



Medical Student Syndrome among Medical Students at the University of Tabuk and Its Effect on Academic Performance: A Cross-Sectional Study

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Abstract Background: Medical student syndrome (MSS) is a circumstantial manifestation of health-related anxiety, operationalized in this study through illness perception and distress scores. This is characterized by increased anxiety about contracting diseases during medical studies. Exposure to disease-related knowledge, academic stress, and cognitive biases can all exacerbate this anxiety in medical students, thereby compromising their mental health and academic performance. This study aimed to determine the prevalence and severity of MSS and health-related anxiety among medical students at the University of Tabuk, as well as the relationship between these disorders and their academic performance. **Methods:** This cross-sectional survey was carried out between June and October 2025 on 526 medical students at the University of Tabuk. A self-administered questionnaire was used to collect data, which included demographic information, the Short Health Anxiety Inventory (SHAI), Medical Student's Disease (MSD) perception and distress scores, and a record of physician visits. We conducted descriptive statistics, t-tests, one-way ANOVA, and correlation analysis. A p-value of <0.05 indicated that the results were significant. **Results:** Nearly 25.3% of participants exhibited elevated health anxiety (SHAI ≥ 18). Elevated health anxiety was significantly correlated with advanced age, clinical academic years ($p = 0.010$), lower GPA, and increased medical consultations. Male students indicated significantly higher levels of MSD distress (3.10 vs. 2.94). Higher health anxiety levels were linked to lower academic performance. **Conclusion:** Both features of MSS and health anxiety are prevalent among medical students at the University of Tabuk. They exhibit a significant cross-sectional correlation with academic progression, performance, and healthcare utilization. Early identification of at-risk students may help mitigate adverse academic and psychosocial outcomes.

Key Words Medical Student Syndrome, Health Anxiety, Medical Students, And Academic Performance

INTRODUCTION

Medical student syndrome (MSS) or disease refers to the health-related anxieties experienced by medical students following the acquisition of knowledge about or investigation into a medical condition [1]. A lot of clinical expertise gained through studying different diseases can explain this phenomenon. This can lead to symptom hunting, worrying about a serious illness, or making small symptoms seem worse than they are. All of which can lead to a self-diagnosis of a specific somatic illness [2]. It is a form of hypochondriasis, which is characterized by an intense fear of a serious illness or the belief that one is afflicted by it, despite not being so. Patients are not always calm or convinced that they are not sick by medical tests and promises of good health. The Diagnostic and Statistical Manual of Mental

Disorders has a list of symptoms that doctors use to diagnose hypochondriasis [3]. Hypochondriasis and cyberchondria are distinct from “nosophobia,” which refers to an intense or irrational fear of contracting a specific disease. It is a persistent fear of a severe illness stemming from exaggerated minor symptoms and delusions of contracting the disease, despite appropriate medical assessment [4].

People often confuse MSS with health anxiety (HA), which is when someone is always worried about their health [5]. Health anxiety differs from MSS in the temporal dimension in which a person views themselves as suffering from the illness. Health anxiety generally involves the fear of potentially acquiring a disease in the future, whereas MSS relates to the worry of already having the disease. Many recent studies on MSS have focused on how medical students

seek help for the symptoms they experience [6]. A study conducted in Karachi investigated the help-seeking behaviors of two distinct groups: medical students and engineering students. The findings indicated no significant difference between the two cohorts [7]. This is very different from the common belief that medical students don't often get medical help when they need it. MSS is a frequent phenomenon among medical students. A study conducted in London showed that as many as 70% of the medical students who took part had the disease [8].

Psychological distress is significantly associated with medical student syndrome (MSS) and health anxiety (HA). People who have it feel more stressed, have trouble sleeping, and have anxiety symptoms all at the same time. Thinking about your illness all the time can make you more tired and make your mental health problems worse. Research shows that medical students are more likely to feel anxious, hopeless, and burned out than students who are not in medical school [8].

Health anxiety is identified as a contributing factor to this phenomenon [8]. Long-term exposure to unaddressed health anxiety may increase healthcare utilization and sustain maladaptive reassurance-seeking behaviors, consequently affecting students' future professional attitudes towards health and illness [9]. A plethora of studies demonstrate that medical students display a higher incidence of health anxiety compared to the general populace. Exposure to extensive information regarding diseases, coupled with academic pressure and competitive settings, appears to heighten individuals' awareness of their symptoms and increase their health-related anxiety. A significant cross-sectional study of Egyptian medical students revealed that 15.7% met the criteria for clinically significant health anxiety, underscoring the prevalence of health anxiety within this demographic. Health anxiety is a prevalent concern among students pursuing medicine and health sciences. Research comparing preclinical and clinical medical students indicates that a significant proportion (approximately 14.8%) display symptoms of health-related anxiety, associated with medical student syndrome and hypochondriacal concerns stemming from academic exposure to diseases. Students often become more worried during the preclinical years because they don't know much about theoretical disease knowledge and haven't had any real-world experience to help them understand it [10].

This negative correlation indicates that MSS and HA influence not only academic performance but also physical, mental, and social well-being. Research on anxiety in medical students, which extends beyond HA/MSS, indicates that elevated anxiety levels correlate with diminished quality of life, impaired relationships, and depressive symptoms [8]. Medical Student Syndrome is regarded as a contextual expression of health anxiety, rather than a distinct psychiatric disorder. Studies show that cognitive biases, like seeing small symptoms as big ones and only paying attention to information about the illness, can affect MSS, especially when a person first sees a doctor [11].

Students afflicted with health anxiety consistently indicate a reduced quality of life (QoL) compared to their peers who are not experiencing health anxiety. A cross-sectional study in Egypt revealed that 16.2% of enrolled medical students in the study exhibited diminished quality of life scores, including reduced satisfaction with academic performance [12]. Studies show that health anxiety and MSS can make students do worse in school. A study involving health-science students at King Saud University revealed that individuals with MSS exhibited significantly elevated levels of anxiety and hypochondriacal symptoms. MSS was strongly linked to lower grades. Students who indicated a decrease in their GPA were almost three times more likely to display hypochondriacal tendencies [9]. Extensive research on health anxiety indicates a negative relationship between health anxiety and academic performance. A study conducted in Iran with nursing students during the COVID-19 pandemic identified a significant negative correlation between health anxiety levels and academic performance. This means that worrying about health problems makes it harder to learn, stay motivated, and focus [13]. The current literature on anxiety in medical education links stress and anxiety to inadequate academic performance, professional disengagement, and attrition, although research specifically focused on HA/MSS is still scarce [8].

Despite the existing international literature, there is a specific gap in evidence regarding health anxiety and MSS among medical students in northern Saudi Arabia, particularly at the University of Tabuk. The primary objective of this study was to assess the prevalence and severity of health anxiety among medical students at the University of Tabuk. Secondary objectives included: 1) comparing SHAI and MSD perception/distress scores across healthcare (1st year), preclinical (2nd and 3rd years), and clinical (4th to 6th year) students; 2) examining the cross-sectional association between these phenomena and academic performance; and 3) evaluating the association between health anxiety and the frequency of physician consultations.

METHODS

Study Design, Setting, And Population

A cross-sectional study was performed in the Faculty of Medicine, University of Tabuk, Saudi Arabia, from June to October 2025 following STROBE reporting guidelines. This institution, situated in northern Saudi Arabia, provides several healthcare-related programs, including medical courses. Eligibility criteria encompassed medical students who consented to participate. Students who were diagnosed with psychiatric diseases or actively undergoing treatment for psychiatric illnesses were excluded to mitigate potential confounders associated with perceived illness, though this may underestimate the overall burden of health anxiety.

Sample Size Calculation

Of the 990 medical students, 526 engaged in the study, yielding a response proportion of approximately 53%.

Convenience sampling was utilized to identify suitable participants because it is practical, though it increases the possibility of selection bias. An official online platform was used to invite students. Duplicate online responses were prevented through institutional email restrictions, and only complete questionnaires were analyzed [14,15].

Recruitment and Sampling

Convenience sampling was utilized to identify suitable participants. We chose convenience sampling because it is practical, inexpensive, and feasible, though it increases the possibility of selection bias. An official online platform was used to invite students. A message explained the study's goals and provided instructions on how to sign up to participate. There was a link to the Google Forms online questionnaire in the email. A week after the first invitation, a follow-up message was sent to remind people to respond. Duplicate online responses were prevented through institutional email restrictions, and only complete questionnaires were analyzed.

Ethical Considerations

Ethical approval was obtained from the Institutional Review Board (IRB) committee at the University of Tabuk with the following number: UT-781-349-2025. Informed electronic consent was acquired from all participants through Google Forms prior to their participation in the survey. Participants were assured of the confidentiality of their comments and informed that they could withdraw at any time without facing negative repercussions. All procedures complied with institutional ethical standards and the 1964 Declaration of Helsinki, including its subsequent amendments. Anonymity was maintained as no identifying information was collected, and data were stored securely with password protection. We provided information about university mental-health support at the end of the survey.

Data Collection Tool

We collected data using a self-administered questionnaire that consisted of four sections. While the scales have been widely used internationally, their application in this specific Saudi student population was supported by expert face validity and internal consistency calculated within the present sample.

- Demographic information and self-reported GPA
- The 18-item Short Health Anxiety Inventory (SHAI) to measure health anxiety. A score of ≥ 18 indicated elevated health anxiety [16,17]
- The Medical Student's Disease (MSD) perception and distress scale. This scale measures mean distress and perception scores but does not utilize a specific cut-off to determine a definitive MSS "diagnosis"
- A record of self-reported physician visits within the past twelve months, without distinguishing the specific reasons for consultation [18]

Internal consistency (Cronbach's alpha) ranged from 0.85 to 0.93 for the SHAI and from 0.79 to 0.92 for the MSD scales within this student population.

Data Analysis

Data analysis was conducted utilizing IBM SPSS (version 26.0). Descriptive statistics were used to present demographic information. Following normality checks, one-way ANOVA, independent t-tests, and cross-tabulation were used to determine relationships. Results were statistically significant at $p < 0.05$. No multivariable regression analysis was performed, which limits the ability to determine independent associations among interrelated variables such as age, academic year, and GPA [19].

RESULTS

A total of 526 participants were included in this study. Based on the Short Health Anxiety Inventory (SHAI), 393 participants (74.7%) were classified as low health anxiety ($\text{SHAI} < 18$), while 133 participants (25.3%) had high health anxiety ($\text{SHAI} \geq 18$). There was no statistically significant correlation between gender and health anxiety level ($p = 0.236$). However, 23.9% of the men who took part had high SHAI scores, while 27.0% of the women who took part had high SHAI scores. Moreover, the participants' academic year category and the SHAI score categories were related ($p = 0.010$). The prevalence of elevated health anxiety was higher in the clinical years (34.2%) compared to the preclinical years (24.8%) and the healthcare track year (15.7%). Additionally, there was a significant correlation ($p = 0.042$) between grade point average (GPA) and health anxiety level. Higher SHAI scores were more common in those with lower GPAs, particularly in those with GPAs below 3.0 (44.4%) and between 3.0 and 3.49 (40.5%). On the other hand, individuals with GPAs higher than 4.5 were less likely to have high levels of health anxiety (23.0%). Age was significantly associated with SHAI categories ($p = 0.007$). Participants aged 23–25 years had the highest proportion of high health anxiety (38.5%), compared with those aged 20–22 years (25.8%) and those younger than 20 years (17.6%). Only one participant was older than 25 years, and none in this age group exhibited high health anxiety (Table 1).

The mean value of SHAI scores, medical student disease (MSD) perception, and MSD distress were compared across demographic and academic variables [Table 2]. The mean SHAI scores of male and female participants did not differ significantly ($p = 0.143$). Similarly, there was no significant gender difference in MSD perception ($p = 0.741$). Nonetheless, the MSD distress levels of female participants were substantially lower than those of male participants (mean $\pm$ SD: 2.94 $\pm$ 1.04 vs. 3.10 $\pm$ 0.79; $p = 0.046$). There were no significant differences in MSD perception ($p = 0.081$) or statistically significant differences in mean SHAI scores between academic year categories ($p = 0.624$). On the other hand, participants in the healthcare track reported the highest mean MSD distress scores (3.32 $\pm$ 0.67) compared to those in preclinical (2.99 $\pm$ 0.85) and clinical years (2.93 $\pm$ 1.18). This difference was significant by academic year category ($p = 0.003$).

Grade point averages (GPAs) and SHAI scores were found to be significantly correlated ($p < 0.001$). Individuals with lower GPAs, especially those with GPAs below 3.0

Table 1: Demographic Data of the Participants and their SHAI Categories

Parameters		SHAI<18 (Low)		SHAI score 18 or above (High)	p-value
		393 (74.7%)		133 (25.3%)	
		n (%)	n (%)	n (%)	
Gender	Male	285 (54.2)	217 (76.14)	68 (23.86)	0.236
	Female	241 (45.8)	176 (73.03)	65 (26.97)	
Academic year category	Healthcare track	89 (16.9)	75 (84.27)	14 (15.73)	0.010*
	Preclinical year	323 (61.4)	243 (75.23)	80 (24.77)	
	Clinical year	114 (21.7)	75 (65.79)	39 (34.21)	
GPA	>4.5	317 (60.3)	244 (76.97)	73 (23.03)	0.042*
	4-4.49	98 (18.6)	76 (77.55)	22 (22.45)	
	3.5-3.99	51 (9.7)	38 (74.51)	13 (25.49)	
	3-3.49	42 (8.0)	25 (59.52)	17 (40.48)	
	<3	18 (3.4)	10 (55.56)	8 (44.44)	
Age	<20 Y	148 (28.1)	122 (82.43)	26 (17.57)	0.007*
	20-22 Y	299 (56.8)	222 (74.25)	77 (25.75)	
	23-25 Y	78 (14.8)	48 (61.54)	30 (38.46)	
	>25 Y	1 (0.2)	1 (100.00)	0 (0.00)	

* Significant p Value

Table 2: Comparison of Means of the Sum of SHAI with MSD Perception and MSD Stress

Parameters		SHAI			MSD perception			MSD distress		
		Mean (SD)	Test Value	p-value	Mean (SD)	Test Value	p-value	Mean (SD)	Test Value	p-value
Gender	Male	12.16 (8.61)	2.15 (t)	0.143	2.98 (0.68)	0.109 (t)	0.741	3.10 (0.79)	4.011	0.046*
	Female	13.23 (8.08)			2.99 (0.91)			2.94 (1.04)	(t)	
Academic year category	Healthcare track	12.29 (7.91)	0.47	0.624	3.05 (0.66)	2.525	0.081	3.32 (0.67)	5.847	0.003*
	Preclinical year	12.52 (7.75)	(F)		2.93 (0.71)	(F)		2.99 (0.85)	(F)	
	Clinical year	13.31 (10.27)			3.11 (1.06)			2.93 (1.18)		
GPA	>4.5	12.54 (7.39)	5.82	<0.001*	3.01 (0.68)	1.142	0.336	3.10 (0.80)	1.905	0.108
	4-4.49	11.09 (7.37)	(F)		2.87 (1.01)	(F)		2.95 (1.01)	(F)	
	3.5-3.99	12.49 (10.35)			3.03 (1.00)			3.04 (1.21)		
	3-3.49	13.67 (8.98)			3.12 (0.75)			2.72 (1.01)		
	<3	21.11 (15.41)			2.83 (0.80)			2.91 (0.99)		
Age	<20 Y	12.16 (7.81)	4.156	0.006*	2.98 (0.82)	2.534	0.056	2.95 (0.98)	1.966	0.118
	20-22 Y	12.10 (7.58)	(F)		2.93 (0.75)			3.09 (0.82)	(F)	
	23-25 Y	15.71 (11.33)			3.21 (0.88)			2.97 (1.08)		
	>25 Y	10.00			2.81			1.40		

* Significant p Value, t: Independent t-test, F: One-way ANOVA

Table 3: Relation of Means of SHAI, MSD Perception, MSD Distress, and Number of Visits to a Physician in the Last 12 Months

Parameters	Total SHAI	MSD perception	MSD distress
Mean (SD)	12.72 (8.52)	2.99 (0.80)	3.03 (0.914)
Times of doctor consultation (Mean 2.01±2.09)	p = <0.001*	p = 0.097	p = 0.231

* Significant p-value

(21.11±15.41), showed higher mean SHAI scores. However, students with higher GPAs reported greater levels of medical student distress. On the other hand, MSD distress ($p = 0.108$) and MSD perception ($p = 0.336$) did not significantly differ between GPA categories. The students' age was found to be significantly correlated with mean SHAI scores ($p = 0.006$), with the highest mean SHAI scores (15.71±11.33) reported by participants aged 23–25. There was no statistically significant difference in MSD perception ($p = 0.056$) or MSD distress ($p = 0.118$) between age groups (Table 2).

The participants' mean scores for health anxiety (SHAI), medical student disease (MSD) perception, and distress were compared to the number of doctor consultations needed by the students during the previous 12 months. The study population's mean SHAI score was 12.72±8.52, and their mean MSD distress and perception scores were 3.03±0.91 and 2.99±0.80, respectively. The number of doctor visits and

SHAI scores were found to be statistically significantly correlated ($p < 0.001$), suggesting that individuals with more frequent doctor visits had higher health anxiety scores. On the other hand, neither MSD distress ($p = 0.231$) nor MSD perception ($p = 0.097$) was significantly correlated with the number of doctor visits (Table 3).

DISCUSSION

This study looked at how common health anxiety is among medical students and how it is related to demographics, academic performance, and seeking medical care. It focused on how medical students feel about and deal with their own health problems (MSD). The SHAI showed that about 25% of the participants had high health anxiety, with a cut-off score of 18. This shows how big a problem health anxiety is in medical education. The observed prevalence is slightly higher than what was found in earlier studies conducted in

the Emirates (16.1–17.4%) [16] and Egypt (15.7%) [12]. This rate is significantly lower than what an earlier study found, which reported a range of 70–80% [20]. Nonetheless, it is considerably higher than findings from other studies, which indicated rates of 8.3–9.3% [7]. This prevalence shows that medical students are more likely to have health anxiety than the general population. This is probably because they are exposed to more medical knowledge and illness-related information during their training. The significant difference in prevalence may be due to the scoring system and cut-off employed in the study.

Demographic Factors

Gender did not have a big effect on health anxiety levels. This is in line with other studies that found that male and female medical students had similar SHAI scores [21]. However, female students reported much higher levels of MSD distress. This suggests that while overall health anxiety may be similar between men and women, how they react emotionally to feeling sick may be different. This finding is similar to earlier research that showed that female students may have more mental health problems even though they think about health threats in the same way [22]. The academic stage turned out to be an important factor. Students in clinical years had a higher rate of high health anxiety than students in preclinical years and those in the healthcare track. People have talked about this pattern before, and it is often thought to be caused by more exposure to patients, more responsibility, and more encounters with serious illnesses during clinical rotations [23]. Even though the average SHAI scores didn't change much between academic years, the fact that there were more clinically anxious students in later years suggests that clinical exposure may make some students more vulnerable instead of affecting all students equally. It's interesting that students in the healthcare track said they were the most stressed out about MSD, even though they didn't have the highest health anxiety scores. This could be because the person doesn't have much clinical experience and only partial medical knowledge, which has been linked to increased emotional distress because of confusion and misunderstanding of symptoms [24].

Age was strongly linked to health anxiety, with students between the ages of 23 and 25 having the highest rates and average SHAI scores. This group often goes through later stages of medical school, higher academic demands, and unclear career paths, all of which can make anxiety worse [25]. The fact that there weren't any big differences in how people of different ages saw and felt about MSD suggests that age-related effects may be more obvious in generalized health anxiety than in specific health problems.

Academic Performance

The present study identified an inverse correlation between health anxiety levels and Grade Point Average (GPA). This indicates that students with elevated scores on the Short Health Anxiety Inventory (SHAI) exhibit inferior academic performance. Conversely, students exhibiting elevated GPAs

demonstrated increased levels of medical student syndrome perception and distress. This shows that there is a strong link between the medical students' mental health and their academic success. Our finding that medical students with lower GPAs demonstrate elevated health anxiety corresponds with prior research showing analogous trends among students in health-related disciplines. A study of medical undergraduates found a strong link between higher SHAI scores and lower academic performance ($r = -0.157$, $p = 0.002$). This suggests that health anxiety may hinder academic performance by reallocating cognitive and emotional resources away from learning and assessment activities [26]. A study of nursing students revealed a negative correlation between health anxiety and GPA ($r = -0.19$, $p \leq 0.05$), indicating that excessive concern for health may adversely affect clinical academic performance [13]. There could be many reasons why worrying about your health makes you do worse in school. When you have health anxiety, you worry about getting sick all the time and don't understand how your body feels. This can make you check your health all the time, make you more stressed, and make it hard to focus on schoolwork. These mental and emotional stresses could make it harder for you to use your working memory and executive functioning, which are two important skills for learning and doing well on tests. Also, people with more health anxiety may avoid clinical or academic settings that they think are stressful, which would make it even harder for them to learn and get involved.

Interestingly, our data also indicate that students with higher GPAs reported greater levels of medical student distress and illness perception. This finding may initially appear counterintuitive in light of the inverse GPA–health anxiety relationship; however, it reflects a broader and more complex pattern noted in educational psychology and medical education research. Some literature indicates that moderate anxiety levels may serve as a motivator. A study on academic anxiety showed that students who have certain types of performance-related anxiety may study harder to get better grades, which turns their anxiety into positive academic engagement [27]. Because medical students with higher GPAs are required to meet higher academic demands, and because they strive for perfection and have high expectations of themselves, they may face increased stress and cognitive burden related to illness. Individuals in this group may be more distressed by their clinical responsibilities, employment, and continuous assessments than they are by their illness. While this form of distress differs from health anxiety as measured by SHAI, it nevertheless signifies a psychological burden that coexists with high achievement [28]. Additional research in health and psychological sciences has documented that students at the top of the academic cohort often report high stress, burnout, and anxiety symptoms, particularly in environments with competitive climates and high expectations [29].

Physician Consultation

This work revealed a strong association between the frequency of physician consultation by medical students and

their health anxiety level. This supports previous studies that reported that individuals with elevated health anxiety engage more frequently with healthcare services [30,31]. This report highlights the potential burden of untreated health anxiety on healthcare systems. On the other hand, medical student syndrome parameters, either perception or distress, were not significantly associated with doctor visits. This indicates that general health anxiety, rather than illness-specific distress, may be the primary driver of increased healthcare consultation.

Implications for Medical Education

Collectively, these findings underscore the need for early identification and targeted support for medical students at risk of elevated health anxiety, particularly those in clinical years, students with lower academic performance, and those in specific age groups. Incorporating mental health education, stress management strategies, and access to counseling services within medical curricula may mitigate the negative academic and psychological consequences of health anxiety [13].

Theoretical and Practical Implications

The association found that elevated health anxiety scores and lower medical student disease parameters are associated with lower academic outcomes, suggesting that there is a U-shaped relationship or a complex relationship between academic achievement and distress. Where health anxiety might act as a barrier to effective learning efficiency and academic productivity, a type of stress related to academic performance and load might be more observable in high-performing students. These results highlight the need in the future for specialized mental health support services within medical and health science course curricula from a practical as well as a medical standpoint. Students who scored higher in health anxiety might require therapeutic interventions based on cognitive behavioral principles, which might help in restructuring health-related catastrophic thoughts and enhancing concentration and academic outcomes. Students who performed well in academics but are facing problems might be aided through stress management courses, resilience interventions, and academic modifications in such a manner that academic motivation is spared and distress is minimized.

Limitations and Future Directions

This study is subject to several limitations. Convenience sampling from a single institution substantially limits external validity and the generalizability of the findings. The cross-sectional design limits our ability to determine causality. Furthermore, the absence of multivariable regression analysis means that confounding factors among age, academic year, and GPA were not adjusted for. Dependence on self-reported GPA and physician consultations is subject to recall and reporting bias. Future multicenter, longitudinal studies utilizing independently verified academic records and multivariable models are necessary to clarify the independent determinants of health anxiety.

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