant
Sex	Male vs Female	1.85	0.79 – 4.35	0.157	Not significant
Year of Study	Overall	—	—	0.005	Significant
	Year 1	0.51	0.15 – 1.72	0.275	Not significant
	Year 2	1.10	0.04 – 32.79	0.957	Not significant
	Year 3	0.11	0.02 – 0.74	0.023	Lower odds
	Year 4	0.04	0.01 – 0.24	0.001	Strongly lower

					odds
	Year 5	0.66	0.15 – 2.79	0.569	Not significant
	Year 6	0.10	0.01 – 0.75	0.024	Lower odds
Academic Satisfaction	Dissatisfied vs Satisfied	3.11	1.36 – 7.12	0.007	Higher odds
Self-esteem (RSES)	Continuous	0.63	0.48 – 0.83	0.001	Protective factor
Family Residence	Overall	—	—	0.021	Significant
	Rural vs Urban	6.35	1.32 – 30.51	0.021	Higher odds
	Semi-urban vs Urban	0.57	0.20 – 1.63	0.295	Not significant
Cumulative GPA	Overall	—	—	0.006	Significant (overall)
	<2.50	0.39	0.03 – 6.06	0.500	Not significant
	≥3.75	2.93	0.71 – 12.07	0.138	Not significant
	2.50–2.99	0.27	0.06 – 1.16	0.079	Not significant
	3.00–3.49	2.25	0.69 – 7.33	0.179	Not significant
GAD (Anxiety)	Yes vs No	2.76	0.99 – 7.75	0.053	Borderline

A multivariable logistic regression analysis was conducted to identify factors independently associated with Impostor Syndrome among students at SPHMMC (N = 224). Variables were included in the multivariable logistic regression model based on the following criteria: Variables with p-value < 0.25 in bivariate analysis were considered candidates, Variables with theoretical relevance based on literature (e.g., age, sex, psychological factors) were included, Multicollinearity was assessed to avoid redundancy among predictors and Variables contributing to model fitness and interpretability were retained in the final model

Impostor Syndrome status was coded as 0 = No Impostor Syndrome and 1 = Yes Impostor Syndrome. Predictor variables entered into the model included age, sex, year of study, academic satisfaction, self-esteem (RSES), family place of residence, cumulative GPA, and anxiety status (GAD).

The overall logistic regression model was statistically significant ($\chi^2(17) = 85.52$, $p < .001$), indicating that the set of predictors reliably distinguished between students with and without Impostor Syndrome. The model explained between 31.7% (Cox & Snell R^2) and 46.2% (Nagelkerke R^2) of the variance in Impostor Syndrome status.

The classification table showed that the model correctly classified 81.3% of cases overall, correctly identifying 90.2% of students without Impostor Syndrome and 56.7% of students with Impostor Syndrome.

Factors significantly associated with Impostor Syndrome

Year of Study

Year of study was significantly associated with Impostor Syndrome ($p = .005$). Compared to the reference category, students in specific academic years demonstrated significantly lower odds of experiencing Impostor Syndrome.

Year 3 students had reduced odds of Impostor Syndrome (AOR = 0.11, 95% CI: 0.02–0.74, $p = .023$). Similarly, **Year 4** students showed a markedly lower likelihood (AOR = 0.04, 95% CI: 0.01–0.24, $p = .001$).

Year 6 students also exhibited significantly lower odds (AOR = 0.10, 95% CI: 0.01–0.75, $p = .024$).

This indicates that progression through medical training is associated with reduced likelihood of experiencing impostor feelings, possibly reflecting increased academic confidence and professional identity development.

Academic Satisfaction

Academic satisfaction was significantly associated with Impostor Syndrome. Students who were Academically dissatisfied had over three times higher odds of experiencing Impostor Syndrome compared to satisfied students (AOR = 3.11, 95% CI: 1.36–7.12, $p = .007$).

Self-Esteem (RSES Total Score)

Self-esteem was inversely associated with Impostor Syndrome. For each one-unit increase in self-esteem score, the odds of experiencing Impostor Syndrome decreased by 37% (AOR = 0.63, 95% CI: 0.48–0.83, $p = .001$), indicating that higher self-esteem serves as a protective factor.

Family Place of Residence

Family place of residence was significantly associated with Impostor Syndrome ($p = .021$). Students from rural backgrounds had significantly higher odds of experiencing Impostor Syndrome by 6.349 times compared to those from urban areas (AOR = 6.35, 95% CI: 1.32–30.51, $p = .021$). Semi-urban residence was not significantly associated with Impostor Syndrome.

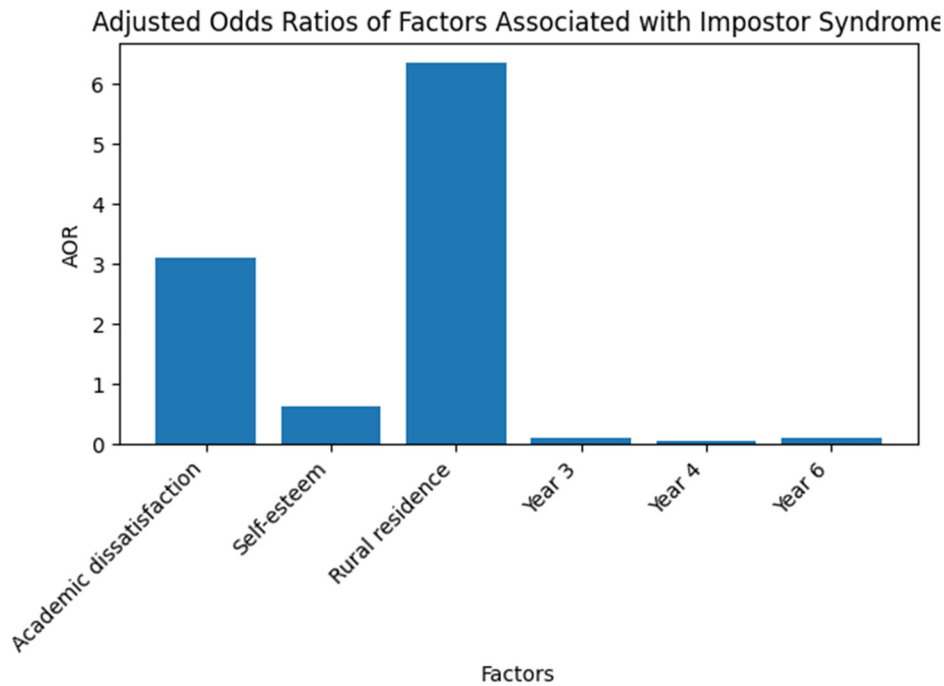


Figure 4: Adjusted Odds Ratios of key factors associated with Impostor Syndrome

Factors Not- significantly associated with Impostor Syndrome

After adjusting for other variables in the model, the following factors were not statistically significant associated with Impostor Syndrome: Age ($p = .136$), Sex ($p = .157$), Cumulative GPA (overall $p = .006$, but individual GPA categories were not independently significant), Generalized Anxiety Disorder (GAD) ($p = .053$, borderline significance)

5.5 Summary of Key Findings

In summary, the multivariable analysis identified year of study, academic dissatisfaction, low self-esteem, and rural family residence as independently associated with Impostor Syndrome among SPHMMC students. The final model demonstrated good explanatory power and classification accuracy, highlighting the importance of academic, psychological, and sociodemographic factors in understanding Impostor Syndrome.

The present study identified several academic, psychological, and sociodemographic factors independently associated with Impostor Syndrome among SPHMMC students. Academic dissatisfaction emerged as a strong predictor, with dissatisfied students exhibiting significantly higher odds of Impostor Syndrome. This finding is consistent with previous research suggesting that negative academic self-appraisal and unmet academic expectations contribute to persistent self-doubt despite objective achievement.

Self-esteem demonstrated a protective effect, as higher self-esteem was associated with significantly lower odds of Impostor Syndrome. This aligns with existing literature describing Impostor Syndrome as closely linked to negative self-concept and reduced self-worth, reinforcing the role of internal psychological resources in buffering Impostor feelings.

Year of study was also significantly associated with Impostor Syndrome, with several senior academic years showing lower odds compared to the reference group. This may reflect increased academic confidence, professional identity formation, and adaptation to academic demands over time, as suggested in prior studies of medical and health science students.

Additionally, students from rural family backgrounds were more likely to experience Impostor Syndrome than those from urban settings. This finding may be explained by differences in prior educational exposure, social capital, and perceived academic preparedness, which have been previously documented as contextual contributors to Impostor feelings in higher education environments.

In contrast, age, sex, cumulative GPA, and anxiety status were not independently associated with Impostor Syndrome after adjustment, suggesting that subjective academic experiences and psychological factors may be more influential than objective performance indicators.

6. Discussion

This study examined how common, severe, and related factors of Impostor Syndrome (IS) are among undergraduate medical students at St. Paul's Hospital Millennium Medical College (SPHMMC) in Addis Ababa, Ethiopia. The results provide a clear view of the psychological challenges medical students face in a tough academic setting and identify important academic, psychological, and demographic factors linked to IS.

6.1 Prevalence and Severity of Impostor Syndrome

The overall prevalence of IS was 26.8%, meaning that more than one-quarter of students felt significant Impostor feelings. This rate matches previous research among medical students and high-achieving groups, where prevalence rates range from 20% to 60% (8,25,31). A recent review and meta-analysis also found a high global prevalence of IS among health service providers, showing its widespread relevance (3).

Regarding severity, most participants reported frequent Impostor experiences (57.1%), followed by intense (23.7%) and moderate (19.2%) levels. This trend suggests that IS should be seen as a spectrum of psychological experiences rather than a simple yes-or-no condition (7,12,31). Constant feelings of being an Impostor despite not meeting formal clinical thresholds can affect one's mental health and academic performance.

The lower prevalence in this study compared to some international research may stem from methodological differences, like sample size, study design, or varying cutoff scores on the Clance Impostor Phenomenon Scale (CIPS). Cultural factors might also affect how willing students are to admit self-doubt, especially in cultures where showing vulnerability or admitting inadequacy can carry stigma. Additionally, differences in institutional support and academic environments could lead to different outcomes across studies.

6.2 Academic Factors and Impostor Syndrome

Dissatisfaction with academics was a strong predictor of IS. Students who were unhappy with their academic experience were over three times more likely to feel like Impostors. This matches what earlier studies found, showing that negative self-views, unfulfilled expectations, and poor perceived learning outcomes increase feelings of inadequacy and self-doubt (28,29). Dissatisfaction may point to systemic challenges like high workload, competitive environments, limited feedback, and perceived lack of institutional support.

Interestingly, academic workload and perceived stress were not independently linked to IS. This suggests that how students view their academic environment, not just their objective workload, drives feelings of being an Impostor. High-achieving students might handle large workloads without feeling like Impostors, while those sensing a lack of support or unmet expectations are more at risk.

Cumulative GPA had a significant association in bivariate analysis, with higher-achieving students reporting more IS. In the multivariable model, GPA remained significant as an overall variable ($p = 0.006$); however, individual GPA categories were not independently significant predictors.

This suggests that while academic performance is related to Impostor Syndrome, its effect may be influenced by other psychological or contextual factors, supporting attribution theory: students with IS often attribute their success to external factors (luck, timing) rather than their own abilities (18). Year of study also affected IS, with senior students showing lower odds. This might indicate greater self-confidence, better adaptation to academic demands, and development of a professional identity over time (2,23). Clinical exposure and practical experience may boost perceived competence and lessen Impostor feelings.

6.3 Psychological Factors

Anxiety was significantly linked to IS in bivariate analysis and showed borderline significance in multivariable analysis. This aligns with prior studies that found a strong

connection between IS and anxiety (1,27). Anxiety can heighten fear of failure, self-doubt, and negative self-judgment all key elements of IS.

Self-esteem acted as a protective factor, with higher self-esteem greatly reducing the chances of experiencing IS. This fits with earlier research pointing out that low self-esteem is central to IS (27,31). People with high self-esteem are more likely to view their successes as their own efforts, while those with low self-esteem often seek external explanations, leading to more self-doubt.

Contrary to expectations, depression, perfectionism, burnout, and social support were not significantly linked to IS in multivariable analysis, even though they were significant in some earlier studies (4,6,10). Although depression was highly prevalent in this study (97.8%), it was not significantly associated with Impostor Syndrome. This may be due to limited variability in the data, as the overwhelming majority of participants reported depressive symptoms. Such skewed distribution reduces the statistical power to detect meaningful associations and may reflect measurement limitations or low cutoff thresholds. Burnout, often reported in medical education (22,24), also did not independently predict IS, suggesting that contextual or cultural factors may influence these relationships.

6.4 Sociodemographic Factors

Family background significantly related to IS. Students from rural areas experienced higher odds of feeling like Impostors. This may indicate differences in prior educational backgrounds, access to resources, and readiness for competitive urban medical settings (30). Transitioning from rural to urban academic environments can create feelings of social and academic displacement, which may lead to self-doubt.

Sex and age were not independently linked to IS, even though some studies indicate higher prevalence among females (12,31). In this study, while female students showed significantly higher prevalence of Impostor Syndrome in the bivariate analysis ($p =$

0.002), this association was not significant in the multivariable model ($p = 0.157$). This suggests that the observed gender difference may be mediated by other variables, such as self-esteem or academic satisfaction, rather than intrinsic sex differences.

These results point to structural inequalities in the education system and indicate that specific interventions are needed for vulnerable student groups.

6.5 Factors Not Independently Associated

Several variables including cumulative GPA, academic workload, and anxiety were significant in bivariate analysis but lost significance in multivariable analysis. This difference likely results from confounding and mediation by psychological factors such as self-esteem or academic satisfaction. For instance, high-achieving students may report IS due to perfectionism or self-imposed pressure rather than their GPA alone (9,31).

The borderline significance of anxiety ($p = 0.053$) suggests a possible connection that should be explored further in larger studies using more sensitive measures.

6.6 Implications of the Findings

The findings show that IS among medical students is influenced more by subjective psychological and contextual factors rather than by their actual academic performance. Tackling IS requires a multi-level approach:

1. psychological interventions: Boost self-esteem and resilience through counseling, mentorship, and confidence-building programs.
2. Academic interventions: Enhance satisfaction with learning settings, offer constructive feedback, and lessen perceived inequities.

3. Support for vulnerable groups: Develop programs aimed at students from rural or disadvantaged backgrounds, including orientation, peer mentoring, and academic help.
4. Institutional strategies: Incorporate mental health services, early detection of IS, and resilience-building workshops into the medical curriculum.

7. Conclusion

Impostor Syndrome is common among SPHMMC medical students, affecting over one-quarter of those surveyed. A significant number reported frequent and intense feelings of being an Impostor, indicating a notable psychological burden.

Independent predictors included academic dissatisfaction, low self-esteem, year of study, and rural family background. These results suggest that IS is shaped more by personal views and psychological factors than by actual academic performance.

Addressing IS calls for integrated strategies that combine academic support, psychological interventions, and institutional policies. Building self-esteem, improving academic satisfaction, and assisting vulnerable students are crucial for promoting well-being and academic success.

8 . Limitations

This study has several limitations. The cross-sectional design does not allow for establishing causal relationships between Impostor Syndrome and the associated factors. Additionally, the use of self-administered questionnaires may have introduced reporting biases such as social desirability and recall bias. Furthermore, some potentially relevant factors, including personality traits and coping strategies, were not assessed, which may limit the comprehensiveness of the findings.

Nevertheless, this study has an important strength. It provides valuable insights into the prevalence and associated factors of Impostor Syndrome specifically among undergraduate medical students in an Ethiopian context, contributing to the limited evidence available in this setting.

9. Recommendation

Based on the findings of this study, the following recommendations are proposed for St. Paul's Hospital Millennium Medical College (SPHMMC) and future research:

9.1. For SPHMMC Administration and Faculty

- 1 **Enhance Academic Support and Environment:** Given the strong association between academic dissatisfaction and Impostor Syndrome, SPHMMC should critically review its curriculum, teaching methodologies, and student support services. Efforts should focus on creating a more supportive, engaging, and less intimidating academic environment that fosters a sense of belonging and competence among students.
- 2 **Implement Self-Esteem Building Programs:** As low self-esteem is a significant predictor of IS, the college should develop and integrate programs aimed at enhancing self-esteem and self-efficacy among medical students. These could include workshops on positive self-talk, resilience training, and celebrating small successes.
- 3 **Provide Targeted Support for Rural Students:** Recognizing that rural residence is an independent predictor of IS, SPHMMC should establish specific support mechanisms for students transitioning from rural backgrounds. This could involve mentorship programs, academic bridging courses, cultural orientation, and accessible counseling services to help them adapt to the urban academic environment and mitigate feelings of isolation or inadequacy.
- 4 **Routine Screening and Early Intervention:** Integrate routine screening for Impostor Syndrome and related psychological distress (e.g., low self-esteem, anxiety) into student wellness checks. Early identification can facilitate timely intervention and support, preventing the escalation of IS and its potential negative impacts on academic performance and mental well-being.

9.2. For Future Research

- 5 **Longitudinal Studies:** Future research should adopt longitudinal designs to establish causal relationships between the identified factors and Impostor Syndrome, providing a clearer understanding of its development over time in medical students.
- 6 **Qualitative Research:** Conduct qualitative studies (e.g., in-depth interviews, focus groups) to explore the lived experiences of medical students with Impostor Syndrome, particularly those from rural backgrounds, to gain a deeper understanding of the nuances of their challenges and coping strategies.
- 7 **Intervention Studies:** Evaluate the effectiveness of specific interventions designed to reduce Impostor Syndrome and enhance self-esteem and academic satisfaction among medical students through randomized controlled trials.
- 8 **Multi-Institutional Studies:** Expand research to include multiple medical colleges across Ethiopia to assess the generalizability of these findings and identify any institutional-specific factors influencing Impostor Syndrome prevalence and its associated factors.

Future Research Directions

Future studies should consider expanding the study area and sample size by including students from multiple medical colleges to allow for broader comparisons and improved generalizability of findings. Extending the duration of data collection would also be beneficial, as a longer study period could provide a more comprehensive understanding of the factors associated with Impostor Syndrome.

In addition, future research should employ multiple data collection methods rather than relying solely on self-report questionnaires. The use of qualitative interviews, focus group discussions, or longitudinal designs could facilitate triangulation of findings and strengthen the validity of conclusions.

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11. Annex

Annex 1: Participant Information

Purpose: We are assessing prevalence and associated factors of Impostor Syndrome on medical students and interns. Findings will inform student wellbeing initiatives.

Voluntary & Confidential: Participation is voluntary. You may skip any question or stop at any time without penalty. No identifying information will be linked to your responses. Aggregate results will be reported.

Risks/Benefits: Some items ask about stress or mental health. If you feel discomfort, you may skip. The study may help improve support services.

Consent: By proceeding, you enrolled at SPHMMC, and you consent to take part.

☐ I consent to participate

Instructions

-Unless otherwise specified, choose one answer per question.

-For Likert items, select the option that best reflects your view/experience.

"Prefer not to say" is available where sensitive.

Annex 2: Questionnaire

Questionnaire: Prevalence and Associated Factors of Impostor Syndrome among Medical Students of SPHMMC

Section A: Demographic and Academic Characteristics

#	Item	Response Options
1	Age (in years)	_____
2	Sex	☐ Male ☐ Female
3	Year of study	☐ Year 1 ☐ Year 2 ☐ Year 3 ☐ Year 4 ☐ Year 5 ☐ Year 6 ☐ Medical Intern
4	Marital status	☐ Single ☐ Married ☐ Divorced/Separated ☐ Other: _____
5	Place of family residence	☐ Urban ☐ Semi-urban ☐ Rural
	Socioeconomic status (self-rated)	
	Use the same 5-point Likert scale throughout:	
	1 = Strongly disagree 2 = Disagree	
	3 = Neutral 4 = Agree 5 = Strongly agree	

		☐ Low ☐ Middle ☐ High
6	Monthly Allowance / Financial Support	
	1. What is your average monthly allowance or financial support?	
	• ☐ No regular support	
	• ☐ Low	
	• ☐ Moderate	
	• ☐ High	
	2. My financial support is sufficient for my basic needs.	
	☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5	

Section B: Academic/Institutional Factors

#	Item	Response Options
7	Cumulative GPA (most recent)	☐ < 2.50 ☐ 2.50–2.99 ☐ 3.00–3.49 ☐ 3.50–3.74 ☐ ≥ 3.75
8	Average study hours per week	_____ hours
9	Satisfaction with academic experience	☐ Satisfied ☐ Dissatisfied
10	Perceived workload / academic stress	☐ High ☐ Low
Section C: Psychological Factors		
PHQ-9: Depression Symptoms (Past 2 weeks)		
Scoring: 0 = Not at all 1 = Several days 2 = More than half the days 3 = Nearly every day		
#	Item	0 1 2 3
1	Little interest or pleasure in doing things	☐ [☐ ☐]
2	Feeling down, depressed, or hopeless	☐ [☐ ☐]
3	Trouble falling/staying asleep or sleeping too much	☐ [☐ ☐]
4	Feeling tired or having little energy	☐ [☐ ☐]
5	Poor appetite or overeating	☐ [☐ ☐]
6	Feeling bad about yourself	☐ [☐ ☐]
7	Trouble concentrating	☐ [☐ ☐]
8	Moving/speaking slowly or fidgety	☐ [☐ ☐]
9	Thoughts of self-harm	☐ [☐ ☐]
Interpretation: PHQ-9 ≥ 10 → presence of depressive symptoms		
GAD-7: Anxiety Symptoms (Past 2 weeks)		
Scoring: 0 = Not at all 1 = Several days 2 = More than half the days 3 = Nearly every day		
#	Item	0 1 2 3
1	Feeling nervous, anxious, or on edge	☐ ☐ ☐ ☐
2	Not being able to stop or control worrying	☐ ☐ ☐ ☐
3	Worrying too much about different things	☐ ☐ ☐ ☐
4	Trouble relaxing	☐ ☐ ☐ ☐
5	Restlessness (hard to sit still)	☐ ☐ ☐ ☐
6	Becoming easily annoyed/irritable	☐ ☐ ☐ ☐

7 Feeling afraid something awful might happen ☐ ☐ ☐ ☐

Interpretation: GAD-7 $\geq 10 \rightarrow$ presence of anxiety symptoms

Self-Esteem (Rosenberg Scale – Shortened)

#	Item	Agree	Disagree
1	I feel that I am a person of worth	☐	☐
2	I feel that I have a number of good qualities	☐	☐
3	I am able to do things as well as most people	☐	☐
4	I feel I do not have much to be proud of	☐	☐
5	I take a positive attitude toward myself	☐	☐

Perfectionism

1. I set extremely high standards for myself.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

2. I feel distressed when my performance is not perfect.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Burnout / Emotional Exhaustion

1. I feel emotionally exhausted by my academic/work responsibilities.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

2.. I feel overwhelmed by my workload.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Social Support

1. I have people I can rely on for emotional or practical support.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

2.. I feel supported by my family, friends, or peers.

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5

Section D: Impostor Syndrome (Clance Impostor Phenomenon Scale – CIPS)

Scoring: 1 = Not at all true 2 = Rarely true 3 = Sometimes true 4 = Often true 5 = Very true

#	Item	1	2	3	4	5
1	I have often succeeded on a test/task even though I feared I would not do well.	☐	☐	☐	☐	☐
2	I can give the impression I'm more competent than I am.	☐	☐	☐	☐	☐

3	I avoid evaluations and dread being evaluated.	☐	☐	☐	☐	☐
4	Praise makes me worry I won't meet expectations next time.	☐	☐	☐	☐	☐
5	I think I succeeded due to luck/right timing/known right people.	☐	☐	☐	☐	☐
6	I recall failures more than successes.	☐	☐	☐	☐	☐
7	I rarely do a project/task as well as I'd like.	☐	☐	☐	☐	☐
8	I fear others will discover my lack of ability.	☐	☐	☐	☐	☐
9	I compare myself to peers and think they may be smarter.	☐	☐	☐	☐	☐
10	I worry about failing despite others' confidence in me.	☐	☐	☐	☐	☐
11	When I succeed, I doubt I can repeat it.	☐	☐	☐	☐	☐
12	I discount my accomplishments when praised.	☐	☐	☐	☐	☐
13	I feel I've "fooled" others into overestimating me.	☐	☐	☐	☐	☐
14	I think I succeed because I work hard, not due to intelligence.	☐	☐	☐	☐	☐
15	I worry that others will find I'm less capable.	☐	☐	☐	☐	☐
16	I frequently worry about failing in academic/clinical tasks.	☐	☐	☐	☐	☐
17	Success makes me feel relieved, not happy.	☐	☐	☐	☐	☐
18	I think my peers are smarter/more competent.	☐	☐	☐	☐	☐
19	I fear being "found out" as less capable.	☐	☐	☐	☐	☐
20	I avoid showing confidence to prevent others' high expectations.	☐	☐	☐	☐	☐
Scoring:						
• Total = 20–100						
• ≤40: Few Impostor characteristics						
• 41–60: Moderate Impostor phenomenon						
• 61–80: Frequent Impostor phenomenon						
• 81–100: Intense Impostor phenomenon						

Annex 3: Assurance of Investigator

Declaration

I, the undersigned student, declare that this research project is my original work in partial fulfillment of the requirement for the Degree of Doctor in Medicine, MD. I also declare that it has never been presented in this or any other higher institution and that all resources and materials used in the research work have been duly acknowledged.

Name of the student: _____

Date: _____ Signature: _____

Approval of Advisors

Advisor	signature	date
1. _____	_____	_____
2. _____	_____	_____