Occurrence and determinants of MSS among health care students in Jeddah, Saudi Arabia

Background: Health anxiety and medically unexplained somatic distress (MSD) are common among medical students and may vary by demographic, academic, and psychosocial factors. This study examined the relationships between health anxiety, MSD, and academic performance across different stages of medical training.

Methods: A cross-sectional study was conducted among 403 medical students using the Short Health Anxiety Inventory (SHAI-18) and standardized MSD measures. Associations with demographic variables, academic year, and grade point average (GPA) were analyzed using comparative statistics and Pearson correlation.

Results: Health anxiety and MSD perception and distress were highest in early academic years and declined significantly with progression through medical training. Female sex, marital status, academic year, and lower academic performance were associated with higher health anxiety, although effect sizes were small. GPA showed very weak negative correlations with SHAI-18 ($r = -0.017$) and MSD scores ($r = -0.158$), indicating limited practical relevance. In contrast, SHAI-18 and MSD scores demonstrated a moderate positive correlation ($r = 0.330$, $p < 0.001$), suggesting a meaningful association between illness-related anxiety and somatic distress.

Conclusion: Health anxiety and MSD symptoms are most pronounced in early years and decline with advancing training, while the strong link between health anxiety and MSD highlights the need for targeted psychological interventions. Early, curriculum-integrated mental health support is recommended to mitigate illness anxiety and somatic distress during medical education.

Keywords: health anxiety; medically unexplained symptoms; somatic distress; medical students; academic performance; SHAI-18; mental health; medical education.

Introduction

Medical students' syndrome (MSS) comprises psychosomatic symptoms arising from students associating their ambiguous symptoms with medical illnesses they have recently studied, whether through textbooks, lectures, or clinical experiences [1].Research in

London has indicated that this issue mostly arises from the substantial demands placed on the ordinary medical student during their preclinical and clinical years. This encompasses extended working hours, tasks, continuous exam preparations, and the competitive atmosphere in which they are engaged [2].

The condition arises when a pupil learns about or examines a certain ailment. The student thereafter begins to believe they are exhibiting symptoms associated with the condition, despite the absence of any underlying pathology [3]. Symptoms encountered may fluctuate as students often alter the ailment they believe they have based on their current clinical rotation[3].

MSS is sometimes conflated with health anxiety, a disorder characterized by excessive concern for one's health[4]. Health anxiety differs from MSS about the temporal perception of the individual's belief in their affliction with the condition. Health anxiety often encompasses the apprehension of contracting a condition in the future, whereas illness anxiety disorder (MSS) pertains to the fear of currently possessing the ailment [3].

Students' academic performance might be adversely affected by Medical Student Syndrome (MSS), a well-known cause of stress throughout undergraduate medical school. As they delve more into medical topics, students frequently start to make sense of intangible or previously unimportant physical feelings in relation to the illnesses they are learning about. An individual may begin to associate even a mild headache with potentially life-threatening disease after studying about brain tumors [5]. Within the context of recently gained medical knowledge, symptoms that were formerly written off as typical psychological or physiological phenomena may take on more importance.

As a result of the feedback loop between increasing clinical knowledge and academic pressure, students are more likely to link common symptoms with underlying medical issues [6]. Identifying and addressing possible sources of stress is vital, as success in medical school depends on more than just academic aptitude. It also requires emotional resilience and certain personality attributes [6].

According to earlier studies, there are two parts to MSS. One part is cognitive, which includes students' thoughts that they may have the illnesses they're learning about. The

other part is distress, which represents the worry that students feel as a result of these thoughts. Although the cognitive component is present at all levels of medical school and tends to get worse as students progress through their training, the distress component is more noticeable in first-year students and gets better as they get older, probably because they gain more experience, knowledge, and emotional maturity [7].

To lessen the effect of MSS, it is essential to prioritize medical students' mental health despite the high levels of academic and psychological stress they endure. Therefore, the purpose of this research was to determine how common MSS complaints were among a sizable group of medical students in Jeddah, Saudi Arabia, and how much of an impact MSS had on their GPA

Methodology

The current cross-sectional study was performed at Jeddah city over six months. Utilizing a cluster sampling approach, all medical colleges in the Jeddahcity were considered as separate clusters. From these, one medical college was randomly selected for detailed study, serving as a representative sample for the larger population. A convenient nonprobability sampling technique was used to collect data for different years of the Medicine Program. Using Epi info Application, the sample size is determined to 384 or more are needed to have a confidence level of 95% based on an estimated prevalence of 50 % with a margin of error of 5%. To cover unexpected non-response rate the sample size was increased to 450.

A self-administered questionnaire was developed to collect data necessary to fulfill the objectives of the research. The questionnaire was disseminated to students by using Google form. The questionnaire included three sections. A self-administered questionnaire with three parts was used to collect the data: demographic information and standardized psychology scales such as Short Health Anxiety Inventory (SHAI) and the Medical Students' Disease (MSD) Perception and Distress Scale were filled out by the participants.

The SHAI is a shorter version of the original Health Anxiety Inventory. It has 18 questions that are meant to measure the severity of disease anxiety condition. Items 1–14 measure

general health-related worry, and Items 15–18 measure fears about serious sickness and death [8]. A 4-point Likert scale goes from 0 (not at all or rarely) to 3 (most of the time), so the total score that can be given is between 0 and 54. Scores above 18 show high levels of health-related anxiety. Scores above 18 show very high levels of health-related anxiety. The SHAI has a strong internal stability among student groups, as shown by Cronbach's alpha values range from 0.87 to 0.95 in previous studies [9].

To measure parts of medical students' health-related worry, the MSD scale was used. It has two subscales: the first five items measure the cognitive (view) component, and the last five items measure the anxiety component [8]. The thinking subscale shows what students think and worry about having the diseases they study, while the distress subscale shows how these thoughts make them feel emotionally anxious. There is a 5-point scale that goes from 1 (definitely fake) to 5 (definitely true). Subscale scores are found by adding up the relevant items. Each component can have a number between 1 and 25, and higher scores mean more cognitive anxiety or worry. Previous study has shown that the MSD scale has good to excellent internal reliability (Cronbach's alpha = 0.78–0.90) [8]. The questionnaire was pilot-tested in this study to make sure it was clear and reliable. The cognitive subscale got a Cronbach's alpha value of 0.84, and the anxiety subscale got a value of 0.72.

Data analysis was performed with IBM SPSS statistical software version 25. All continuous data were expressed as mean ± standard deviation, and categorical data were represented as frequencies and percentages. Independent sample t-tests were employed to analyze the difference scores between the two groups, specifically comparing illness anxiety disorder (IAD) symptoms, MSD perception, and distress among medical and nursing students. The Chi-square test was employed to analyze the proportions of high and low SHAI scores among medical students. One-way ANOVA was employed to analyze the differences in IAD symptoms, MSD perception, and distress among students categorized by their years of study. The group scores of each student were compared according to their replies to the additional questions utilizing independent t-tests. The significance level for all analyses was established at a P-value of 5%. The research was executed in accordance with the approval from the Institutional Research Review Board (IRRB) of the college in Saudi Arabia. A p-value below 0.05 was deemed significant.

Results

Demographics

In this study, 403 out of 450 questionnaires were filled out and examined. Figure 1 illustrates the demographic and academic profile of the study participants. Females constituted a greater proportion of the sample than males (58.3% vs. 41.7%), and the majority of students were Saudi nationals (91.3%), indicating a largely homogeneous nationality distribution. Most respondents were single (76.7%), while less than one quarter were married (23.3%). With respect to age, the sample was predominantly composed of students aged 20–24 years (60.3%), followed by those aged 25–29 years (24.1%), whereas younger students aged 15–19 years represented the smallest group (15.6%).

Regarding medical and familial background, only a small proportion of participants reported a positive family history of illness (7.4%), while the vast majority reported none (92.6%). Academically, over half of the students were in the pre-clinical years (2nd–3rd year; 59.3%), with smaller proportions in the clinical years, including 5th–6th year students (22.1%) and 4th-year students (18.6%). Academic performance was generally high, as most students reported achieving Grade A (58.3%), followed by Grades B (18.4%) and C (15.6%), while Grade D was least frequent (7.7%). Collectively, these findings indicate that the study population was predominantly young, single, Saudi, and academically high-performing, with relatively limited representation of students with lower grades or a family history of illness.

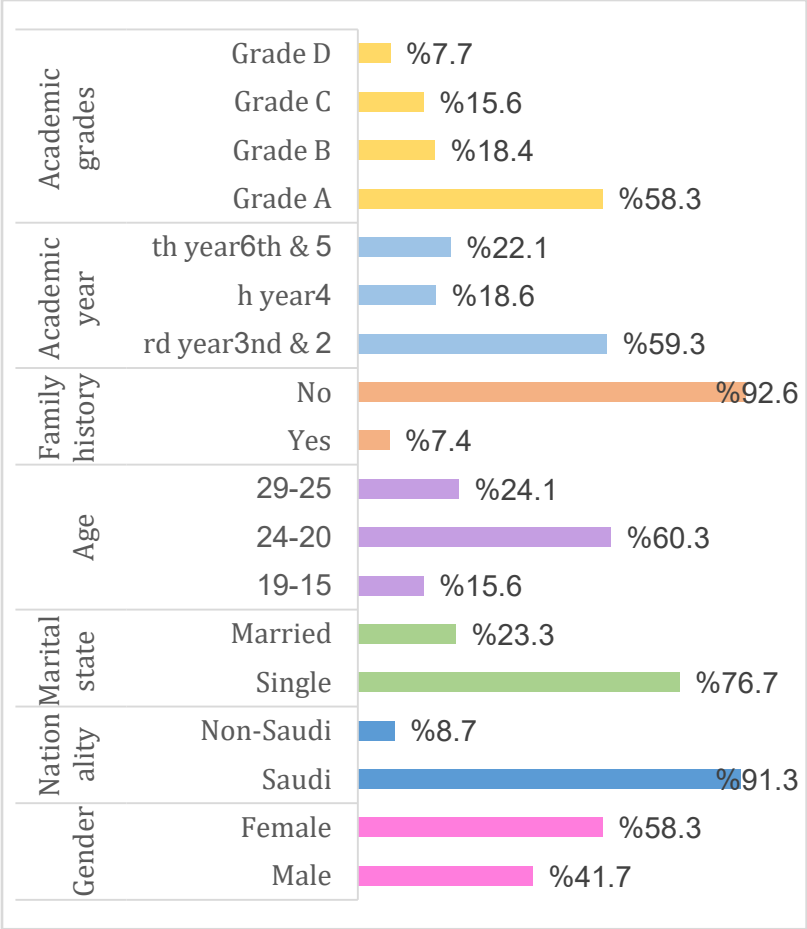

Figure 1: Demographic factors of the participants

Health anxiety levels differed significantly according to several demographic and academic factors. Female students had a higher proportion of high SHAI scores compared with males (34.9% vs. 21.4%, p = 0.03). Marital status was also significantly associated with health anxiety, with married students more frequently reporting high SHAI scores than single students (64.9% vs. 19.4%, p = 0.02). Academic year showed a significant relationship, as higher health anxiety was more prevalent among 4th-year students (36.0%) compared with those in 2nd–3rd years (29.7%) and 5th–6th years (27.0%) (p = 0.02). Academic performance was likewise associated with health anxiety, with students achieving lower grades exhibiting a higher proportion of elevated SHAI scores (p = 0.03). In contrast, age group, nationality, and family history of illness were not significantly related to health anxiety levels (p > 0.05). (Table 1)

Table 1: Association Between Demographic Characteristics and Health Anxiety Inventory Scores

	Health anxiety inventory score				
	SHAI<18 (Low)	**%**	**SHAI>18 (High)**	**%**	**p-value**
Gender					
Male	132	78.6%	36	21.4%	0.03*
Female	153	65.1%	82	34.9%	
Age					
15-19	41	65.1%	22	34.9%	
20-24	147	60.5%	96	39.5%	0.71
25-29	67	69.1%	30	30.9%	
Nationality					
Saudi	297	80.7%	71	19.3%	0.89
Non-Saudi	27	77.1%	8	22.9%	
Marital Status					
Married	33	35.1%	61	64.9%	0.02*
Single	249	80.6%	60	19.4%	
Family history					
Yes	11	36.7%	19	63.3%	0.98
No	268	71.8%	105	28.2%	
Academic year					
2nd & 3rd year	168	70.3%	71	29.7%	
4h year	48	64.0%	27	36.0%	0.02*
5th & 6th year	65	73.0%	24	27.0%	
Academic grades					
Grade A	199	84.7%	36	15.3%	
Grade B	58	78.4%	16	21.6%	0.03*
Grade C	41	65.1%	22	34.9%	

Grade D	23	74.2%	8	25.8%

*. Significant at the 0.05 level (2-tailed)

Table 2: Comparison of Health Anxiety and Medical Students' Disease Scores by Academic Year

	All	2nd year	3rd year	4h year	5th year	6th year	p-value
n	403	126	113	75	51	38	
SHAI, Mean (SD)	11.94(6.21)	12.99(6.34)	12.95(6.47)	11.86(6.08)	11.37(5.68)	10.54(5.33)	0.002
MSD Perception Scale, Mean (SD)	15.13(4.18)	15.34(4.49)	14.64 (4.08)	14.59(4.17)	14.34(3.88)	14.12(3.79)	0.001
MSD Distress Scale, Mean (SD)	13.71(4.44)	13.46(4.23)	13.98(4.11)	13.69(4.32)	13.01(4.01)	12.87(3.88)	0.031

Abbreviations: SHAI=Short Health Anxiety Inventory; MSD= Medical Students' Disease; *One-way ANOVA test.

Among 403 students, SHAI scores differed significantly across academic years, with higher levels in the 2nd (12.99 ± 6.34) and 3rd years (12.95 ± 6.47) and a progressive decline to the 6th year (10.54 ± 5.33) (p = 0.002). MSD Perception scores also decreased significantly with advancing year, from 15.34 ± 4.49 in 2nd year to 14.12 ± 3.79 in 6th year (p = 0.001). MSD Distress scores showed a similar but less pronounced downward trend, peaking in 3rd year (13.98 ± 4.11) and reaching the lowest levels in 6th year (12.87 ± 3.88) (p = 0.031). These findings indicate reduced health anxiety and MSD-related perception and distress with progression through medical training. (Table 2)

Table 3: Pearson Correlations Among GPA, SHAI-18 Scores, and MSD Scores

		GPA	SHAI -18 Score	MSD Score
GPA	Pearson Correlation	1	-0.017*	-0.158*
	Sig. (2-tailed)		0.026	0.041
	N	403	403	403
SHAI -18 Score	Pearson Correlation	-0.017*	1	.330**
	Sig. (2-tailed)	0.026		0
	N	403	403	403
MSD Score	Pearson Correlation	-0.158*	.330**	1
	Sig. (2-tailed)	0.041	0	
	N	403	403	403
*. Correlation is significant at the 0.05 level (2-tailed)				
**. Correlation is significant at the 0.01 level (2-tailed)				

Pearson correlation analyses were conducted to examine the relationships among GPA, SHAI-18 scores, and MSD scores in a sample of 403 participants. GPA showed a very weak but statistically significant negative correlation with SHAI-18 scores ($r = -0.017$, $p = 0.026$) and a weak negative correlation with MSD scores ($r = -0.158$, $p = 0.041$). In contrast, SHAI-18 scores were moderately and positively correlated with MSD scores ($r = 0.330$, $p < 0.001$). Although the associations between GPA and both psychological measures reached statistical significance, their magnitudes were small, indicating limited practical relevance. The relationship between SHAI-18 and MSD scores, however, demonstrated a stronger and more meaningful association(Table 3).

Discussion

The purpose of this study was to shed light on a significant but often overlooked issue among medical students worldwide: hypochondriasis, a mental disorder that falls under the category of somatoform disorders, in which people falsely believe they have serious illnesses or suffer from an extreme fear of getting sick as a result of misinterpreting physical symptoms for a period of six months or longer [10]. In this study, 24.7% of medical

students in Jeddah city of Saudi Arabia were found to have illness anxiety disorder based on HAI-18 results. Another survey among Saudi Arabian medical students in Western and Riyad region of Saudi Arabia revealed a prevalence of 17% & 22.3%[11, 7]. On the other hand, Al-Turki Y et al. discovered that 3.4% of medical students at King Saud University had hypochondria'.

The prevalence observed in the present study exceeds that reported in several previous investigations. For example, medical student MSS prevalence has been documented at 16% in Iran [11], 11.9% in Pakistan [12], and 8.3% in the United States [13]. Earlier work has suggested that medical students may be particularly susceptible to MSS and related anxiety disorders [15], although other studies have failed to demonstrate consistently higher health anxiety among medical students compared with non-medical peers [16]. In this cohort, anxiety and depression were the most prevalent mental health conditions, affecting 83.9% and 73.6% of students, respectively. While these rates are higher than those reported in comparable populations—ranging from 43.7% to 69% for anxiety and from 19.5% to 35.1% for depression in prior studies [17]—the overall pattern aligns with existing evidence that affective symptoms represent a substantial burden among medical students.

The observed demographic and academic differences in health anxiety are consistent with evidence that female students report higher anxiety-related symptoms than males [18,19]. The association between lower academic performance and elevated health anxiety accords with prior studies demonstrating an inverse relationship between SHAI scores and academic outcomes, indicating potential adverse effects of anxiety on learning [20]. Although some studies, particularly among medical students, have reported no association between year of study and health anxiety [21], the higher prevalence in specific academic years in this study may reflect curriculum-related stress and transitional demands [22]. The significant association with marital status suggests that social context and role-related responsibilities may influence anxiety, despite limited investigation of this factor in existing research [23]. Conversely, the lack of association with age, nationality, and family history aligns with reports that demographic variables beyond gender and academic factors have limited predictive value for health anxiety [19].

The progressive decline in SHAI scores and MSD-related perception and distress across academic years in this cohort suggests that health anxiety and somatic concern diminish as students advance through medical training, likely reflecting increasing clinical exposure, diagnostic confidence, and adaptive coping skills. Recent multi-institutional studies have similarly reported higher health anxiety and illness-related worry in pre-clinical students, with attenuation during clinical years as experiential learning and professional identity formation increase tolerance of uncertainty and reduce symptom misinterpretation [24-26]. Longitudinal evidence further indicates that early-year medical students are more vulnerable to anxiety driven by curricular transitions, heavy assessment loads, and limited patient contact, whereas senior students benefit from habituation to clinical environments and more realistic appraisals of bodily sensations [27-28]. The parallel reduction observed in MSD Perception and Distress aligns with contemporary research linking health anxiety to heightened symptom monitoring and catastrophizing, which tends to abate with repeated clinical exposure and improved metacognitive regulation [29-30]. Nevertheless, the persistence of non-trivial MSD Distress even in later years echoes findings that clinical workload, sleep deprivation, and exposure to severe illness can sustain somatic distress despite reduced illness preoccupation [31]. Educational interventions emphasizing cognitive-behavioral skills, uncertainty management, and reflective practice have shown promise in accelerating this adaptive trajectory and mitigating early-year vulnerability [32]. Collectively, these data support a developmental model in which health anxiety and MSD-related concerns are most pronounced in the pre-clinical phase and progressively decline with training, underscoring the importance of targeted mental health support in earlier years of medical education [33].

The present findings indicate that academic performance bears only a minimal relationship to students' psychological burden: GPA was very weakly and negatively correlated with both health anxiety (SHAI-18) and MSD scores, suggesting that although statistically detectable in a large sample, these associations have limited practical significance. This pattern is consistent with recent literature showing that academic grades are poor proxies for mental well-being, with anxiety and somatic complaints influenced more by cognitive styles, perceived stress, and learning environment than by objective achievement alone

[25,27,29]. Contemporary studies in medical and health-science cohorts similarly report that high-performing students are not necessarily protected from anxiety or symptom distress, while modest academic difficulties do not reliably predict clinically meaningful psychological impairment [25,31]. These results underscore the importance of interpreting statistically significant correlations cautiously and prioritizing effect sizes when considering the educational implications of mental health screening.

In contrast, the moderate positive correlation between SHAI-18 and MSD scores highlights a more robust and clinically meaningful link between health anxiety and symptom perception/distress. This finding accords with current models positing that health anxiety amplifies attentional focus on bodily sensations, increases catastrophic interpretation, and thereby elevates both perceived symptom severity and associated distress [29,30]. Recent network and longitudinal analyses further demonstrate that health anxiety and somatic distress mutually reinforce one another over time, independent of academic outcomes, suggesting a shared cognitive–affective mechanism rather than an achievement-driven pathway [30,33]. Taken together, the present results suggest that interventions in student populations may be more impactful if they target maladaptive illness beliefs, symptom monitoring, and coping with uncertainty, rather than focusing narrowly on academic performance, which appears only weakly related to psychological symptom burden.

Conclusion.

Across analyses, health anxiety and MSD-related perception and distress were influenced more by training stage and psychosocial processes than by demographics or academic performance. Symptoms were most pronounced in early years and declined with progression through medical training, likely reflecting increasing clinical exposure and adaptive coping. Although some demographic and academic factors were associated with health anxiety, effects were small, and GPA showed only weak correlations with SHAI-18 and MSD scores. In contrast, the moderate and consistent association between health anxiety and MSD underscores a clinically meaningful link between illness-related anxiety and somatic distress.

Recommendations.

Interventions should prioritize early identification and targeted support in pre-clinical and early clinical years. Curriculum-integrated, CBT-informed strategies, reflective practice, and resilience training, alongside accessible counseling services, are recommended to address maladaptive illness beliefs, excessive symptom monitoring, and uncertainty intolerance. Given the limited relevance of GPA, screening should not be restricted by academic performance. Future longitudinal research should clarify causal pathways, assess the effectiveness of embedded mental health interventions, and examine contextual factors such as workload, assessment structure, and clinical exposure to guide evidence-based student well-being policies.

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