



مجلة جامعة سبها للعلوم الطبية
Sebha University Journal of Medical Sciences

Journal homepage: www.sebhau.edu.ly/journal/joms



Medical Student Syndrome and Health Anxiety Among Medical and Non-Medical Students: A Comparative Cross-Sectional Study at Misurata University

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Keywords:

Medical student syndrome
Health anxiety
Hypochondriasis
Illness perception
Medical education
Libya

ABSTRACT

Background: “Medical student syndrome” (MSS) describes the tendency of medical trainees to perceive in themselves the symptoms of the diseases they study; whether it reflects benign cognitive awareness or pathological health anxiety remains debated. This study aimed to compare disease perception, disease distress, health anxiety, health concern, self-rated health and physician consultations between medical and law students at Misurata University, Libya. **Methods:** A comparative cross-sectional study was conducted between October 2023 and March 2024 using convenience sampling and an online questionnaire ($N = 348$; 224 medical and 124 law students). The validated Arabic questionnaire comprised the Medical Students’ Disease Perception (MSD-Perception) and Distress (MSD-Distress) scales, the Whiteley Index, the Health Concern Scale (HCS), a 1–10 self-rated health score and 12-month physician consultations. Data were analysed with Mann–Whitney U and Kruskal–Wallis H tests and multivariable ordinary least squares (OLS) regression adjusted for age, sex and economic status. **Results:** Medical students had higher MSD-Perception scores than law students (12.65 ± 4.42 vs. 11.39 ± 4.01 ; $U = 12,082.5$, $p = 0.029$; Cohen’s $d = 0.29$), and medical enrolment remained an independent predictor after adjustment ($\beta = 1.12$, 95% CI 0.15–2.09, $p = 0.024$). No significant differences were found in MSD-Distress, Whiteley Index, HCS, self-rated health or physician visits. Clinical-stage medical students reported higher HCS (39.92 ± 14.70 vs. 35.68 ± 14.76 ; $p = 0.047$) and self-rated health (7.57 ± 1.84 vs. 6.96 ± 2.13 ; $p = 0.040$) scores than pre-clinical students. **Conclusions:** Medical students show heightened cognitive perception of disease symptoms without increased emotional distress, health anxiety or healthcare use. In this setting, MSS appears to be a benign educational adaptation rather than a pathological hypochondriacal disorder.

متلازمة طالب الطب والقلق الصحي لدى طلبة الكليات الطبية وغير الطبية: دراسة مقطعية مقارنة في جامعة مصراتة

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المصطلحات المفتاحية:	الملخص
متلازمة طالب الطب	الخلفية: تصف «متلازمة طالب الطب» ميل طلبة الطب إلى استشعار أعراض الأمراض التي يدرسونها في أنفسهم، ولا يزال الجدل قائماً حول ما إذا كانت تعكس وعياً معرفياً حميداً بالمرض أم قلقاً صحياً مريضاً. هدفت هذه الدراسة إلى مقارنة إدراك المرض، والضيق الانفعالي المرتبط به، والقلق الصحي، والاهتمام بالصحة، والتقييم الذاتي للصحة، وعدد مرات استشارة الطبيب بين طلبة كليتي الطب والقانون بجامعة مصراتة، ليبيا.
القلق الصحي	الطرائق: أجريت دراسة مقطعية مقارنة خلال المدة من أكتوبر 2023 إلى مارس 2024 باستخدام عينة ملائمة واستبانة إلكترونية ($n = 348$): منهم 224 طالباً من كلية الطب و124 طالباً من كلية القانون. اشتملت
توهم المرض (المراق)	
إدراك المرض	
التعليم الطبي	
ليبيا	

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Article History : Received 09 July 2026 - Received in revised form 25 September 2026 - Accepted 01 October 2026

الاستبانة العربية المُجَمَّعة على مقياس إدراك المرض (MSD-Perception) والضييق المرتبط بالمرض (MSD-) لدى طلبة الطب، ومؤشر وايتلي (Whiteley Index)، ومقياس الاهتمام بالصحة (HCS)، والتقييم الذاتي للصحة على مقياس من 1 إلى 10، وعدد زيارات الطبيب خلال الاثني عشر شهرًا السابقة. خُلِّت البيانات باستخدام اختباري مان-ويتني (U) وكروسكال-واليس (H)، وتحليل الانحدار الخطي المتعدد بطريقة المربعات الصغرى الاعتيادية (OLS) مع ضبط العمر والجنس والمستوى الاقتصادي. النتائج: سجَّل طلبة الطب درجات أعلى في مقياس إدراك المرض مقارنةً بطلبة القانون (4.42 ± 12.65 مقابل 4.01 ± 11.39 ؛ $U = 12,082.5$ ؛ $p = 0.029$ ؛ d لكوهين = 0.29)، وظلَّ الالتحاق بكلية الطب منبًًا مستقلًا بإدراك المرض بعد الضبط ($\beta = 1.12$ ، فترة ثقة 95%: 0.09–2.09، $p = 0.024$). ولم تُرصد فروق دالة إحصائية في الضيق المرتبط بالمرض، أو مؤشر وايتلي، أو مقياس الاهتمام بالصحة، أو التقييم الذاتي للصحة، أو عدد زيارات الطبيب. كما سجَّل طلبة المرحلة السريرية درجات أعلى من طلبة المرحلة ما قبل السريرية في مقياس الاهتمام بالصحة (39.92 ± 14.70 مقابل 35.68 ± 14.76 ؛ $p = 0.047$) وفي التقييم الذاتي للصحة (7.57 ± 1.84 مقابل 6.96 ± 2.13 ؛ $p = 0.040$). الاستنتاجات: يُظهر طلبة الطب إدراكًا معرفيًا أعلى لأعراض الأمراض دون زيادة في الضيق الانفعالي أو القلق الصحي أو استخدام الخدمات الصحية، مما يشير إلى أن متلازمة طالب الطب في هذا السياق تمثل تكيّفًا تعليميًا حميدًا، لا اضطرابًا مرضيًا من نوع توهّم المرض.

1. Introduction

“Medical student syndrome” (MSS)—historically termed “medical students’ disease” or “nosophobia”—is commonly described as the tendency for medical trainees to experience temporary hypochondriacal worries and perceive somatic symptoms corresponding to the pathologies they are actively studying [1]. The rigorous nature of medical education, characterized by extensive memorization of clinical signs, intense academic competition, exam-related stress, and immersive patient care exposure, is thought to heighten students’ internal bodily awareness [1,2]. Consequently, normal physiological sensations or transient minor ailments may be selectively attended to and cognitively matched against newly acquired diagnostic knowledge [1,3].

From a modern psychiatric standpoint, it is essential to distinguish MSS as an educational or cognitive phenomenon rather than a formal, diagnostic clinical entity [4,5]. In the American Psychiatric Association’s *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5), traditional hypochondriasis has been reclassified into Illness Anxiety Disorder (IAD) and Somatic Symptom Disorder (SSD) [6]. While IAD is characterized by persistent, debilitating health fears without significant physical symptoms and SSD involves distressing bodily symptoms accompanied by disproportionate thoughts and high healthcare utilization, MSS typically lacks these severe, chronic functional impairments [5,6]. Early descriptive investigations, such as that by Woods et al. [2], asserted that as many as 70% to 80% of medical students develop MSS during their training. Subsequent research by Howes and Salkovskis [3] emphasized that heightened health anxiety in medical students could potentially lead to reassurance-seeking behaviors and medical consultations.

To establish whether MSS is specific to medical curricula or merely reflects general undergraduate academic stress, researchers began incorporating non-medical student control groups [4,7]. Law students represent an ideal control benchmark because law school involves parallel levels of academic pressure, high workloads, competitive grading, and prolonged study hours, while lacking formal exposure to clinical medical literature [4,7]. In a landmark comparative investigation, Moss-Morris and Petrie [4] proposed that MSS is composed of two distinct components: a *cognitive/perceptual component* (symptom attention and illness matching) and an *emotional/affective component* (disease distress and anxiety). Their findings demonstrated that while medical students had elevated disease perception compared to law students, their emotional distress levels did not differ significantly [4].

Conversely, several recent empirical studies have cast doubt on the premise that medical students suffer from pathologically higher health anxiety or greater healthcare-seeking behavior than their non-medical peers [7–9]. Waterman and Weinman [7] evaluated London

university students and failed to support the hypothesis that medical students seek medical advice more frequently for hypochondriacal concerns. Studies from Taif University, Saudi Arabia [8], and Menoufia University, Egypt [9], further highlighted complex nuances, showing that while medical students reported greater illness-related fears, non-medical students exhibited comparable or even higher rates of physician visits.

In the North African academic landscape, higher education stress is known to profoundly impact student physiological and psychological well-being [10]. As demonstrated recently by Ahmed et al. [10], university student stress in Libya is significantly associated with health-related behaviors, somatic vulnerability, and disease prevalence. However, data specifically evaluating whether medical education in Libya selectively drives hypochondriacal health anxiety or excessive physician consultation rates remain sparse.

Therefore, this study aimed to evaluate and compare symptom perception, emotional disease distress, hypochondriacal anxiety, general health concern, self-rated general health, and physician consultation frequency between undergraduate medical students and law students at Misurata University, Libya. We hypothesized that medical students would exhibit higher cognitive symptom perception due to domain-specific knowledge exposure, but would not differ from law students in clinical health anxiety, emotional distress, or healthcare consultation rates.

2. Materials and Methods

2.1. Study design and setting

A comparative cross-sectional study was conducted between October 2023 and March 2024 at Misurata University, a prominent public institution located in Misurata, Libya. The study targeted undergraduate students enrolled in the Faculty of Medicine and the Faculty of Law.

2.2. Population, sampling frame and selection criteria

The target population comprised all active undergraduate students registered at the Faculty of Medicine (Years 1 to 5, plus the compulsory internship year) and the Faculty of Law (Semesters 1 to 8). Inclusion criteria were active enrollment status in either faculty during the 2023–2024 academic year and voluntary digital informed consent. Exclusion criteria included incomplete questionnaire submissions or refusal to participate.

Recruitment was executed using a convenience sampling approach via official student social media channels (Facebook groups and Telegram channels) associated with both faculties. An electronic survey link (Google Forms) was distributed. Participation was entirely voluntary and anonymous. To prevent duplicate

submissions, Google Forms settings restricted responses to one per authenticated Google account, and IP addresses were logged automatically to screen for multiple entries.

2.3. Sample size determination

The sample size was calculated prior to data collection using the Raosoft online sample size calculator. Based on an estimated total combined student population of approximately 3,500 students across both faculties, an assumed response proportion of 50%, a 95% confidence level, and a 5% margin of error, the required minimum sample size was determined to be 334 participants. To account for potential non-response or invalid entries, sampling was maintained until 348 complete, validated responses were secured (224 medical students and 124 law students), successfully exceeding the calculated sample threshold.

2.4. Study instruments and conceptual framework

The structured questionnaire incorporated demographic items (age, sex, faculty, academic year, self-reported economic status) and six standardized, validated psychometric domains (Fig. 1):

Medical Students' Disease Perception Scale (MSD-Perception):

A 5-item scale adapted from Moss-Morris and Petrie [4] measuring

the cognitive experience of symptom–disease matching and illness attention (score range: 5 to 25).

Medical Students' Disease Distress Scale (MSD-Distress): A 5-item scale adapted from Moss-Morris and Petrie [4] assessing emotional worry, fear, and distress triggered by learning about illnesses (score range: 5 to 25).

Whiteley Index: A 7-item shortened version of the classic Whiteley Index measuring hypochondriacal attitudes, illness conviction, and somatic pre-occupation (score range: 7 to 35) [3,11].

Health Concern Scale (HCS): A 10-item scale evaluating general worries about physical health, metabolic risks, dietary intake (fat, cholesterol, sugar, salt), and hypertension (score range: 10 to 50) [4,7].

Self-Rated Health Score: A single-item visual/numeric rating scale where participants rate their general physical health on a scale from 1 ("Very Poor") to 10 ("Excellent"). Higher scores indicate superior perceived health status.

Physician Consultation Frequency: A self-reported continuous metric recording the total number of times the student consulted a medical doctor/physician in the preceding 12 months.

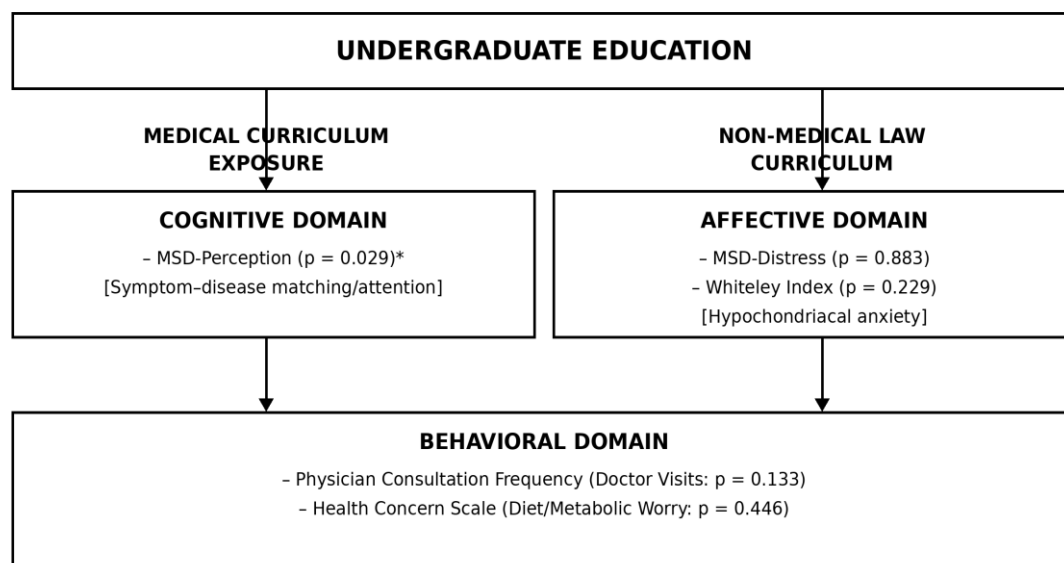


Fig. 1. Conceptual framework linking undergraduate curriculum exposure with cognitive, affective and behavioural domains.

2.5. Translation, validation and psychometric evaluation

Because Arabic is the native language of the study population, the questionnaire underwent standard forward–backward translation protocols. Two independent bilingual community medicine specialists performed the forward translation from English into Modern Standard Arabic. A native English speaker fluent in Arabic who was blinded to the study objectives executed the back-translation. Content validity was evaluated and confirmed by a panel of senior academic epidemiologists.

The translated Arabic draft was pilot-tested on 20 undergraduate students (10 medical, 10 law; excluded from final statistical analysis) to confirm cognitive item clarity and readability. Internal consistency reliability was calculated using Cronbach's alpha across all survey domains, yielding high reliability coefficients ranging from $\alpha = 0.813$ to $\alpha = 0.930$. Item–domain Pearson correlations confirmed robust internal consistency, with all individual items correlating significantly with their respective overall domain score ($p < 0.01$).

2.6. Ethical approval

The study protocol was reviewed and granted formal administrative consent by the Deanships of the Faculty of Medicine and Faculty of Law at Misurata University. The investigation was conducted in full

compliance with the ethical principles outlined in the Declaration of Helsinki. Digital informed consent was mandatory prior to survey entry. Confidentiality and data anonymity were rigorously maintained; no personal identifiers (such as names, student ID numbers, or contact details) were collected. Participation was entirely voluntary, with participants retaining the right to withdraw at any stage prior to form submission without penalty.

2.7. Statistical analysis

Data entry and statistical computations were conducted using IBM SPSS Statistics, version 26.0 (IBM Corp., Armonk, NY, USA). Shapiro–Wilk tests demonstrated non-normal distributions across several continuous scale metrics; hence, non-parametric analytical methods were primarily employed. Continuous data are presented as both mean $\pm$ standard deviation (SD) and median with interquartile range (IQR: 25th–75th percentiles). Categorical variables are reported as frequencies and percentages.

Between-group comparisons (medical vs. law students; pre-clinical vs. clinical medical students) were conducted using two-tailed independent-samples Mann–Whitney U tests. Effect sizes for Mann–Whitney tests were quantified using rank-biserial correlation coefficients ($r = 1 - 2U/(n_1n_2)$) and Cohen's d . Multivariable

ordinary least squares (OLS) linear regression models were constructed for the primary outcome (MSD-Perception) and secondary outcomes to adjust for potential baseline confounders, including age, sex, and economic status, reporting unstandardized beta coefficients (β), standard errors, 95% confidence intervals (95% CI), and exact p values. Comparisons across economic status categories were evaluated using independent-samples Kruskal–Wallis H tests, with post-hoc pairwise comparisons executed via Dunn’s test applying Bonferroni adjustments. To control for multiple testing across secondary outcomes, Benjamini–Hochberg false discovery rate procedures were evaluated. Statistical significance was established at two-sided $p \leq 0.05$.

Table 1. Sociodemographic characteristics of participants ($N = 348$).

Characteristic	Medical students ($n = 224$)	Law students ($n = 124$)	Total sample ($N = 348$)
Age, years, mean (SD)	22.22 (2.98)	20.86 (2.20)	21.73 (2.80)
Sex, n (%)			
Male	42 (18.8)	32 (25.8)	74 (21.3)
Female	182 (81.2)	92 (74.2)	274 (78.7)
Economic status, n (%)			
Very good	19 (8.5)	14 (11.3)	33 (9.5)
Fairly good	89 (39.7)	58 (46.8)	147 (42.2)
Average	107 (47.8)	46 (37.1)	153 (44.0)
Below average	9 (4.0)	6 (4.8)	15 (4.3)
Academic stage (medical only), n (%)			
Pre-clinical (Years 1–3)	131 (58.5)	—	—
Clinical (Years 4–5 and internship)	93 (41.5)	—	—

SD, standard deviation; —, not applicable. Percentages are column percentages.

3.2. Primary and secondary comparisons between medical and law students

Statistical analysis revealed a selective difference in the cognitive domain of disease perception. Medical students scored significantly higher on the MSD-Perception scale (mean 12.65 ± 4.42 , median 13.00 [IQR 6.00]) than law students (mean 11.39 ± 4.01 , median 11.00 [IQR 6.00]; Mann–Whitney $U = 12,082.5$, $p = 0.029$, rank-biserial $r = 0.117$, Cohen’s $d = 0.29$).

In contrast, all other secondary outcome domains demonstrated no statistically significant differences between faculties. MSD-Distress scores were similar between medical students (11.03 ± 5.24) and law

Table 2. MSD scores, health anxiety scales and health attitudes by faculty group.

Scale / outcome	Medical students ($n = 224$) Mean (SD) Median (IQR)	Law students ($n = 124$) Mean (SD) Median (IQR)	Mann–Whitney U	p value	Effect (Cohen’s d)	size
MSD-Perception	12.65 (4.42) 13.00 (6.00)	11.39 (4.01) 11.00 (6.00)	12,082.5	0.029*	0.29	
MSD-Distress	11.03 (5.24) 11.00 (7.00)	11.35 (5.96) 11.00 (8.00)	13,760.0	0.883	–0.06	
Whiteley Index	16.40 (5.53) 16.00 (7.00)	17.76 (7.10) 17.00 (9.00)	12,891.0	0.229	–0.22	
Health Concern Scale	37.44 (14.85) 36.00 (21.00)	36.44 (15.23) 34.00 (22.00)	13,293.0	0.446	0.07	
Self-rated health	7.21 (2.03) 7.50 (3.00)	7.27 (2.15) 7.00 (3.00)	13,541.0	0.689	–0.03	
Doctor visits (12 months)	2.76 (3.55) 2.00 (3.00)	3.66 (4.80) 2.00 (4.00)	12,680.5	0.133	–0.22	

MSD, medical students’ disease; SD, standard deviation; IQR, interquartile range. p values from two-tailed Mann–Whitney U tests; * statistically significant at $p \leq 0.05$. Higher scores on MSD-Perception, MSD-Distress, Whiteley Index and Health Concern Scale reflect higher disease perception/anxiety; higher Self-rated health scores indicate better perceived general health.

3.3. Multivariable adjusted regression analysis

To control for baseline differences in age, sex, and socioeconomic background, a multivariable OLS linear regression model was executed predicting the primary outcome, MSD-Perception. Enrollment in the Faculty of Medicine remained an independent positive predictor of MSD-Perception ($\beta = 1.12$, 95% CI 0.15–2.09, $t = 2.26$, $p = 0.024$). Female sex was also independently associated with higher perception scores ($\beta = 1.47$, 95% CI 0.34–2.59, $p = 0.011$), as was reporting a “Below Average” economic status relative to “Very Good” ($\beta = 4.12$, 95% CI 1.50–6.73, $p = 0.002$). Age was not a significant predictor ($\beta = 0.02$, $p = 0.833$).

3.4. Subgroup analysis: pre-clinical vs. clinical stage medical students

A subgroup comparison was performed within the medical cohort

3. Results

3.1. Sociodemographic profile

A total of $N = 348$ students completed the survey, including 224 medical students (64.4%) and 124 law students (35.6%). Medical students were significantly older on average (mean 22.22 ± 2.98 years) than law students (mean 20.86 ± 2.20 years; $p < 0.001$). Female students predominated in both cohorts (81.2% in medicine, 74.2% in law). Self-reported economic status distribution was comparable between groups, with the majority categorizing their financial situation as “Fairly Good” or “Average”. Sociodemographic details are summarized in Table 1.

students (11.35 ± 5.96 ; $p = 0.883$). Hypochondriacal anxiety as measured by the Whiteley Index was slightly higher in law students (17.76 ± 7.10 vs. 16.40 ± 5.53), but this trend did not reach statistical significance ($p = 0.229$). Similarly, overall Health Concern Scale scores (37.44 ± 14.85 vs. 36.44 ± 15.23 ; $p = 0.446$) and Self-Rated Health ratings (7.21 ± 2.03 vs. 7.27 ± 2.15 ; $p = 0.689$) were equivalent across groups. Physician consultation rates in the preceding 12 months were numerically higher among law students (3.66 ± 4.80 visits) than medical students (2.76 ± 3.55 visits), though this difference was not statistically significant ($p = 0.133$). Comprehensive comparative statistics are presented in Table 2.

comparing pre-clinical students (Years 1–3, $n = 131$) and clinical students (Years 4–5 and internship, $n = 93$). MSD-Perception scores were nearly identical between stages (12.66 ± 4.41 vs. 12.62 ± 4.45 ; $p = 0.795$). Similarly, MSD-Distress ($p = 0.504$), Whiteley Index ($p = 0.260$), and annual doctor visits ($p = 0.106$) showed no significant variations between academic stages.

However, clinical-stage students scored significantly higher on the Health Concern Scale (mean 39.92 ± 14.70 , median 40.00 [IQR 23.00]) than pre-clinical peers (mean 35.68 ± 14.76 , median 37.00 [IQR 23.50]; $U = 5,141.0$, $p = 0.047$, Cohen’s $d = -0.29$). Concurrently, clinical students also reported significantly higher Self-Rated Health scores (mean 7.57 ± 1.84 , median 8.00 [IQR 2.00]) compared to pre-clinical students (mean 6.96 ± 2.13 , median 7.00 [IQR 3.00]; $U = 5,122.5$, $p = 0.040$, Cohen’s $d = -0.30$).

Table 3. Scale scores by academic stage among medical students (n = 224).

Scale / metric	Pre-clinical stage (n = 131) Mean (SD) Median (IQR)	Clinical stage (n = 93) Mean (SD) Median (IQR)	Mann–Whitney U	p value	Effect (Cohen's d)	size
MSD-Perception	12.66 (4.41) 12.00 (4.50)	12.62 (4.45) 12.00 (6.00)	6,215.5	0.795	0.01	
MSD-Distress	10.69 (4.85) 10.00 (7.00)	11.49 (5.73) 10.00 (8.00)	5,773.5	0.505	−0.15	
Whiteley Index	16.63 (5.33) 16.00 (7.50)	16.09 (5.81) 14.00 (8.00)	6,629.0	0.260	0.10	
Health Concern Scale	35.68 (14.76) 37.00 (23.50)	39.92 (14.70) 40.00 (23.00)	5,141.0	0.047*	−0.29	
Self-rated health	6.96 (2.13) 7.00 (3.00)	7.57 (1.84) 8.00 (2.00)	5,122.5	0.040*	−0.30	
Doctor visits (12 months)	3.04 (3.68) 2.00 (3.00)	2.38 (3.33) 2.00 (3.00)	6,800.5	0.106	0.19	

Pre-clinical stage, Years 1–3; clinical stage, Years 4–5 and internship. MSD, medical students' disease; SD, standard deviation; IQR, interquartile range. p values from two-tailed Mann–Whitney U tests; * statistically significant at $p \leq 0.05$.

3.5. Analysis by economic status and post-hoc comparisons

Independent-samples Kruskal–Wallis H tests revealed significant variations across economic status categories for Self-Rated Health ($H = 18.21$, $p < 0.001$) and Whiteley Index scores ($H = 12.18$, $p = 0.007$). Conversely, economic status was not significantly associated with doctor visits ($p = 0.732$), MSD-Perception ($p = 0.064$), MSD-Distress ($p = 0.213$), or Health Concern Scale ($p = 0.925$).

Post-hoc pairwise comparisons using Dunn's test with Bonferroni correction demonstrated that students in the “Below Average” economic category reported significantly lower Self-Rated Health compared to “Very Good” ($p_{\text{adj}} = 0.001$) and “Fairly Good” ($p_{\text{adj}} = 0.001$) groups. For the Whiteley Index, students in the “Below Average” group exhibited significantly higher hypochondriacal anxiety scores compared to those in the “Fairly Good” category ($p_{\text{adj}} = 0.005$).

4. Discussion

This study evaluated the empirical basis of Medical Student Syndrome (MSS) among undergraduate students at Misurata University, Libya. The principal scientific contribution of our findings lies in the clear dissociation observed between cognitive disease perception and affective health anxiety. Medical students exhibited a statistically significant elevation in cognitive symptom perception (MSD-Perception) compared to non-medical law students [1,4]. However, this perceptual elevation was not accompanied by increased emotional disease distress, heightened clinical hypochondriasis (Whiteley Index), greater general health concern, or an increase in annual physician consultations [1,4,7].

This pattern strongly supports the conceptual model originally proposed by Moss-Morris and Petrie [4], which separates MSS into distinct cognitive and emotional dimensions. Medical education exposes trainees to detailed information regarding organ pathology, symptom complexes, complication occurrence and disease progression [1,2]. This intensive learning process increases selective bodily awareness and leads students to attempt symptom–disease matching when minor, transient physiological sensations occur [1,4]. Crucially, our data reveal that this cognitive matching process remains a benign, non-pathological educational side-effect rather than a clinical manifestation of Illness Anxiety Disorder [5,6]. Because medical students do not exhibit higher rates of doctor visits or emotional distress, labeling MSS as a “pathology” or “syndrome” in a diagnostic sense is misleading [4,7].

When evaluating the magnitude of the difference in MSD-Perception between medical and law students (mean 12.65 vs. 11.39; $\Delta = 1.26$ points), it is important to contextualize statistical significance against clinical relevance [1,4]. The calculated standardized effect size was small (Cohen's $d = 0.29$; rank-biserial $r = 0.117$) [4]. In multivariable linear regression adjusting for age, sex, and economic status, medical enrollment remained a statistically significant predictor ($\beta = 1.12$, $p = 0.024$) [4]. Nevertheless, an average score shift of 1.26 points on a 20-point scale range indicates a modest perceptual shift that does not induce clinical dysfunction or healthcare burden [4,7].

Subgroup comparison within the medical cohort revealed notable trends across academic stages [1,12]. Clinical-stage medical students (Years 4–5 and internship) reported significantly higher general health concern (HCS) and higher self-rated health scores than pre-clinical peers (Years 1–3) [1,12]. This dual finding is clinically consistent. As students advance into ward rotations, direct clinical contact with severe pathologies and chronic disease complications heightens their awareness of preventive metabolic risks (such as dietary fat, cholesterol, salt, and hypertension) evaluated by the Health Concern Scale [4,12]. Concurrently, developing diagnostic skills and clinical health literacy provides personal reassurance, leading clinical students to rate their overall health status more favorably [1,12].

Our findings also illuminate broader socioeconomic determinants of perceived student health [10]. Post-hoc analyses showed that students reporting “Below Average” economic status exhibited lower self-rated general health and higher Whiteley Index hypochondriacal anxiety scores [1,11]. Rather than implying a direct causal mechanism, this exploratory finding underscores that financial stress and economic uncertainty exacerbate somatic vulnerability and health-related worry among university students, consistent with wider epidemiological literature on social determinants of health [10].

The broader academic stress environment in Libyan higher education provides important context for these results [10]. As highlighted by Ahmed et al. [10], university students in Libya experience substantial psychosocial strain that significantly correlates with altered health behaviors and physiological disease indicators. Within this stress-prone environment, the lack of significant differences in doctor visits and hypochondriacal anxiety between medical and law students may also reflect the universal availability of digital health information [7]. In the modern era, “cyberchondria”—unregulated health searching on the internet and social media—exposes non-medical students to alarming medical data, effectively equalizing general health anxiety across academic disciplines [7,8].

4.1. Study limitations

Several methodological limitations should be considered when interpreting these results. First, the observational cross-sectional design precludes establishing causal relationships between medical training and symptom perception. Second, recruitment via digital convenience sampling through online student groups creates potential selection and volunteer biases, as students with greater online activity or health interest may have been more likely to participate. Third, data were gathered via self-reported questionnaires, introducing potential 12-month recall bias, particularly regarding the exact number of physician consultations. Fourth, the study was conducted across two faculties at a single university in Misurata, which may restrict generalizability to other Libyan institutions or international settings. Finally, while multivariable models controlled for key demographics, unmeasured variables such as personal medical history, family illness exposure, and baseline general anxiety disorders were not evaluated.

5. Conclusions

Undergraduate medical students at Misurata University exhibit a significantly higher cognitive perception of disease symptoms compared to non-medical law students. However, this perceptual awareness is not accompanied by heightened emotional distress, hypochondriacal health anxiety, or increased physician consultations. Medical Student Syndrome in this population represents a benign educational adaptation in symptom attention resulting from medical knowledge acquisition rather than a clinical hypochondriacal disorder. Medical educators should reassure incoming trainees that heightened bodily awareness is a normal, non-pathological phase of professional training, while promoting healthy coping strategies to support overall student mental well-being.

Acknowledgements

Not applicable.

Declarations

Author contributions: O.A.: Conceptualization, Methodology, Formal analysis, Writing – original draft, Supervision. A.A.: Investigation, Data curation, Writing – review & editing. F.S.: Investigation, Validation, Writing – review & editing. All authors read and approved the final manuscript.

Funding: Not applicable.

Conflicts of interest: Not applicable.

Ethics approval and consent to participate: The study protocol was reviewed and granted formal administrative approval by the Deanships of the Faculty of Medicine and the Faculty of Law, Misurata University (approval number and date: not applicable). The study was conducted in accordance with the Declaration of Helsinki. Digital informed consent was obtained from all participants before survey entry.

Data availability: Not applicable.

Use of generative AI: Not applicable.

Supplementary material: Appendix A (survey instrumentation and scoring rules, Table A1) is provided at the end of this manuscript.

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Table A1. Survey instrumentation and scoring rules.

Domain / scale	Item phrasing (translated Arabic questionnaire)	Scoring anchor and range
MSD-Perception Scale (5 items)	1. When I experience symptoms, I try to match these symptoms to an illness I have read or heard about. 2. When I hear about an illness, I get symptoms similar to that illness. 3. I find that when I hear about a new illness, I think for a while that I have that illness. 4. When I hear about diseases, I think I have them. 5. When I experience symptoms, I attempt to find out what disease they may be related to.	5-point Likert: 1 = Not at all to 5 = A great deal. Score range: 5–25.
MSD-Distress Scale (5 items)	1. I get concerned when I experience symptoms in case I have a serious illness. 2. When I learn or read about different diseases, I become worried that I may have one of these diseases. 3. I often fear that I may have a serious illness. 4. I find myself worrying that I might have a disease I have just heard or read about. 5. If a disease is brought to my attention, I worry about getting it myself.	5-point Likert: 1 = Not at all to 5 = A great deal. Score range: 5–25.
Whiteley Index (7 items)	In the past 12 months, how much have you been bothered by: 1. Do you worry a lot about your health? 2. Do you find that you are bothered by many different symptoms? 3. Do you often worry about the possibility that you have a serious illness? 4. Do you think there is something seriously wrong with your body? 5. Are you bothered by many different pains and aches? 6. If a disease is brought to your attention, do you worry about getting it yourself? 7. Is it hard for you to believe the doctor when he tells you there is nothing to worry about?	5-point Likert: 1 = Not at all to 5 = A great deal. Score range: 7–35.
Health Concern Scale (10 items)	1. I am concerned about gaining weight. 2. I am concerned about having hypertension. 3. I am concerned about coronary heart disease. 4. I am concerned about the high amount of energy provided by my diet. 5. I am concerned about the high amount of fat provided by my diet. 6. I am concerned about the high amount of cholesterol provided by my diet. 7. I am concerned about the high amount of sugar provided by my diet. 8. I am concerned about the overall caloric balance of my diet. 9. I am concerned that I consume food products that contain chemical additives. 10. I am not concerned about providing a lot of salt with my diet. (<i>Reverse-scored</i>)	7-point Likert: 1 = Definitely no to 7 = Definitely yes. Item 10 reverse-coded (7 = 1, 6 = 2, 5 = 3, 4 = 4, 3 = 5, 2 = 6, 1 = 7). Score range: 10–70.
Self-rated health (1 item)	How do you rate your general physical health status overall?	Numeric rating scale: 1 = Very poor to 10 = Excellent.
Doctor visits (1 item)	How many times have you visited or consulted a medical doctor/physician in the past 12 months for personal health concerns?	Continuous open numerical entry.

MSD, medical students' disease.