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Factors Influencing Generalized Anxiety Disorder Prevalence among Chinese University Students: A Case Study of a Medical University

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Abstract: The aim of this study is to investigate the prevalence of Generalized Anxiety Disorder (GAD) among students at a medical university in China and to analyze the associations between GAD and factors related to their basic characteristics and sleep situation. The method applied in this paper is a stratified cluster random sampling method used to select on-campus students aged ≥18. An improved questionnaire based on the Generalized Anxiety Disorder 7-item (GAD-7) scale is utilized to screen for tendencies toward GAD. This study also examines the influence of student habits, including late bedtime and sleep-related factors. The findings indicate that approximately 6.437% of respondents exhibit a tendency toward GAD. Significant correlations are identified between GAD and variables such as medical-related majors, family function, academic pressure, emotional issues, and late bedtime, which includes average sleep duration, tendency to late bedtime, and sleep quality ($P<0.05$). No significant associations are observed between GAD and sex or age ($P>0.05$). The results suggest that college students, as a special population, have a higher prevalence rate of GAD compared to the general incidence reported in other countries and regions. A subset of students at the medical university exhibits a tendency toward GAD, which is associated with factors such as family function, medical-related majors, and sleep.

1. Introduction

Generalized Anxiety Disorder (GAD) is a common mental health problem characterized by persistent, excessive, and uncontrollable worry and anxiety. Unlike anxiety, which is limited to specific situations or objects, GAD is pervasive and affects various aspects of daily life[1]. Numerous studies have concluded that since the outbreak of the COVID-19 pandemic in 2019, the global

incidence of GAD has steadily increasing[2]. For example, the prevalence of GAD in Germany has been reported to be 13.4%[3], and among young people in Mexico, it has reached 32.6%[4]. To understand the prevalence of GAD among university students and facilitate the early detection and treatment of psychological issues in this population, this study investigated the tendency towards GAD and its influencing factors in students at a medical university in China.

2. Research Methodology

2.1 Data Source

A random sample of undergraduate students from their first to fifth years at a medical university in China was selected as the study subjects. A total of 235 questionnaires were distributed and returned (response rate, 100%), with 233 valid questionnaires (validity rate, 99.15%). Among the respondents, 78 were male (33.48%) and 155 were female (66.52%) This study informed consent was obtained from all the participants and it was fully compliant with the Code of Ethics of the World Medical Association for experiments involving humans.

2.2 Screening and Diagnostic Methods

An improved version of the Generalized Anxiety Disorder 7-item (GAD-7) scale developed by Spitzer et al[5] was used as the basis for the questionnaire, which consisted of four parts: (1) Basic Information: Including sex, academic year, academic pressure, interpersonal relationships, etc. (2) GAD-7: The severity and functional impact of 7 anxiety symptoms over the past two weeks was assessed, with each symptom scored on a four-point scale from 0 (not at all) to 3 (nearly every day), for a total score of 21. According to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) by the American Psychiatric Association (APA)[6], a score of >10 is considered positive for GAD tendency. (3) Hamilton Anxiety Scale (HAMA)[7]: The somatic anxiety section of the HAMA was used in this study to investigate the frequency of physiological complications in anxious individuals. (4) Sleep Condition Questionnaire: Including frequency of late bedtime, sleep quality, and tendency towards late bedtime. There is no unified definition for "late bedtime" internationally, but based on findings by Professor Shahram Nikbakhtian's team at the University of Oxford, individuals who go to sleep after 23:00 have a 25% higher risk of cardiovascular disease compared to those who go to sleep before 22:59[8]. Therefore, going to sleep after 23:00 is defined as "late bedtime." The Cronbach's alpha coefficient of the self-made questionnaire was 0.934, significantly >0.7, and the KMO value was 0.931, significantly >0.6, close to 1. KMO is a statistical measure that's mainly used to evaluate the correlation and commonality between variables in a questionnaire, as well as to determine if the data is suitable for factor analysis. It indicates good reliability and validity of the questionnaire.

3. Results

3.1 The General Findings of the Results

Among the 233 students surveyed, 160 (68.67%) were enrolled in medical and pharmacy majors, while 73 (31.33%) were enrolled in non-medical majors. The distribution across academic years was as follows: 63 first-year students (27.04%), 89 second-year students (38.20%), 52 third-year students

(22.32%), 24 fourth-year students (10.30%), and 5 fifth-year students (2.15%).

An academic pressure scale was designed, ranging from 0 to 10, where <5 indicated no pressure and ≥5 indicated relatively high pressure. Among the students, 32 (13.73%) reported no academic pressure, and 201 (86.27%) reported high academic pressure.

Regarding family relationships, 63 students (27.04%) reported average or tense family relationships, while 170 (72.96%) reported harmonious or very harmonious family relationships. In terms of interpersonal relationships with classmates, 85 students (36.48%) reported average or distant relationships, while 148 (63.52%) reported close relationships with their classmates. The results are shown in Table 1.

Table 1: Basic characteristics of the study subjects

Characteristic	Number of Students(n=233)	Percentage (%)
Sex		
Male	78	33.48
Female	155	66.52
Academic Year		
First-year	63	27.04
Second-year	89	38.02
Third-year	52	22.32
Fourth-year	24	10.30
Fifth-year	5	2.15
Academic Pressure		
No pressure (<5)	32	13.73
High pressure (≥5)	201	86.27
Family Relationships		
Average or tense	63	27.04
Harmonious or very harmonious	170	72.96
Interpersonal Relationships		
Average or distant	85	36.48
Close	148	63.52
Major		
Medical-related	160	68.67
Non-medical	73	31.33

3.2 Late bedtime and Sleep-related

Among the 233 university students surveyed, 4 (1.7%) did not stay up late, while 229 students (98.3%) reported having a late bedtime. Of the 229 students who stayed up late, 108 (47.16%) went to bed between 23:00 and 00:00, 91 (39.74%) went to bed between 00:00 and 01:00, 21 (9.17%) went to bed between 01:00 and 02:00, and 9 (3.93%) went to bed after 2:00.

Among the 229 students who reported a late bedtime, the frequency of late bedtime was investigated. The results showed that 13 students (5.68%) stayed up late 1-2 days per week, 47 students (20.52%) stayed up late 3-4 days per week, 53 students (23.14%) stayed up late 5-6 days per

week, and 116 students (50.66%) stayed up late every day.

According to the definition of sleep deprivation by the American Thoracic Society (ATS) [9] combined with the comprehensive situation of the study subjects, an average sleep duration of less than 6 hours was defined as insufficient sleep. The results showed that of 233 college students, 15 (6.44%) had insufficient sleep, while 218 (93.56%) had a sleep duration of >6 hours. Among the 233 respondents, 34 (14.6%) had an average sleep duration of >8 hours, 184 (79.0%) had a sleep duration of 6–8 hours, 13 (5.6%) had a sleep duration of 4–6 hours, and only two (0.9%) had a sleep duration of <4 hours.

An additional survey of the 229 college students who reported staying up late was conducted to investigate the reasons for their behavior. The results showed that 91 students (39.74%) stayed up late due to academic reasons, such as coursework and assignments. A total of 163 students (71.18%) stayed up late because of entertainment, such as playing games. Additionally, 59 students (25.76%) stayed up late due to extracurricular activities and related work. Emotional issues were the main reason for late bedtime among 28 students (12.23%). Insomnia or habitual sleep difficulties were cited by 115 students (50.22%), and 59 students (25.76%) indicated that they were influenced by external factors.

Next, the tendency of college students to have a late bedtime was surveyed. The results showed that 10 students (4.3%) were very unlikely to have a late bedtime, 6 students (2.6%) were unlikely to have a late bedtime, 48 students (20.6%) had a neutral or indifferent attitude towards a late bedtime, 74 students (31.8%) were inclined to have a late bedtime, and 95 students (40.8%) were very inclined to have a late bedtime.

A survey on sleep quality revealed the following results: seven participants (3.0%) reported very low sleep quality, 34 participants (14.6%) reported low sleep quality, 114 participants (48.9%) rated their sleep quality as average, 57 participants (24.5%) rated their sleep quality as high, and 21 participants (9.0%) rated their sleep quality as very high.

A survey was conducted among the 229 college students who had late bedtimes to assess their attitudes towards improving late-night sleep habits. The results indicated that 13 students (5.68%) expressed no desire to change their late bedtime, 65 (28.38%) were indifferent about improving their late-night habits, and 151 (65.94%) expressed a desire to improve their late-night sleep patterns.

3.3 Univariate Analysis of Late bedtime, Sleep Patterns, and GAD in College Students

The survey revealed no significant association between different bedtimes and the tendency towards GAD ($P > 0.05$) and no significant association between the frequency of late bedtime and GAD tendency ($P > 0.05$); however, a significant association was found between different average sleep durations and the tendency towards GAD ($P < 0.05$). Late bedtime was significantly associated with the presence of GAD ($P < 0.05$). Sleep quality was also significantly associated with the presence of GAD ($P < 0.05$). The results are shown in Table 2.

Table 2: Analysis of the association between late bedtime, sleep-related characteristics, and the tendency towards GAD among the study subjects.

Item	No Tendency Towards GAD	Tendency Towards GAD	Total
Average Sleep Duration			
>8 hours	33*(97.06%)	1*(2.94%)	34
6~8 hours	174*(94.57%)	10*(5.43%)	184
4~6 hours	11*(84.62%)	2*(15.38%)	13
<4 hours	0	2*(100%)	2
Tendency of Late bedtime			
Strongly Disagree	9*(90.00%)	1*(10.00%)	10
Disagree	4*(66.67%)	2*(33.33%)	6
Neutral or Indifferent	48*(100%)	0	48
Agree	69*(93.24%)	5*(6.76%)	74
Strongly Agree	88*(92.63%)	7*(7.37%)	95
Sleep quality			
Very Low	5*(71.43%)	2*(28.57%)	7
Low	30*(88.24%)	4*(11.76%)	34
Average	110*(96.49%)	4*(3.51%)	114
High	55*(96.49%)	2*(3.51%)	57
Very High	18*(85.71%)	3*(14.29%)	21
Total	218*(93.56%)	15*(6.44%)	233
P	*P<0.05		

Note: P-values indicate the comparison between the group without GAD tendency and the group with GAD tendency.

3.4 Influence of Different Environmental and Sleep-related Factors on GAD in College Students and Multivariate Logistic Regression Analysis

The survey results indicated that a medicine-related major, academic pressure, and family relationships were significantly associated with the presence of GAD tendencies ($P < 0.05$). Academic year, interpersonal relationships, and sex were not significantly associated with the presence of GAD tendencies ($P > 0.05$).

The relationship between the reasons for this behavior and GAD was further explored based on an existing group of college students who exhibited late bedtimes. The results showed that emotional issues were significantly associated with GAD tendencies ($P < 0.05$). However, late bedtime due to courses and assignments, entertainment, extracurricular activities and related work, insomnia or sleep habits, and influence from others were not significantly associated with the presence of GAD tendencies ($P > 0.05$).

3.5 Physiological Complications Arising from Anxiety

An investigation into the physiological complications associated with anxiety revealed that in the

past two weeks, 23 university students (9.87%) experienced somatic (muscular) manifestations (e.g., pains and aches, twitching, stiffness, myoclonic jerks, grinding of teeth, unsteady voice, increased muscular tone). Additionally, 22 students (9.44%) reported somatic (sensory) manifestations (e.g., tinnitus, blurring of vision, hot and cold flushes, feelings of weakness, pricking sensation). Notably, 57 students (24.46%) experienced cardiovascular symptoms (e.g., tachycardia, palpitations, chest pain, vessel throbbing, and feeling faint, missing heartbeats), whereas 39 students (16.74%) reported respiratory symptoms (e.g., pressure or constriction in the chest, choking sensation, sighing, and dyspnea). Gastrointestinal symptoms (e.g., difficulty swallowing, gas pain, burning sensations, abdominal fullness, nausea, vomiting, borborygmi, looseness of bowels, weight loss, and constipation) were observed in 36 students (15.45%), and 45 students (19.31%) experienced genitourinary symptoms (e.g., frequency of micturition, urgency of micturition, amenorrhea, menorrhagia, development of frigidity, premature ejaculation, loss of libido, and impotence). Furthermore, 28 students (12.02%) reported autonomic symptoms (e.g., dry mouth, flushing, pallor, tendency to sweat, giddiness, tension headaches, and hair raising), while 36 students (15.45%) reported having insomnia. Finally, 101 students (43.35%) indicated that they had experienced no physiological discomfort. The results are shown in Figure 1.

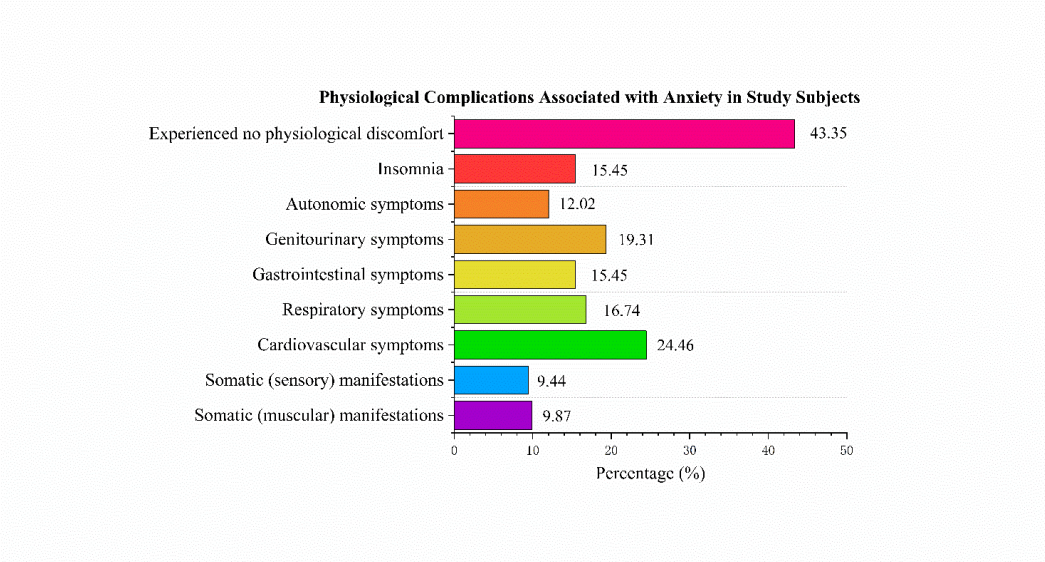

Figure 1: Physiological Complications Associated with Anxiety in Study Subjects (Bar Chart)

4. Discussion

4.1 The Tendency for GAD among College Students is More Severe than in the General Population

In this experimental survey, the tendency for GAD was 6.4%, which was significantly higher than the lifetime prevalence rate of 1.6%[10] found in a second mental health study conducted in Singapore. This suggests that college students have relatively immature psychological states and more pronounced anxiety than adults in society. The mental health of college students is deteriorating, with a psychological health survey from the United States involving over 350,000 college students revealing that more than 60% had one or more mental health issues in the past two years, a 50% increase from 2013[11]. Additionally, the prevalence of GAD among Lithuanian students had reached

38.3% in 2022[12]. It is crucial to pay attention to the mental health issues of college students, and universities should take appropriate measures to monitor their long-term mental health to prevent incidents such as suicide.

4.2 The Impact of Late bedtime and Sleep on GAD Tendency in College Students

The survey revealed that the phenomenon of late bedtime was prevalent among college students (98.3%). Late bedtime not only causes physical harm but also affects learning efficiency[13]. However, an attitude survey showed that 151 students (65.94%) were aware of the dangers of a late bedtime and wished to improve, reflecting the generally contradictory attitude of college students. There was a significant correlation between the tendency towards late bedtime and the tendency to develop GAD. Students who naturally prefer a late bedtime do not experience any burden or anxiety, whereas those who do not prefer a late bedtime but are forced to do so for various reasons are more prone to anxiety, which leads to a tendency towards GAD. Analysis of the reasons for late bedtimes revealed that most college students do so for entertainment, indicating a possible lack of self-discipline and a need for scientific sleep guidance. Only insomnia caused by emotional problems leads to anxiety, further indicating that subjective late bedtime (e.g., for entertainment) does not cause anxiety. This finding suggests that college students lack the ability to handle emotional problems appropriately. Scholars have found that college students generally have weakened emotional responses[14], underscoring the need for proper emotional education and guidance. Universities should pay attention to students' mental health and be wary of the irreversible harm caused by unhealthy relationships. It is evident that students who are inclined to sleep early but delayed due to various factors are prone to anxiety, leading to a tendency towards GAD. Regarding sleep duration, approximately 79.0% of college students sleep 6–8 hours per night on average, which aligns with the recommended 7–9 hours for adults[15], a positive sign. Prolonged insufficient sleep can foster anxiety and lead to high-mortality diseases, such as stroke[16], necessitating special attention. Poor sleep quality and insufficient sleep have become serious global health issues that directly and adversely affect physical health[17]. There is a significant correlation between sleep quality and GAD tendency. Poor sleep and insufficient sleep are likely linked to mental state the following day. High academic pressure, particularly in medical colleges, can exacerbate this situation, leading to a vicious cycle that fosters anxiety.

4.3 The Impact of Background and Environmental Factors on GAD Tendency in College Students

The survey revealed a significant difference between whether a student’s major was related to medicine and the tendency to have GAD, with all 15 students with GAD tendencies being medical students. This finding highlights the psychological uniqueness of medical students. A Canadian research team found that nearly all medical students have psychological issues[18]. It is important to focus on the mental health of medical students, and universities should provide professional psychological counseling to alleviate anxiety and depression. Academic pressure is directly related to anxiety. Medical students face long academic years, heavy coursework, and complex clinical practice[19]. Medical colleges should explore balancing healthy development in medical education and appropriately reducing the burden on medical students. The survey also found that the level of harmony in family interactions is an important factor influencing anxiety. Although college students

are technically adults, they are still in a crucial period of psychological and physical development and have closer connections to their families than students in other countries because the specificity of Chinese education. Inadequate family functioning is a significant cause of depression among Chinese medical students[20]. Tense family relationships can directly cause significant psychological stress and harm, possibly leading to a tendency towards GAD. Universities can explore a model of coaching students and their families and conduct regular visits to investigate family atmospheres to ensure the healthy psychological growth of college students.

5. Conclusion

This study investigated GAD tendencies among college students at a medical university in China and the impact of factors such as major and sleep on anxiety levels. Besides, chronically high levels of anxiety can also lead to several adverse physiological comorbidities. Including medical majors and poor family relationships can indeed contribute to GAD among college students. Additionally, Chinese college students generally Late bedtime, and poor sleep quality and average sleep duration can indeed affect their anxiety levels. This reveals that as a special group, college students have a higher level of anxiety than the general population. Furthermore, medical students experience higher stress levels compared to students in other majors, which makes them more prone to anxiety. These findings provide a solid basis for universities to develop more effective mental health policies, allowing early intervention in students' psychological issues and timely improvement of treatment.

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