ORIGINAL PAPER

¹Depar 1Faculty of Medicine, University of Thessaly, Larissa, Greece

2Laboratory of Hygiene and Epidemiology, Faculty of Medicine, University of Thessaly, 22 Papakyriazi str, Larissa, Greece

3Community Nursing Lab, Faculty of Nursing, University of Thessaly, Greece

4Respiratory Medicine Department, Faculty of Medicine, University of Thessaly, Greece

Corresponding author: Michalis Koureas. Laboratory of Hygiene and Epidemiology, Faculty of Medicine, University of Thessaly, 22 Papakyriazi str, Larissa, Greece. E-mail: mkoureas@med.uth.gr. ORCID ID: http//www.orcid.org/0000-0000-0000-0000.

Increased Frequency of Health Anxiety in Health Science Students: a Cross Sectional Study in a Greek University

Androniki Papadopoulou[1], Michalis Koureas[2], Alexandros Farmakis[1], Argyro Sirakouli[1], Ioanna V. Papathanasiou[3], Konstantinos I. Gourgoulianis[4]

ABSTRACT

Background: Ectopic Health Sciences students often experience higher level of stress due to clinical knowledge, and it has been reported that they frequently develop worries and symptoms of illness. These observations had lead to the hypothesis that studying health sciences may increase the risk for developing health anxiety. Objective: To investigate the correlation between studying health sciences and health anxiety risk in students of a Greek university. Methods: A cross-sectional study was conducted among health science and non-health science students from the University of Thessaly, Greece. The 14 item - Short Health Anxiety Inventory (SHAI) was used to measure students' health anxiety. Univariable and multivariable logistic regression analyses were used to test the hypothesis. Results: The population sample consisted of 562 health science students and 204 agriculture and computer science students. The prevalence of health anxiety (SHAI score >14) was 18.1% (95% CI 15.4%-21.1%) while 8.3% (95% CI 6.4%-10.5%) of the participants suffered from clinical health anxiety (SHAI score >18). Health science students had higher SHAI scores compared to non-health science students. Multivariable analysis revealed an increased risk for health anxiety in health science students (OR: 2.01, 95% CI: 1.02-3.97, p=0.044). Health anxiety was also associated with sex (female) (p<0,008) and the presence of health anxiety in a family member (p<0,001). Conclusion: The current study identified studying health sciences as a determinant of health anxiety in students of a Greek university, after considering several confounding factors. This relatively neglected hypothesis should be further examined, preferably in a prospective cohort design.
Key-words: Health anxiety; health sciences students; SHAI; hypochondriasis

1. BACKGROUND

Health anxiety is characterized by excessive worry or fear of a serious illness which is often based on a misjudgment of symptoms and bodily sensations (1). In clinical health anxiety, these fears and beliefs are extreme related to the actual degree of threat and can result in distress or significant impairment in personal, family, social, educational, occupational or other important areas of functioning. Excessive health anxiety has been described with the term "Hypochondriasis" which covers both disease conviction and fear of a serious disease (2). It can be part of another syndrome, such as depression, or a primary disorder as well. Several symptoms which vary between the patients have been mentioned: abdominal pain, nausea, flatulence, dyspepsia, dyspnea, tachycardia, vision disorders, muscle weakness or even dyspareunia (3). However, the Diagnostic and Statistical Manual of Mental Disorders 5th Edition (DSM-5), has replaced the term hypochondriasis with two new terms namely: Somatic Symptom Disorder and Illness Anxiety Disorder (4).

The hypothesis that the risk for developing health anxiety is increased in medical students is old and its formulation was based on clinical teacher's reports claiming that medical students frequently develop worries and symptoms of illness (5,6). Medical students experience a combination of stress and clinical knowledge which may cause them to overestimate the importance of insignificant symptoms and bodily sensations leading and tend to diagnose themselves with the diseases they are studying (7,8). Moreover, medical training is a demanding and stressful process which may have adverse im-

pacts on the student's mental health including anxiety and depression (9). Health anxiety in medical students has been described with terms such as medical student's disease, hypochondriasis of medical students, and medical studentitis (10).

The current state of knowledge regarding the association between studying health sciences and the prevalence of health anxiety is far from conclusive. The incidence rate of hypochondriasis has been found to be notably high among health science students although estimates vary due to heterogeneity of studies in regard to used instruments, location, education systems and other factors (11). Few analytical epidemiology studies incorporating comparison groups have shown an increased risk in health science students (12,13), while others report no association between field of study and prevalence of health anxiety (14,15). Furthermore some studies report a protective effect of medical education on heath anxiety (16). To our knowledge, although the concept of the so-called "medicals student's disease" exist, for many decades the published body of research studies on the topic is relatively poor. Regarding to Greek medical and other health sciences students there is uncharted territory concerning health anxiety. Despite the controversial results of previous studies, the consolidated estimation of health anxiety prevalence in health science students during their education would be crucial for the identification and prevention of hypochondriac symptoms in this population because of their impact on their future clinical skills and performance.

Objective

The aim of this study was to investigate if there is a relation between studying health sciences and health anxiety risk. More over the study aimed to estimate the prevalence of health anxiety in Greek health science students and to identify the potential determinants of hypochondriac symptoms in students.

2. MATERIALS AND METHODS

2.1 Design and Participants: A cross-sectional study was conducted, utilizing self-reported, fully structured questionnaires to collect information. The sampling method used was that of convenience sampling. Different departments of the University of Thessaly were chosen. Departments of "Medicine", "Nursing" and "Medical Laboratories" were chosen as health-related studies departments, whereas departments of "Computer Science and Telecommunications" and "Agricultural Engineering Technologists" were chosen as a control group. Data collection was carried out during the first week of December 2019, after obtained permission from the Internal Committee for Research Ethics of the Medicine Department of the University of Thessaly (date of approval 02/12/2019; protocol n. 64). The completion of the questionnaires was done by the participants themselves after informing them about the purpose of the research. All necessary clarifications were provided. The participation of the students was voluntary and in accordance with principles and ethical rules of research. Students of all the semesters of each department were

approached before lectures and each student was given 10 minutes to complete the questionnaire, anonymously.

2.2 Questionnaires and measures: The questionnaire that was used for data collection consisted of two parts as follows:

A form of individual characteristics of the students which included socio-demographic characteristics; studying characteristics, habits and performance; smoking and alcohol consumption habits; physical exercise; presence of health anxiety in a family member and presence of a serious illness

The 14 item–Short Health Anxiety Inventory (SHAI) was used to measure health anxiety among study participants. The SHAI is a self-reported questionnaire to detect clinical and non-clinical health anxiety, developed by Salkovskis et. al (17). Each one of the 14 items of the SHAI consists of a group of 4 statements, which are scored from 0 to 3 in a total scale range between 0-42. Items concerning the Negative Consequences of being ill were not included. Based on the SHAI score, participants were characterized as normal (0-14), suffering from health anxiety (>14) and suffering from clinical (severe) health anxiety (>18) (18). In our study the Greek version of the Short Health Anxiety Inventory was used, which has shown good internal consistency in previous studies in Greek population (19).

2.3 Statistical analysis: The statistical analysis was performed by using IBM SPSS Statistics V22.0 software. The normality of the distribution of quantitative variables was determined by the *Shapiro-Wilk* test. For the quantitative variables, the median value and the corresponding interquartile range (IQR) are presented. Kruskal-Wallis (> 2 groups) and Mann-Whitney criteria were used to determine statistically significant differences between subgroups. Short Health Anxiety scores were compared between categories of independent qualitative variables. Outcome was also handled as a qualitative variable. Separate analyses were conducted with two binary outcomes (health anxiety/normal [SHAI cuttof:14], clinical health anxiety/Non clinical health anxiety [SHAI cuttof:17]). Univariable and multivariable logistic regression analyses were performed to determine risk factors. For logistic regression analysis all independent variables were transformed to dichotomous, except age and year of studies which were examined as continuous variables. Multivariable logistic regression analysis included all variables with a p<0.15 in univariable analysis. Odds ratios, 95% CI, and p-values were presented for each risk factor included in the analysis. For all analyses a p-value <0.05 were considered statistically significant.

3. RESULTS

Sample Characteristics

From the 801 students approached during the conduction of the study, 766 agreed to participate (response rate 95.6%). No particular reason was given for non-participation. The population sample consisted of 340 medical students, 129 nursing students, 93 students of medical laboratories department, 127 students from the agricul-

		Medicine Department (n=340)		Nursing Department (n=129)		Department of Medical Laboratories (n=93)		Agricultural Engineering Department (n=127)		Computer Science and Telecommunications Department (n=77)	
		n	%	n	%	n	%	n	%	n	%
Gender	Male	146	42.90%	17	13.20%	15	16.10%	78	61.40%	60	77.90%
	Female	194	57.10%	112	86.80%	78	83.90%	49	38.60%	17	22.10%
Year of studies	1	59	17.40%	28	21.70%	0	0.00%	32	25.20%	29	37.70%
	2	65	19.10%	40	31.00%	34	37.00%	61	48.00%	15	19.50%
	3	70	20.60%	2	1.60%	35	37.60%	22	17.30%	3	3.90%
	4	72	21.20%	2	1.60%	22	23.90%	5	3.90%	28	36.40%
	5	39	11.50%	53	41.10%	1	1.10%	3	2.40%	1	1.30%
	6	34	10.00%	4	3.10%	0	0.00%	1	0.80%	0	0.00%
	7 +	1	0.30%	0	0.00%	0	0.00%	3	2.40%	1	1.30%
Residence	Urban	287	85.70%	91	71.10%	58	62.40%	55	43.30%	39	50.60%
	Suburban	31	9.30%	19	14.80%	19	20.40%	34	26.80%	26	33.80%
	Rural	17	5.10%	18	14.10%	16	17.20%	38	29.90%	12	15.60%
Education (Father)	Primary	17	5.00%	25	19.40%	14	15.10%	21	16.70%	8	10.50%
	Secondary	76	22.50%	50	38.80%	35	37.60%	47	37.30%	32	42.10%
	Tertiary	177	52.40%	49	38.00%	40	43.00%	45	35.70%	30	39.50%
	Msc, PhD	68	20.10%	5	3.90%	4	4.30%	13	10.30%	6	7.90%
Education (Mother)	Primary	7	2.10%	27	20.90%	6	6.50%	9	7.10%	7	9.10%
	Secondary	73	21.60%	51	39.50%	40	43.00%	45	35.70%	29	37.70%
	Tertiary	187	55.30%	45	34.90%	43	46.20%	59	46.80%	35	45.50%
	Msc, PhD	71	21.00%	6	4.70%	4	4.30%	13	10.30%	6	7.80%
Family Income	Not answered	59	17.60%	31	24.00%	14	15.10%	48	37.80%	24	31.20%
	0-1000£	23	6.80%	43	33.30%	23	24.70%	19	15.00%	14	18.20%
	1001€ -2000€	94	28.00%	38	29.50%	36	38.70%	39	30.70%	23	29.90%
	£ 2001€ -3000€	98	29.20%	13	10.10%	13	14.00%	10	7.90%	10	13.00%
	>£ 3001€	62	18.50%	4	3.10%	7	7.50%	11	8.70%	6	7.80%
Average Grade	5-6,9	53	19.00%	14	13.70%	25	26.90%	70	72.90%	36	76.60%
	7,0-8,4	194	69.50%	51	50.00%	60	64.50%	25	25.80%	11	23.40%
	8,5-10	32	11.50%	37	36.30%	8	8.60%	2	2.10%	0	0.00%
Smoking	never	226	67.10%	74	58.70%	56	60.20%	67	52.80%	51	67.10%
	former	23	6.80%	13	10.30%	7	7.50%	5	3.90%	5	6.60%
	occasionally	48	14.20%	18	14.30%	20	21.50%	25	19.70%	9	11.80%
	daily	40	11.90%	21	16.70%	10	10.80%	30	23.60%	11	14.50%

Alcohol consumption	Never	18	5.30%	18	14.00%	3	3.30%	15	11.80%	10	13.20%
	1-3 drinks/ month	138	40.80%	73	56.60%	37	40.20%	47	37.00%	28	36.80%
	1-3 drinks/ week	144	42.60%	31	24.00%	42	45.70%	41	32.30%	26	34.20%
	4-6 drinks/ week	36	10.70%	7	5.40%	7	7.60%	20	15.70%	10	13.20%
	1-2 drinks/ day	2	0.60%	0	0.00%	2	2.20%	1	0.80%	0	0.00%
	>3 drinks/ day	0	0.00%	0	0.00%	1	1.10%	3	2.40%	2	2.60%
Physical exercise	never	89	26.30%	40	31.00%	21	22.60%	32	25.20%	21	27.60%
	once a week	100	29.60%	46	35.70%	30	32.30%	38	29.90%	20	26.30%
	2-3 times / week	85	25.10%	27	20.90%	29	31.20%	33	26.00%	17	22.40%
	>3 times / week	64	18.90%	16	12.40%	13	14.00%	24	18.90%	18	23.70%
Family member with Health Anxiety	No	205	61.00%	63	48.80%	52	56.50%	70	56.00%	53	68.80%
	Yes	131	39.00%	66	51.20%	40	43.50%	55	44.00%	24	31.20%
Diagnosed with Serious Illness	No	295	87.80%	114	89.10%	72	79.10%	115	92.70%	69	89.60%
	Yes	41	12.20%	14	10.90%	19	20.90%	9	7.30%	8	10.40%

Table 1. Characteristics of Study Participants According to Department of Attendance

tural engineering department and 77 students from the computer science and telecommunications department.

Mean age was 21 (SD: 3) for medical students, 23 (SD: 7) for nursing students, 22 (SD: 5) for medical laboratories students, 21 (SD:5) for agricultural students and 20 (SD:3) for computer science and telecommunications students. **Table 1** summarizes the key characteristics of the population sample. Some differences in several variables are observed. Gender distribution was different between schools with health science students having higher frequencies of female participants, especially nursing students and medical laboratories students. Health science students reported more frequently urban permanent residence, higher parental education level and higher family income. A parameter strongly related to the department of study was the performance (average grade) on the completed courses, with health science student having better performance. Smoking habits, alcohol consumption and frequency of physical exercise were similar among participants studying different disciplines. Regarding the current year of studies it should be mentioned that studies in the Medical Department have a duration of six years while the sample from the Department of Medical Laboratories did not include freshmen since the department stopped accepting new students in 2019.

Health Anxiety Scores according to Participant's Characteristics

Normality test for Short Health Anxiety Index scores revealed that the variable is not normally distributed among the population sample (Shapiro-Wilk test: p <0.001). Visual evaluation of the histogram showed that SHAI scores follow a right skewed distribution. Median SHAI score for all participants was 9 (IQR 6-13), with a minimum of 0 and a maximum of 33. **Table 2** presents the SHAI scores according to variables of interest and the p-values for association calculated by Mann Whitney and Kruskal-Wallis tests. Participants of all the health science departments had higher SHAI scores compared to agriculture and computer science students. Within students studying health sciences the analysis did not document significant correlation with the department of study (Kruskal-Wallis, p=0.580) suggesting similar levels of anxiety in medical, nursing and medical laboratory students. The median SHAI score was 10 (IQR: 7-14) for all health science students grouped together and 7 (IQR:4-10) for students from the control group. As shown in **table 2**, gender was also found to be significant correlated with health anxiety levels with females scoring higher on SHAI test (p<0,001). Increased health anxiety is also observed in students having better grades (p<0,001), those who reported having a family

member with health anxiety (p<0,001) and those who reported having a serious medical condition (p=0,001). Kruskal-Wallis test did not reveal a significant association between SHAI score and year of studies. Linear regression analysis to identify potential association between age and SHAI scores also did not reveal a significant relationship (β= -0.013, p=0.730).

Association between prevalence of health anxiety and participant's characteristics

The prevalence of health anxiety (SHAI score >14) was 18.1% (95% CI 15.4%-21.1%) while an 8.3% (95% CI 6.4%-10.5%) of the participants suffered from clinical health anxiety (SHAI score >18). The relation between health anxiety and potential risk factors was examined with regression analyses. Since no differences were observed in SHAI scores between participants from different health science disciples, these individuals were grouped together as were the students attending non-health science departments. Thus, all analyses presented in this section concern the comparison of health science student with non-health science students.

Univariable logistic regression to identify risk factors revealed significant correlations between the risk for having health anxiety and studying health sciences [OR: 2.67, (95% CI: 1.57-4.51), p<0.001]. Other parameters that were statistically associated with health anxiety were gender, residence, performance (grade), and presence of health anxiety within the family. More detailed results are presented in Supplementary table 1. Similarly, when the determinants for the presence of clinical health anxiety were assessed studying health sciences was also associated with increased risk [OR: 2.96, (95% CI: 1.32-6.62), p= 0.008]. Residence, presence of health anxiety within the family and year of studies were also associated with increased risk (Supplementary table 2). Interestingly, the year of studies was associated only with clinical health anxiety. To further examine if this association is affected by the school of studies, we repeated the analysis stratifying for school of study. The relation between year of studies and hypochondriasis prevalence was statistically significant only in the stratum of medical students [OR 1.29 (95% CI: 1.04-1.61), p=0.022] while in other strata no significant association were found (data not shown).

Variable		n	Median (IQR) SHAI Scores	p-value1
Gender***	Male	316	8 (5-11)	<0.001
	Female	450	10 (7-14)	
Department***	Medical	340	10 (7-14)	<0.001
	Nursing	129	9 (6-12)	
	Medical Laboratories	93	10 (7-14)	
	Agricultural Engineering	127	8 (4-10)	
	Computer Science and Telecommunications	77	6 (4-10)	
Year of Studies	1	148	8 (6-12)	0.483
	2	215	9 (6-13)	
	3	132	10 (7-13)	
	4	129	8.5 (6-13)	
	5	97	10 (6-14)	
	6	39	8 (5-13)	
	7+	5	4(3-9)	
Performance (Grade)**	Good	198	9 (5-11)	0.001
	Very Good	341	10 (7-14)	
	Excellent	79	10 (7-15)	
Residence	Urban	530	9 (6-13)	0.178
	Suburban	129	9 (5-12)	
	Rural	101	9 (6-12)	
Education (father)	Primary	85	10 (5-14)	0.114
	Secondary	240	9 (6-12)	
	Tertiary	341	9 (6-13)	
	Msc, PhD	96	10 (7-14)	
Education (mother)	Primary	56	10 (5-14)	0.697
	Secondary	238	9 (6-12)	
	Tertiary	369	9 (6-13)	
	Msc, PhD	100	9 (7-13)	
Monthly Family Income	not answered	176	8 (5-12)	0.127
	<£ 1000€	122	9 (6-14)	
	£ 1001€ -2000€	230	10 (6-13)	
	£ 2001€ -3000€	144	9 (6-14)	
	>£ 3001€	90	9 (6-14)	
Smoking	never	474	9 (6-13)	0.316
	former	53	8.5 (6-13)	
	Occasionally	120	10 (6-13)	
	Daily	112	8 (5-13)	
Alcohol Consumption	Never	64	8 (5-12)	0.300
	1-3 drinks/month	323	9 (6-13)	
	1-3 drinks/week	284	9 (6-13)	
	4-6 drinks/week	80	8 (5-13)	
	1-2 drinks/day	5	11 (10-19)	
	>3 drinks/ day	6	10 (9-11)	
Exercise	never	203	9 (6-14)	0.087
	Once a week	234	10 (7-13)	
	2-3 times per week	191	9 (6-13)	
	>3 times per week	135	8 (5-12)	

To control for potential confounders multivariate logistic regression analysis was conducted. The model included all variables found to be associated with a p<0.15. An exception was the variable "average grade", which was not included in the analysis because it was very strongly correlated to studying health sciences [OR: 11,58 (95% CI: 7.50-17.89), p< 0.001], and thus its potential confounding effect could not be controlled since the variable were not independent. In the analysis concerning health anxiety, 5 variables were included namely gender, studying health sciences, residence, family income and presence of health anxiety in family environment. Correspondingly, six independent variables (gender, studying health sciences, residence, presence of health anxiety in family environment, self-reported serious illness and year of studies) were considered in the multivariable analysis concerning clinical health anxiety. In **table 3** and **table 4** the results of the multivariate analysis are presented. Studying health sciences retains a statistically significant association with health anxiety, while increased risk is also observed for clinical health anxiety but the association was not statistically significant.

4. DISCUSSION

The results of the current study support the hypothesis that health science students are more likely to suffer from health anxiety than students of other disciplines. This increased risk was observed not only in medical students, but also in nursing and medical laboratory students.

Previous studies on the topic have produced conflicting findings. Moss-Morris et. al (12), compared 92 first-year and 85 third-year medical students to 82 law students and reported that medical students scored higher on disease perception and on disease distress. Afifi et al. (13), also reported higher fears of disease in medical students (n=195) compared to non-medical students (n=200), although caution is suggested since this finding was not statistically significant. However, in contrast to our findings, several studies suggest that there is not significant different prevalence of clinical health anxiety (hypochondriasis) between medical and non-medical students. Waterman et. al report no significant differences in health anxiety between 103 medical students, 107 non-medical students and 78 law students, all at the third year of studies (7). A larger cross sectional study of 214 medical students and 816 law students concluded that studying medicine does not seem to affect health anxiety levels (14). Similarly, an older investigation of 60 medical and 60 law students reported no difference in the prevalence of hypochondriacal fears, beliefs, and attitudes (20). Furthermore, there are studies directly contradicting the examined hypothesis. A cross sectional study consisting of 449 medical students and 485 non-medical students conducted in London, UK, reported that medical training reduces the risk of health an-

Family member with health anxiety***	No	443	8 (6-12)	
	Yes	316	10 (7-14)	<0.001
Diagnosed with serious illness**	No	665	9 (6-13)	
	Yes	91	11 (8-14)	0.001

1Mann Whitney test for 2 groups, Kruskal-Wallis test for>2 groups

**p < .01. ***p < .001.

Table 2. Short Health Anxiety Index Scores in Accordance to Participant's Characteristics

Risk factor	Odds Ratio	95% CI		p-value
Gender (male/female)**	0.51	0.31	0.84	0.008
Field of study (Health sciences/non-health sciences)*	2.01	1.02	3.97	0.044
Residence (Urban/Suburban, rural)	1.28	0.75	2.18	0.367
Family income (>2000€/≤2000€)	1.43	0.92	2.23	0.11
Family member with health anxiety (yes/no)**	2.13	1.39	3.28	0.001

*p < .05. **p < .01..

Table 3. Multivariable Logistic Regression Analysis to Identify Risk Factors for Health Anxiety

Risk factor	Odds Ratio	95% CI		p-value
Gender (male/female)	0.73	0.4	1.34	0.311
Field of study(Health sciences/non-health sciences)	1.92	0.81	4.58	0.14
Residence (Urban/Suburban, rural)	1.82	0.88	3.76	0.106
Family member with health anxiety(yes/no)	1.61	0.93	2.77	0.088
Diagnosed with serious illness (yes/no)	1.75	0.86	3.57	0.125
Year of studies (continuous)*	1.18	1.03	1.35	0.016

*p<0.05

Table 4. Multivariable Logistic Regression Analysis to Identify Risk Factors for Clinical Health Anxiety

xiety [16] , as did a study of 80 medical students and 100 law students conducted in Norway (21).

It is evident, that varying findings on the examined hypothesis exist in the current literature, while our literature search identified relatively few studies. The results of our study differ from the majority of previous researches. The reasons for this apparent disagreement can be sought in the heterogeneity of the published studies in terms of research methodology, psychometric scales used and control groups selected. Most of the previous

studies incorporated law students as control groups while in our study we recruited computer science and agricultural science students. Both approaches have limitations and ideally, the control groups should consist of students representative of all non-health science students. Medical and law students may share some personality traits that could be associated with increased anxiety. Type A personality which has been associated with anxiety symptoms (22), is more prevalent in medical students (23). The selection of individuals studying computer and agricultural sciences as a control group could also have introduced socioeconomic and life-style related confounders, other than the factors considered in our multivariable analysis. Moreover, differences in the social-cultural environment in the study settings could explain the different findings between studies.

In our study we measured health anxiety by using the Short Heath Anxiety Inventory a scale that been shown to have acceptable Cronbach's alpha scores, construct validity, sensitivity to treatment (24). Caution is suggested regarding the cutoff values used to define health anxiety and clinical health anxiety. We adopted cutoff scores proposed by Rode et. al. (18), who report that "*a cut-off point of 18 or higher in the short form reliably and exclusively identified people fulfilling DSM-IV diagnostic criteria for hypochondriasis*", while individuals scoring 15–17 "*were three standard deviations above the norms for nonclinical controls*". However different cutoff values have been used by other research teams and cutoff values should be further investigated (24).

Our results also suggest an increasing risk for severe health anxiety with years of study. The fact that this association was strong and statistically significant only in medical students is an additional element that underlies that studying medicine may play a role in the risk for developing health anxiety. Previous investigations have found higher health anxiety at entering the clinical years and a decrease later (7,25). The results of the present study combined with the fact that the potential association of studying health sciences with health anxiety is relatively uninvestigated, underline the need of further research on the topic. More specifically, in the current literature there is a lack of cohort studies recruiting students at the beginning of their studies and prospectively record the incidence of health anxiety. This type of studies will clarify if the effect (health anxiety) occurs after the presumed cause (school of studies) and exclude the possibility of reverse causality, which is a known limitation of cross-sectional designs. Additionally, more representative controls are needed and the diversity of findings from different setting should be further elucidated.

5. CONCLUSIONS

Concluding, the current study identified studying health sciences as a determinant of health anxiety in students of a Greek university, after considering several confounding factors. This relatively neglected hypothesis should be further examined.

REFERENCES

1. WHO. International Classification of Diseases and Related Health Problems 11 for Mortality and Morbidity Statistics, ICD-11, 2018.
2. American Psychiatric Association. Diagnostic and statistical manual of mental disorders : DSM-IV: Fourth edition. Washington, DC : , 1994.
3. Neng JM, Weck F. Attribution of somatic symptoms in hypochondriasis. Clinical psychology & psychotherapy 2015;22(2):116-24 doi: 10.1002/cpp.1871.
4. American Psychiatric Association. Diagnostic and statistical manual of mental disorders : DSM-V: . 2013
5. Hunter RC, Lohrenz JG, Schwartzman AE. NOSOPHOBIA AND HYPOCHONDRIASIS IN MEDICAL STUDENTS. The Journal of nervous and mental disease 1964;139:147-52 doi: 10.1097/00005053-196408000-00008.
6. Woods SM, Natterson J, Silverman J. Medical students' disease: hypochondriasis in medical education. Journal of medical education 1966;41(8):785-90
7. Waterman LZ, Weinman JA. Medical student syndrome: fact or fiction? A cross-sectional study. JRSM Open 2014;5(2):2042533313512480-80 doi: 10.1177/2042533313512480.
8. Collier R. Imagined illnesses can cause real problems for medical students. CMAJ : Canadian Medical Association journal = journal de l'Association medicale canadienne 2008;178(7):820 doi: 10.1503/cmaj.080316.
9. Y usoff MS, Abdul Rahim AF, Baba AA, et al. The impact of medical education on psychological health of students: a cohort study. Psychology, health & medicine 2013;18(4):420-30 doi: 10.1080/13548506.2012.740162.
10. Salkovskis PM, Howes OD. Health anxiety in medical students. The Lancet 1998;351(9112):1332 doi: 10.1016/S0140-6736(05)79059-0.

11. Meng J, Gao C, Tang C, et al. Prevalence of hypo-chondriac symptoms among health science students in China: A systematic review and meta-analysis. PLoS One 2019;14(9):e0222663-e63 doi: 10.1371/journal.pone.0222663.

12. Moss-Morris R, Petrie KJ. Redefining medical students' disease to reduce morbidity. Medical education 2001;35(8):724-8 doi: 10.1046/j.1365-2923.2001.00958.x.

13. Afifi O, Siraj S, AlSufyani M, et al. The health anxiety in medical students, a comparative study from Taif University: Medical student's syndrome revisited. British Journal of Medical Practitioners, 2019, Volume 12 Number 1. British Journal of Medical Practitioners 2019;Volume 12

14. Barić H, Trkulja V. Declining health anxiety throughout medical studies: it is mainly about a more relaxed perception of the health-related concerns. Medical teacher 2012;34(12):1056-63 doi: 10.3109/0142159x.2012.716180.

15. Howes OD, Salkovskis PM. Health anxiety in medical students. Lancet (London, England) 1998;351(9112):1332 doi: 10.1016/s0140-6736(05)79059-0.

16. Singh G, Hankins M, Weinman JA. Does medical school cause health anxiety and worry in medical students? Medical education 2004;38(5):479-81 doi: 10.1046/j.1365-2929.2004.01813.x.

17. Salkovskis PM, Rimes KA, Warwick HM, et al. The Health Anxiety Inventory: development and validation of scales for the measurement of health anxiety and hypochondriasis. Psychological medicine 2002;32(5):843-53 doi: 10.1017/s0033291702005822.

18. Rode S, Salkovskis P, Dowd H, et al. Health anxiety levels in chronic pain clinic attenders. Journal of Psychosomatic Research 2006;60(2):155-61 doi: 10.1016/j.jpsychores.2005.07.005.

19. Karademas EC, Christopoulou S, Dimostheni A, et al. Health anxiety and cognitive interference: Evidence from the application of a modified Stroop task in two studies. Personality and Individual Differences 2008;44(5):1138-50 doi: https://doi.org/10.1016/j.paid.2007.11.007.

20. Kellner R, Wiggins RG, Pathak D. Hypochondriacal fears and beliefs in medical and law students. Archives of general psychiatry 1986;43(5):487-9 doi: 10.1001/archpsyc.1986.01800050093012.

21. Ellingsen AE, Wilhelmsen I. [Disease anxiety among medical students and law students]. Tidsskrift for den Norske laegeforening : tidsskrift for praktisk medicin, ny raekke 2002;122(8):785-7

22. GhorbaniAmir H, b TA, shayan N. Relationship between Type A Personality and Mental Health. Procedia–Social and Behavioral Sciences 2011;30:2010-18 doi: https://doi.org/10.1016/j.sbspro.2011.10.390.

23. Alnasir / Alnaser F, Alfulaij A. Type A and B personalities from a psychological perspective among medical students. Psychology Research 2014;4:559-66 doi: 10.1016/j.ijpsycho.2014.08.841.

24. Alberts NM, Hadjistavropoulos HD, Jones SL, et al. The Short Health Anxiety Inventory: a systematic review and meta-analysis. Journal of anxiety disorders 2013;27(1):68-78 doi: 10.1016/j.janxdis.2012.10.009.

25. Azuri J, Ackshota N, Vinker S. Reassuring the medical students' disease—health related anxiety among medical students. Medical teacher 2010;32(7):e270-5 doi: 10.3109/0142159x.2010.490282.