

# Medical student syndrome: fact or fiction? A cross-sectional study

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## Abstract

**Objectives:** It is often reported by medical practitioners that medical students develop hypochondriacal concerns and symptoms relating to diseases they are studying, a phenomenon labelled 'medical student syndrome'. However, the evidence that this syndrome exists and particularly that it contributes to an increased number of consultations (as typical hypochondriasis does) is weak. The present study investigates this phenomenon in terms of differences between medical and non-medical students in help-seeking behaviour.

**Design:** Cross-sectional survey.

**Setting:** Three universities in London.

**Participants:** Medical students ( $n=103$ ), non-medical science student controls ( $n=107$ ) and law student controls ( $n=78$ ), all third-year undergraduates, were recruited from within their universities.

**Main outcome measures:** Help-seeking behaviour was measured using the 'Health Anxiety Questionnaire' reassurance-seeking behaviour subscale; the overall number of doctors' visits made for new health complaints since beginning university; a new 'Hypochondriacal and Help-Seeking Behaviour' scoring-system, which asked questions pertaining to not just the number but the nature of consultations, identifying participants who had experienced health concerns that were disproportionate to the diseases diagnosed.

**Results:** No significant differences were found between medical students and either control group in any of the main outcome variables.

**Conclusions:** These findings fail to support the notion that medical students, more so than other students, seek medical advice for hypochondriacal health concerns. They are pertinent to clinicians due to the potentially negative consequences of incorrectly assuming medical students to behave in this way, including cursory evaluations and disintegration of the doctor–patient relationship.

## Keywords

hypochondriasis, medical student syndrome, medical students' disease, health anxiety, help-seeking

## Introduction

It is widely believed that many medical students repeatedly develop fears and symptoms of illness relating to the diseases that they are studying at the

time<sup>1,2</sup> a phenomenon colloquially labelled 'medical student syndrome'. In fact, it is even alluded to in the health psychology courses of many medical schools in UK. Research has indicated that medical school causes students to experience a large amount of psychological pressure due to the work required, the stress of examinations, the anxiety associated with new clinical experiences and the competitive environment.<sup>3,4</sup> This stress is thought to affect symptom detection by enhancing physical sensations through autonomic activation, making individuals more aware of their bodily state,<sup>5</sup> particularly enhancing pain.<sup>6</sup> Another factor unique to medical students is the intensive clinical and preclinical exposure to medical knowledge. It is thought that this knowledge affects symptom perception via the expectations and illness beliefs ('schemata') that arise from it, leading to 'selective attention' to specific bodily sensations and areas.<sup>7</sup> The knowledge is also thought to affect symptom interpretation, by causing medical students to discover how slim the line can be between health and illness and to reconceptualize previously neglected symptoms within the context of newly obtained knowledge.<sup>5</sup> Previous researchers have suggested that this unique combination of stress and clinical knowledge causes medical students, after noticing some harmless bodily dysfunction, to attach unjustified importance and fear to what they have perceived, and that this importance is normally either modelled after a patient they have seen or a clinical story they have heard.<sup>1</sup>

However, this phenomenon has little evidentiary support and the evidence to support that medical student syndrome translates into an increased number of consultations, as typical hypochondriasis does,<sup>8</sup> is particularly weak. Therefore, any notion that clinicians should take medical student syndrome into account when assessing patients who are medical students is currently not supported by the literature. Whilst two small, uncontrolled studies in the 1960s (one of which was based solely on case records) indicated a prevalence of the condition of

between 70% and 80% in medical students,<sup>1,9</sup> two later studies have shown the phenomenon to be no more pronounced in medical students than in non-medical students.<sup>10,11</sup> In fact, two yet more recent studies found health anxiety to be greater in law and English students than in medical students.<sup>12,13</sup> In 2001, Moss-Morris and Petrie<sup>14</sup> concluded that students in their first year of medical school are hyperaware of their bodies and health; however, the authors recruited no Year 1 controls and instead compared Year 1 medical students with Year 3 law students, meaning that this could just be a consequence of beginning university and associated psychological stress. Consequently, it is apparent that there must have been significant methodological differences between these past studies and that the best method of investigating this phenomenon has yet to be established.

Most of these past studies have looked at health anxiety in medical students, but not at whether medical school actually has any effect on medical help-seeking behaviour. Those that did<sup>12,14,15</sup> only investigated the *number* of doctors' visits made by participants without determining the *nature* of those visits, and there are many reasons, other than for symptoms, that a person might go to the doctor. For example, first year students may have reported doctors' visits due to registering with a new General Practitioner (GP) closer to university or due to compulsory health checks prior to commencing medical school. Additionally, those authors did not take into account that medical students may have had more access than non-medical students to the unofficial advice of medical practitioners (from peers, mentors or relatives).

This study aimed to investigate the presence of hypochondriacal concerns in medical students, as the core feature of medical student syndrome. Hypochondriacal concerns are hereby defined as concerns that are groundless: i.e. concerns that are either due to 'imagined' symptoms or due to an undeserved importance being placed on bodily sensations that do not clinically warrant either medical attention or the degree of anxiety that they have provoked; they are also not easily relieved following medical reassurance.<sup>8</sup>

This study used a new scoring-system as opposed to an existing questionnaire, since studies using the Illness Behaviour Questionnaire<sup>16</sup> (the only existing questionnaire to have investigated the help-seeking behaviour of medical students) have been criticized for equating medical complaints with hypochondriasis in the absence of additional information relating their context and whether diagnoses resulted.<sup>17</sup>

## Methods

### Design

This quantitative study employed a cross-sectional, between-subjects survey design. Self-reported questionnaires were used for data collection. Participants were grouped according to subject of study at university, and data were sought pertaining to medical reassurance-seeking behaviour and their consultations with doctors since beginning university. Analytical tests of difference between medical students and non-medical student control groups were employed.

### Participants

Medical students, non-medical science students and law students were recruited for participation from three London universities – Imperial College London, King's College London and University College London. Permission for participant recruitment was obtained from all relevant faculty administrators and lecturers, and participants were approached in student common/study rooms, teaching hospitals, lecture theatres and at home. No payment was offered for participation.

Third-year medical students were chosen for investigation since, at the time of data collection (mid-February 2011), they would have been at university for roughly 2½ years and experienced both preclinical and some clinical teaching (around six months). Furthermore, they would be less likely to have forgotten any health concerns since beginning university than students in older years. Only third-year student controls were included so that participants would all be recalling health concerns at university over the same time period; for this same reason, those who had taken years away from their course were excluded.

Alongside non-medical science students, a law student group was recruited to allow comparisons to be made with previous studies which found law students to be particularly health anxious.<sup>12,13</sup> Biology students were excluded from the control group due to medical content in their courses. Students with other higher education study prior to their current course were excluded, to maintain consistency of education level across groups. In order to maintain consistency of age, an age requirement of 20–23 years was enforced.

### Procedure

Ethical permission was obtained from King's College London. Data were collected over a two-week period

during mid-February 2011. Students were approached by the principal researcher, who explained what was involved without disclosing the purpose of the study. Interested students were handed information sheets and questionnaires, which were completed on-site. During all incidences of data collection, participants were ensured adequate space to complete questionnaires with privacy. Participants were always assured that confidentiality would be maintained (e.g. completed questionnaires were placed into envelopes/folders), particularly when addressing small groups. Participants were always given ample time in which to complete questionnaires: for example, for students approached during lectures, questionnaires and information sheets were distributed at the beginning of a lecture block.

### *Materials: student health questionnaire*

The research instrument employed was the self-designed 'Student Health Questionnaire' (Appendix 1). The questionnaire first asks for basic socio-demographic information (age, gender, ethnicity, university). Screening questions (to double-check conformation to selection criteria) enquire about year of study, university course, previous higher education courses/degrees and any years of the course retaken or absent.

The final page consists of a newly constructed table (the 'Hypochondriacal and Help-Seeking Behaviour (HHSB) Table') in which the participants are asked to describe medical advice sought since beginning university. For each separate health concern, the HHSB table enquires about symptoms experienced, from whom advice was sought and when, and tests/investigations received. Participants are also asked to include medical advice sought from peers, mentors and relatives who are medical students/professionals. In order to identify participants who have recurrently had health concerns that were disproportionate to diagnosed illnesses, the table enquires if they were concerned their symptoms could be due to something serious and, if so, what they thought that could be; they are then asked what diagnosis they actually received. In order to identify the feature of hypochondriasis of patients suffering with the fear that they have a serious illness despite reassurance from medical professionals,<sup>8,18</sup> participants are also asked whether, after a benign diagnosis, they continued to worry that something serious may be wrong.

In order to include the use of a pre-existing standardized scale in the present study, the questionnaire includes a four-point scale containing the three questions from the Health Anxiety Questionnaire (HAQ)<sup>19</sup> which together form the 'reassurance-

seeking behaviour subscale'; these are interspersed with three masking questions (question numbers 1, 2 and 4, which were not included in analysis). The HAQ was selected for its good overall psychometric properties (Cronbach's alpha = 0.92, six-week test-retest  $r = 0.87$ , high discriminative validity in distinguishing DSM-III hypochondriasis from mood/anxiety disorders), its development using non-psychiatric samples and the subscale's brevity and relevance to the present study objectives.

### *Data coding and analysis*

For the purpose of data coding, a 'serious disease' was defined as one for which a GP would usually refer the patient on to a specialist or one that may be life threatening. For each incidence reported in the questionnaire where the participant sought medical advice with concerns of having a 'serious disease', but was diagnosed with a 'non-serious disease', one point was awarded. This was done to identify participants who had health concerns that were disproportionate to the diseases diagnosed (i.e. hypochondriacal concerns). Each time a participant reported not being reassured by a benign diagnosis, one more point was awarded. The total score for each participant was referred to as the 'HHSB score'. Coding was performed by a medical doctor, who was blinded to participants' comparison groups and demographic information. In order to evaluate the inter-rater reliability, 35% of data were re-coded by another doctor (not included in the overall analysis).

Questionnaire data were entered into SPSS (version 19.0). Missing values were excluded pairwise. Levene's test (to check for homogeneity of variance) and Kolmogorov-Smirnov tests with Lilliefors Correction, along with visual methods to check conformation to the normal distribution, were performed on all numerical data: only numerical variables that were approximately normally distributed were analysed using parametric tests. Between-group analysis was performed using Kruskal-Wallis tests for the HHSB score measure and number of doctors' visits, and both a two-way ( $3 \times 2$ ) between-subject analysis of variance (ANOVA) test and an analysis of covariance (ANCOVA) test (with gender as a covariant) for the HAQ-subscale scores.

## **Results**

### *Patient demographics*

In total, 103 medical, 78 law students and 107 non-medical science students (46 Chemistry, 36 Civil

Engineering, nine Geophysics and 16 Materials Science) completed questionnaires.

The age range of participants was 20–23 years, with mean age 20.9 years. No significant differences were found between the groups with regards to age, as measured by date of birth ( $H=0.138$ ,  $df=2$ ,  $p>0.05$ ). Participants in the medicine and law groups consisted of more females (approximately 60%) than males, whereas the science group consisted of more males (approximately 60%) than females. Female participants scored significantly higher on all main outcome variables: HAQ-subscale score ( $t=-2.14$ ,  $df=280$ ,  $p=0.033$ ), HHSB score ( $U=8881.0$ ,  $Z=-2.231$ ,  $p=0.021$ ) and overall number of doctors' visits since beginning university ( $U=7478.5$ ,  $Z=-3.966$ ,  $p<0.0005$ ). Therefore, during hypothesis testing, an ANCOVA was used to analyse the HAQ-subscale scores (with gender as a covariant) and analyses of the latter two variables considered males and females separately. Ethnicity had no significant effect on reassurance-seeking behaviour as measured by HHSB score ( $\chi^2=5.96$ ,  $df=7$ ,  $p>0.05$ ), HAQ-subscale score ( $F(7, 270)=1.14$ ,  $p>0.05$ ) or number of doctors' visits ( $\chi^2=3.71$ ,  $df=7$ ,  $p>0.05$ ).

### Questionnaire reliability

The internal reliability (Cronbach's alpha) of the HAQ-subscale, re-calculated for this study, was 0.57. Item deletions did not vastly improve the alpha value.

Since the coding of perceived and diagnosed diseases into 'serious' and 'non-serious' categories would have been somewhat subjective, a second rater was employed to re-code 99/288 questionnaires, in order to determine the inter-rater reliability. The second rater did not have access to previously coded information. Both were given the same guidelines for coding and calculations revealed that the Intra-Class Correlation Coefficient (Absolute Agreement) = 0.97 (95% CI 0.96–0.98,  $p<0.001$ ).

Calculated using eight students, the mean six-week test–retest reliability of the HAQ-subscale was 94% ( $r=93.7$ ,  $p<0.001$ ). The mean six-week test–retest reliability for HHSB scores was 83% ( $r=0.833$ ,  $p<0.01$ ).

### Health anxiety questionnaire scores

HAQ-subscale scores out of nine were computed for each participant. Between-group HAQ-subscale scores were non-significant when subjected to a two-way ( $3 \times 2$ ) between-subjects ANOVA: the main effect size of university course on HAQ-subscale score was non-significant ( $F(2, 277)=0.634$ ,  $p=0.53$ , partial  $\eta^2=0.005$ ) and there was no significant interaction between university course and gender ( $F(2, 277)=0.713$ ,  $p=0.491$ , partial  $\eta^2=0.005$ ) (see Table 1).

An ANCOVA was performed in order to determine the effect of university course on HAQ-subscale score whilst partialling out the effect of gender (the covariate). There was still no significant effect of

**Table 1.** Descriptive statistics of HAQ-subscale scores by comparison group and gender.

Group		<i>n</i>	Minimum	Maximum	Mean	Std. deviation
Medicine	Total	103	0	9	3.46	2.244
	(Male)	(42)	(0)	(8)	(2.93)	(2.149)
	(Female)	(61)	(0)	(9)	(3.82)	(2.269)
Science	Total	106	0	9	3.10	2.016
	(Male)	(62)	(0)	(9)	(2.97)	(2.024)
	(Female)	(42)	(0)	(9)	(3.29)	(2.003)
Law	Total	77	0	7	3.08	1.735
	(Male)	(28)	(0)	(7)	(2.93)	(1.961)
	(Female)	(48)	(0)	(6)	(3.17)	(1.616)

HAQ: Health Anxiety Questionnaire.

university course on HAQ-subscale score ( $F(2, 279) = 0.918$ ,  $p = 0.40$ ,  $\eta^2 = 0.007$ ). *Post hoc* power analysis demonstrated that a power of 85% was achieved to detect an effect size of 0.197 with a significance level (two-tailed) of 0.05.

### HHSB scores

HHSB scores ranged from 0 to 5 and the mode was 0 for both males and females (see Table 2).

For HHSB score, no significant difference was found by Kruskal–Wallis test between any of the comparison groups for males ( $\chi^2(2, 133) = 0.135$ ,  $p = 0.94$ ) or females ( $\chi^2(2, 152) = 1.151$ ,  $p = 0.56$ ).

### Number of doctors' visits made

For male participants, a significant difference was found by Kruskal–Wallis test between the three groups in the number of doctors' visits made ( $\chi^2(2, 133) = 7.92$ ,  $p < 0.02$ ); however, when *post hoc* Mann–Whitney U tests were performed comparing medical with law students and medical with science students, no significant differences were found (for both,  $p \geq 0.05$ ). Additionally, when doctors' visits for physical injuries (such as sporting injuries) were excluded, Kruskal–Wallis tests showed no significant differences between any of the male groups ( $\chi^2(2, 133) = 4.15$ ,  $p = 0.13$ ).

For female participants, no significant difference was found by Kruskal–Wallis test between the groups ( $\chi^2(2, 152) = 3.51$ ,  $p = 0.17$ ).

## Discussion

These findings fail to support the notion that medical students, more so than other students, seek medical advice for hypochondriacal health concerns.

There are various possible explanations as to why the myth might have persisted. The findings of the two methodologically flawed 1960s studies<sup>1,9</sup> have been misinterpreted and overgeneralized, and consequentially 'selective attention' may have been paid to the phenomenon, reducing the threshold for its

identification and thus perpetuating the myth.<sup>11</sup> Additionally, it is possible that health anxiety in medical students is more conspicuous to the students' doctors/tutors than in other students, perhaps because medical students have a higher degree of contact with tutors on placement and so anxieties are more likely to be mentioned in casual conversation.<sup>10</sup> Further, whilst medical students may consult doctors with hypochondriacal concerns as frequently as other students, other students might be more vague about suspected disease, mentioning 'something serious' or 'cancer', whereas medical students may be more definitive in their self-diagnoses, mentioning concerns about, for example, 'hypertrophic cardiomyopathy': this may make the health concerns of medical students particularly memorable.

Another possible explanation for the discrepancies between recent findings and the long-held view is that, whilst medical students might have always exhibited these concerns, in recent years other students have caught up, diminishing observed gaps between the groups. The internet has become a very popular avenue for accessing medical information, via websites that often provide unreliable or alarming information.<sup>20</sup> Perhaps the recent phenomenon of the public seeking to diagnose themselves via the internet, often described by the term 'cyberchondria',<sup>21</sup> has led to the public in general developing hypochondriacal concerns.

It is also possible that medical training provides students with a sense of confidence in self-diagnosis and self-management of health problems; this would explain why, if heightened symptom detection and health concerns were experienced, these might not lead to increased help-seeking behaviour.

### Strengths and limitations

This study achieved a number of improvements upon its predecessors. The questionnaire used was designed such that participants would be unlikely to know that hypochondriasis was being investigated, reducing the risk of their responses being affected by fear of stigma. The students' time at university was used as

**Table 2.** Descriptive statistics for HHSB score.

Gender		<i>n</i>	Minimum	Maximum	Mean	Std. deviation
Male	HHSB	133	0	3	.23	.614
Female	HHSB	152	0	5	.43	.843

HHSB: Hypochondriacal and Help-Seeking Behaviour.

a time frame to facilitate anchoring and thus improve recall. A relatively large sample size was utilized and two types of appropriate control group were recruited. Moreover, the *nature* of consultations was evaluated, whereas previous research had only determined the *number*.

A number of limitations were also exhibited. The HHSB scoring-system is a new tool and one cannot be sure of its sensitivity and specificity: these could be determined by testing it on a population known to be suffering with hypochondriasis. Only moderate internal reliability was found for the HAQ-subscale.

Studies employing a cross-sectional design have numerous limitations, in this case including: not considering health concerns that did not result in consultation; and not being able to investigate fully the medical student experiences of symptom perception, appraisal and decisions to seek medical advice. Many of these study design limitations would be overcome with a prospective longitudinal design, which has yet to be used in researching the health concerns and reassurance-seeking behaviour of medical students. This proposed study might follow medical and non-medical students from the beginning of university right through to their final year, asking participants to enter into a log (similar to Wells' Health Anxiety Thoughts Record<sup>22</sup>) all their symptoms, associated thoughts, concerns and emotional responses, outcomes such as seeking medical advice, what they were told by doctors and their willingness to be reassured. Through this proposed study, abnormalities in symptom perception, attribution processes and help-seeking behaviour might be further investigated and, if abnormalities in symptom perception/appraisal are indeed found, the mechanism may be identified by which concerns are short-circuited before medical help-seeking results.

### Clinical implications

The findings are pertinent to clinicians due to the potentially negative consequences of incorrectly assuming medical students to behave in this way. First, cursory evaluations may result in the presence of disease being missed. Second, patients who have been patronized in the past by doctors suspecting medical student syndrome may hesitate to seek medical advice the next time symptoms arise. Third, dismissal of patient symptoms by a doctor can lead to patients feeling misunderstood and invalidated,<sup>20</sup> which can destroy the doctor-patient relationship.<sup>23</sup> This is particularly problematic since many doctors are already hesitant to become patients themselves.<sup>2</sup>

### Declarations

**Competing Interests:** None declared

**Funding:** None declared

**Ethical Approval:** The study obtained ethics approval from King's College London's research ethics office, with approval ID PNM/10/11-58. Participants gave informed consent before taking part.

**Guarantor:** LW

**Contributorship:** LW performed the literature review, designed the study and questionnaire, applied for ethical approval, performed data collection, performed data analysis and authored this article. JW provided research supervision.

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### Appendix 1

#### STUDENT HEALTH QUESTIONNAIRE

All questionnaires will be kept **anonymous**.  
**PLEASE DO NOT WRITE YOUR NAME ON THIS QUESTIONNAIRE!**

Age .....  
 DOB .....  
 Gender M/F  
 Ethnicity .....  
 University .....  
 Course .....  
 Year of study .....

Any previous higher education courses/degrees? Y/N  
 If yes, please state the name of the course and between which dates it was studied.  
 .....  
 .....

Have you retaken any years at university? Y/N  
 Have you taken any years out from your course, to intercalate in another degree or for any other reason? Y/N  
 If yes, please state for how many years and the reason, including any subjects studied during that time.  
 .....  
 .....

Prior to starting university, had you been diagnosed with any medical conditions (including mild conditions)? Y/N  
 If yes, please state the medical condition(s) and estimate the year they were diagnosed.  
 .....  
 .....

Have you ever been diagnosed with a mental health disorder? Y/N  
 If yes, please describe the disorder(s) and estimate the year they were diagnosed.  
 .....  
 .....

Do you believe that any of the medical or mental health conditions stated above contributed to your decision to study medicine? Y/N

Has anybody very close to you suffered from a serious health problem? Y/N

If yes,

- (i) What was their relationship to you?  
.....  
.....
- (ii) What health problem were they suffering from?  
.....  
.....
- (iii) How old were you when they were diagnosed?  
.....  
.....
- (iv) Did this influence your decision to study medicine? Y/N (**please answer**)

Below is a list of questions. Please indicate whether, *during the past month*, each statement has been relevant to you 'not at all or rarely', 'sometimes', 'often' or 'most of the time'. Please tick the appropriate boxes.

		<i>not at all or rarely</i>	<i>sometimes</i>	<i>often</i>	<i>most of the time</i>
1	Do you smoke?				
2	Do you brush your teeth twice per day?				
3	When you experience unpleasant feelings in your body do you tend to ask friends or family about them?				
4	Do your friends and family ask you for medical advice?				
5	Do you tend to read up about illness and diseases to see if you may be suffering from one?				
6	Do you ever examine your body to find whether there is something wrong?				

Please fill out this form, describing the medical advice you have sought **since beginning university**. This includes visits to the doctor or A&E, calls to NHS Direct and medical advice sought from friends, relatives or colleagues who are medical professionals/medical students. Please use 1 row for each different health concern.



Month and Year of when advice was sought ( _/ _ )	Were you concerned your symptoms could be due to something serious? If so, what did you think this could be?	How long after first experiencing the symptoms did you seek medical advice?	Whom did you seek medical advice from?	What tests/investigations did you receive?	What diagnosis were you given?	After the diagnosis, did you continue to worry that something serious may be wrong?

‘I consent to the processing of my personal information for the purposes explained to me. I understand that such information will be treated in accordance with the terms of the Data Protection Act 1998.’ Y/N

*\*The Data Protection Act, 1998 classifies sensitive personal data as consisting of information as to ‘(a) the racial or ethnic origin of the data subject, (b) his political opinions(1), (c) his religious beliefs or other beliefs of a similar nature, (d) whether he is a member of a trade union (within the meaning of the Trade Union and Labour Relations (Consolidation) Act 1992), (e) his physical or mental health or condition, (f) his sexual life, (g) the commission or alleged commission by him of any offence, or (h) any proceedings for any offence committed or alleged to have been committed by him, the disposal of such proceedings or the sentence of any court in such proceedings’. (<http://www.legislation.hmso.gov.uk/acts/acts1998/19980029.htm>). (1) ‘His’ should also be taken to infer ‘her’.*