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Original Article

Health Anxiety and Its Relationship with Academic Performance and Learning Styles among Nursing Students during COVID-19 Pandemic

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Abstract

Introduction: This study aimed to investigate health anxiety and its relationships with academic performance and learning styles among nursing students during the COVID-19 pandemic.

Methods: A cross-sectional design was employed, involving 365 participants selected through stratified random sampling in Iran in 2021. Data were collected using Health Anxiety Inventory, Visual, Aural, Reading/Writing, and Kinesthetic Learning Styles Questionnaire and students' self-reported grade point average (GPA). Data were analyzed using descriptive and inferential statistics (independent samples t-test, one-way ANOVA, Pearson correlation coefficient and chi-square test) by SPSS version 13.

Results: The mean (SD) health anxiety score among nursing students was 24.33(9.79) on a range of 0-54; and the mean (SD) of GPA was 15.60 (1.51) on a range of 0-20. The majority of students (85.8%) had a unimodal learning style, with the dominant pattern being kinetic-motor (39.7%). The study found a negative correlation between health anxiety and academic performance (r=-0.19, $P\leq0.05$). However, no significant association was identified between health anxiety and learning style (r=-0.27, P=0.42). The analysis of health anxiety among participants indicated notable differences based on demographic factors such as sex, interest in nursing, and education level) $P<0.001$.)

Conclusion: This study revealed a moderate level of health anxiety among Iranian nursing students during the COVID-19 pandemic and identified a significant negative correlation between health anxiety and academic performance. These findings underscore the need for interventions targeting health anxiety to potentially improve academic outcomes for nursing students, as reducing anxiety levels can enhance focus, learning capacity, and overall academic performance.

Introduction

Mental health is an essential component of public health, encompassing the ability to communicate effectively with others, solve individual conflicts and contradictions logically, and improve personal and social environments.[1] Somatic symptom disorders, a common psychological problem worldwide, are characterized by physical symptoms that can be distressing or disruptive to daily life and accompanied by excessive thoughts, feelings, and behaviors related to those symptoms.[2]

Health anxiety disorder, a subgroup of somatic symptom disorders, is characterized by excessive worry and fear about having a serious illness or medical condition, despite little or no evidence of illness.[3] This disorder can cause a person's mental preoccupation, leading to the unnecessary use of health services, increased costs, and decreased occupational, social, and academic performance and quality of life.[4,5] A recent study reported a prevalence of health anxiety at 47.3% among the general population.[6] For healthcare professionals like nursing students, maintaining good mental health is particularly crucial due to the demanding nature of their studies and future careers.[5] Medical students, particularly those in nursing programs, are susceptible to health anxiety due to factors such as exposure to diseases, a sense of responsibility for patients' well-being, and the demanding and prolonged nature of their training.[7,8] Moreover, the perceived vulnerability to diseases such as COVID-19 is

linked to heightened fear of infection and anxiety among nursing students.[9]

Academic performance is a crucial aspect of education, particularly for nursing students, as their knowledge, skills, and professional ethics can significantly impact society's health.[10, 11] Learning is the process of acquiring knowledge, habits, and attitudes, with academic performance closely related to learning. Learning style, preferred by individuals for representing and processing information, is a crucial factor related to students' learning. However, cognitive style, representing and processing information by the brain, can also affect anxiety levels.[12,13]

The relationship between health anxiety and learning style is not yet fully understood, but there are several possible ways in which these factors may be related. Firstly, individuals with health anxiety may have a tendency towards a specific learning style. For example, they may prefer to learn through reading and researching medical information, which may further exacerbate their anxiety about their own health. Alternatively, they may avoid learning about medical conditions altogether, which could limit their knowledge and understanding of important health topics.[14] Secondly, health anxiety can have a significant impact on cognitive functioning, including attention and memory. Individuals with health anxiety may be more likely to experience cognitive distortions and negative thinking patterns, which can interfere with their ability to learn and retain information. This could lead to difficulties with academic performance, particularly in areas related to health and medicine.[15,16] Understanding how learning styles and health anxiety may interact can be crucial for improving educational experiences and academic performance of nursing students.

The undergraduate nursing program in Iran is four years long. However, limited research has explored the potential influence of health anxiety and learning styles on academic performance among nursing students.[17,18] This study aimed to investigate health anxiety and its relationships with academic performance and learning styles among nursing students during the COVID-19 pandemic. Understanding these connections can inform the development of targeted interventions that may improve both the mental well-being and academic success of nursing students. Ultimately, this could enhance the quality of patient care as these students transition into the healthcare workforce.

Material and Methods

A descriptive-correlational cross-sectional study was conducted on 365 nursing students at Tabriz University of Medical Science in 2021. Tabriz School of Nursing is the oldest and one of the most famous nursing schools in Iran. To estimate the sample size, using the standard deviation of the Howes study for health anxiety and the Janat Alipour study for learning styles,[19,20] with a margin of error of 0.11 and a confidence level of 95% considering the probability of a 10% attrition rate, 365 students were selected through proportionate stratified random sampling due to the unequal distribution of students among the various academic semesters. Proportionate stratified random sampling was employed to ensure representation from different academic semesters. Student enrollment data from the university registrar's office was used to determine the proportion of students in each semester. Based on these proportions, a random sample was drawn from each semester using computer-generated random numbers. The study included second-semester and higher Bachelor of Nursing students who agreed to participate, while excluding those who reported a history of psychiatric disorders. Data were collected by a trained researcher throw interview method.

Data was collected during February to April 2021. The data collection instruments utilized in the study included a demographic questionnaire, a Short Health Anxiety Inventory (SHAI), and a VARK Learning Styles Questionnaire. The demographic questionnaire encompassed variables such as age, gender, duration of education (in years), interest in the field of study. Academic performance was measured using self-reported grade point average (GPA) from the preceding semester. The SHAI, developed by Salkovskis and Warwick, is a concise version derived from the original Health Anxiety Questionnaire structure. This form was based on the cognitive model of health anxiety and self-morbidity. The short form of this questionnaire was first developed by Salkovskis and Warwick and included 18 items scored on a 4-point Likert scale ranging from 0 to 3 in the three components of worry about health (7 items; 0–21 points), awareness of bodily sensations or changes (6 items; 0–18 points), and feared consequences of having an illness (5 items; 0-15 points). The total score range of this questionnaire is 0–54 points. Scores of 0–18, 18–36, and above 36 indicate a low, moderate, and high health anxiety level, respectively. The validity and reliability of this questionnaire are evaluated and confirmed in previous studies.[21.22]

The third component of the data collection tools was the Visual, Aural, Reading/Writing, and Kinesthetic Learning Styles Questionnaire) VARK (Questionnaire, a validated learning preference assessment tool. This questionnaire comprises 16 multiple-choice questions, with each question presenting four choices aligned with the sensory modalities VARK assesses (visual, aural/auditory, read/write, and kinesthetic). In visual style, persons learn better through seeing and presenting a show; In aural/auditory style persons learn better through listening and oral instruction; In read/write style the learner learns better through taking notes and reading written or printed texts. In kinesthetic style people learn material through practical experiential examples and manipulation of objects through a better physical process. Participants can select one or more choices that reflect

their preferred ways of receiving and processing new information. Higher scores in each learning style category indicate the dominant learning style of the respondent. The questionnaire's validity and reliability have been established through previous studies, confirming its utility in assessing learning preferences.[23, 24]

This study received ethical approval from the Tabriz University of Medical Sciences Ethics Committee (code IR.TBZMED.REC.1400.1075). Informed consent was obtained from all participants, administrative permissions were secured, and anonymous coding ensured participant privacy. Comprehensive explanations regarding the research process, confidentiality, and withdrawal rights were provided. Questionnaires were completed confidentiality in a private room.

The data were statistically analyzed by SPSS version 13 software using descriptive statistics (mean, standard deviation, frequency, and frequency percentage) and inferential statistics (independent samples t-test, one-way ANOVA, Pearson correlation coefficient and chi-square test).

Results

The study sample consisted of 365 eligible nursing students in Tabriz University of Medical Sciences. Among 420 invited students 365 participated in our study and our response rate was 85.8%. The mean age of the nursing student was 21.98 years (SD = 1.67), with the majority being female (n = 203, 55.6%). More than half of the students expressed an interest in nursing (n = 198, 54.2%), and their average GPA was 15.60 (SD = 1.51) on a range of 0-20.

The study revealed that the average health anxiety score among nursing students was 24.33 (SD = 9.79) on a scale ranging from 0 to 54. About 123(33.7) of participants had low and only 57(15.6) of them had high level of health anxiety. The majority of students (85.8%) exhibited a unimodal learning style, with the most prevalent being kinesthetic-motor (39.7%). Among students with a multimodal learning style (14.2%), the predominant combinations were visual/aural and read & write/ kinaesthetic (Table 1).

A negative correlation was identified between health anxiety and academic performance ($r = -0.19$, $P \leq 0.05$), indicating that students with higher health anxiety scores tended to have slightly lower GPAs. However, no statistically significant differences were observed between health anxiety and learning style.

The analysis of health anxiety among participants indicated notable differences based on demographic factors such as sex, interest in nursing, and education level (Table 2). The analysis of health anxiety among participants revealed no significant differences based on learning styles, academic performance, or educational level (Table 3).

Table 1. Health anxiety and learning styles among nursing students (N = 365)

Variable	Frequency (%)
Health anxiety level	
Low	123 (33.7)
Moderate	185 (50.7)
High	57 (15.6)
Learning style (unimodal)	
Visual	48 (13.2)
Aural	49 (13.4)
Read/write	71 (19.5)
Kinaesthetic	145 (39.7)
Learning style (multimodal)	
Visual/aural	12 (3.3)
Aural/read & write	4 (1.07)
Aural/kinaesthetic	8 (2.2)
Visual/read & write	7 (1.9)
Visual/kinaesthetic	9 (2.5)
Read & write/kinaesthetic	12 (3.3)

Discussion

The current study assessed health anxiety and its relationship with undergraduate nursing students' academic performance and learning styles. Findings revealed that most of the participants had moderate level of health anxiety. This result aligns with prior research suggesting that nursing students could be more susceptible to health anxiety due to their immersion in medical information and the academic stress they encounter.[25,26] However, the results contradict the findings of the studies in which a high level of health anxiety was reported.[27,28] It is important to note that personality and mood characteristics, as well as the potential for adaptation, play a critical role in health anxiety.[17] Additionally, variations in study settings, methodologies, sample sizes, sampling

Table 2. Comparison of health anxiety to demographic characteristics of participants (N = 365)

Variable	Health anxiety N (%)	Test
Sex		
Male	17.41 (6.30)	T = 15.54, df = 363, $P < 0.001$[a]
Female	29.86 (8.48)	
Interested in nursing		
Yes	22.10 (8.68)	T = - 4.8, df = 363, $P < 0.001$[a]
No	26.98 (10.37)	
Education level (year)		
1	19.70 (8.98)	F = 5.572, df = 3.361, $P = 0.001$[b]
2	25.93 (12.17)	
3	25.47 (7.68)	
4	23.03 (8.37)	
Age (years)	21.98 (1.67)	R = 0.006, $P = 0.904$[c]

[a] T-test, [b] One way ANOVA, [a] Pearson coefficient test

Table 3. Comparison of learning styles in terms of education level, sex, and academic performance (N = 365)

Learning styles	N (%)										Mean (SD)	Test
	Education level (years)						Sex				Academic performance	
	One	Two	Three	Four	Total	Test	Male	Female	Total	Test		
Unimodal	34 (77.3)	100 (87)	105 (82.2)	75 (86.2)	314 (86)	$\chi^2 = 3.37^*$, $P = 0.338$, df = 3	141 (87)	173 (85)	314 (86)	$\chi^2 = 2.47^*$, $P = 0.619$, df = 1	15.58 (1.53)	$P = 0.572^{**}$
Multimodal	10 (22.7)	15 (13)	14 (11.8)	12 (13.8)	51 (14)		21 (13)	30 (15)	51 (14)		15.70 (1.33)	

Uni modal includes visual, aural, read/write and kinesthetic; multimodal includes visual/aural, aural/read & write, aural/kinaesthetic, visual/read & Write, visual/kinaesthetic, read & write/kinaesthetic.
* Chi-square test, ** Independent t-test

techniques, and participant demographics may contribute to the differing results observed in various studies.

The study also found that health anxiety had a statistically significant negative correlation with academic performance, indicating that higher levels of health anxiety were associated with low academic performance. This finding is consistent with previous research suggesting that health anxiety can have a significant impact on cognitive functioning, including attention and memory, which can interfere with learning and retention of information.[29,30] It implies that managing health anxiety could be crucial for improving academic performance.

The present study revealed that most students' preferred learning style was unimodal (86.8%). It is in line with the results of some previous studies.[31-33] However, some other studies revealed that the multimodal learning style is more frequent among students.[34,35] Previous encounters with diverse teaching approaches and the type of educational material can influence individual learning styles. The educational framework in Iran prior to university primarily relied on didactic lectures, with limited opportunities for discussions and hands-on practical sessions.[36]

In the present study, the predominant learning style among most students in the unimodal category was the kinesthetic-motor style. Kinesthetic learners tend to retain information more effectively by engaging their bodies and interacting with their surroundings. They prefer being active participants rather than passive observers, often solving problems through trial and error rather than simply accepting presented information. Practical applications typically hold more significance for them than theoretical concepts.[37] The current study's findings support previous research indicating that the most prevalent unimodal preference is kinesthetic.[36-38] However, these findings diverged from the results of Rezigalla and Ahmed study, which identified aural, reading/writing, and aural preferences, respectively.[31] This variation can be attributed to the study context and the educational conditions of the participants in these respective studies.

The current study revealed a notable disparity in health anxiety concerning gender, field of interest, and academic level among students. Specifically, the study indicated that female students exhibited higher levels of health anxiety compared to their male counterparts. These findings are consistent with those of a recent study.[38] This observation may be attributed to the societal expectation for women to be more attuned to their health and to seek medical assistance more readily than men. Consequently, women may possess a heightened awareness of bodily sensations and a greater tendency to interpret them as indicators of illness, potentially leading to elevated levels of health anxiety. However, these results were in contrast with the results of the studies of Nargesi et al[22] and Gao et al.[39] A recent study showed that students at the secondary academic level had high health anxiety. The current study's results align with the results of some studies, including Masha'al et al.[40] It is maybe related to that students at higher level are exposed to a wide range of health information, including information about illnesses, diseases, and health risks. This can lead to increased awareness of health concerns and a heightened sense of vulnerability. However, these results were in contrast with the results of the studies of Gao et al.[39] In the nursing education system in Iran, the second academic year marks the transitional phase from theoretical coursework to clinical training.

This study's data collection occurred during a significant shift from virtual to in-person learning due to the COVID-19 pandemic. This transition could have influenced the reported health anxiety levels and learning styles of the participants. Adapting to new routines, concerns about potential increased exposure to health risks, and the overall stress of the pandemic might have impacted their responses. Future studies conducted under more stable educational environments might yield different results.

Conclusion

These findings reveal a concerning level of health anxiety among Iranian nursing students during the COVID-19 pandemic and highlight a significant negative correlation between this anxiety and their academic performance. This underscores the urgent need for targeted interventions to address health anxiety, as reducing anxiety levels can enhance focus, learning capacity, and overall academic performance, potentially leading to improved academic outcomes and better preparedness for their future roles in healthcare. Implementing management policies, psychosocial interventions, and training is critical to reducing anxiety symptoms during the COVID-19

Research Highlights

What is the current knowledge?

- Nursing students experience higher levels of health anxiety than the general population, especially during stressful times like the COVID-19 pandemic.
- The relationship between health anxiety and learning styles in nursing education is not well investigated.
- Implementing effective psychological support systems and interventions is crucial for nursing students to manage health anxiety, thereby improving both their academic success and mental health.

What is new here?

- The mean health anxiety score among nursing students indicates a moderate level of health anxiety during the pandemic.
- A significant majority of nursing students exhibited a unimodal learning style, predominantly kinetic-motor.
- The study identified a negative correlation) between health anxiety and academic performance, suggesting that higher health anxiety is associated with slightly lower GPAs.
- The findings also indicated no significant association between health anxiety and learning styles.

pandemic. Such interventions could include mindfulness-based programs, cognitive-behavioral strategies, and enhanced access to mental health resources and support systems within nursing programs.

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Author's Contribution

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Competing Interests

Authors declare no competing interests.

Data Availability Statement

The datasets used and/or analyzed in the current study are available through the corresponding author for a scientific use such as replication.

Ethical Approval

The present research project has been approved by the Vice-Chancellor for Research and the Ethics Committee of Tabriz University of Medical Sciences with the code IR.TBZMED.REC.1400.1075. The research goals, anonymity of participants, their voluntary participation and the study information were first verbally explained, then read and signed on a written informed consent and the research method followed the Helsinki Declaration.

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