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RESEARCH ARTICLE

Investigate the Impact of Academics on Mental Health Issues among University Students

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ABSTRACT

Recently, a greater focus has been on exploring the relationship between academic performance and the mental health of university students. As students advance in their academic journey, they encounter a multitude of stressors, with academic responsibilities such as coursework, exams, and assignment deadlines being acknowledged as significant factors that could affect their mental health. As a result, the purpose of this study is to add to the current body of information by investigating the impact of academic parameters such as CGPA and courses on mental health among university students, namely bipolar disorder, depression, and anxiety, with a special emphasis on sleep quality and diet quality. An online questionnaire survey was used to collect data from university students around Malaysia, which yielded a total of 200 responses. In this study, we used IBM SPSS Statistics as an analysis tool to examine the data obtained from the questionnaires. Chi-square and mediating analysis are used to determine the direct and indirect effects of the predictor, mediator, and dependent variable. According to Chi-square, course and depression, anxiety and sleep quality, and depression and sleep quality, are shown to have significant direct effects. Mediation analysis revealed that none of the investigated hypotheses had substantial mediation effects. This study sheds new light on how academics influence student mental health and how mental health affects students' physical health. Our findings imply that mental health has a large direct effect on physical health and that high-pressure courses will have a beneficial impact on mental health scores. This is useful as guidance to educators in the future design of course loads in education.

INTRODUCTION

In recent years, there has been increasing attention to the connection between academic performance and the mental health of university students. As students navigate their academic journey, they encounter a myriad of stressors, especially academic workloads such as coursework,

exams, and assignment deadlines, which are recognized as key factors that can affect their mental well-being (Hernández-Torrano et al., 2020). The issue of mental health among university students has become a significant concern (Brown, 2016). A large-scale international survey that included 14,000 students from 19 universities in 8 different countries found that 35% of them met the diagnostic criteria for at least one common mental health condition (Auerbach et al., 2016). University students exhibit higher rates of depression compared to the general population, which has a prevalence of 12.9% among similarly aged groups (Eisenberg et al., 2007). Although student suicide rates are typically lower than those in the general population, there has been a noticeable rise in recent years, particularly in the UK, with a 15% increase since 2009 (Mortier et al., 2018; Gunnell et al., 2020). Freshman students transitioning to university are considered especially susceptible to mental health issues during this critical period, when young adults often start experiencing such problems, typically before turning 24 years old (Kessler et al., 2008). Therefore, it is crucial to understand how academic factors impact mental health issues for effective interventions among university students.

The literature review explores the connections between academic factors and mental health among university students. It investigates how various aspects of academic life, such as workload, stress, and academic pressure, may impact the mental health and well-being of students. Research indicates that poor academic performance correlates with higher rates of depression, while challenging courses such as engineering and medicine often increase anxiety (Khan et al., 2023; Pascoe, 2020). Bipolar disorder shows complex patterns with academic factors, with some studies suggesting a weak link, while others find associations with eating disorders due to shared traits such as impulsivity (McDonald et al., 2019). Sleep quality is critical, with poor sleep leading to lower academic achievement and more stress, anxiety, and depression (Hossain, 2020; Norbury, 2019). Similarly, diet quality can reflect mental health, as depression and anxiety can lead to unhealthy eating habits (Keck et al., 2020). These findings highlight the need for universities to address broader lifestyle factors to improve students' well-being.

Although previous research has traditionally focused on the academic aspects of student life, there is a growing recognition of the importance of considering broader lifestyle factors that may intersect with academic pursuits to influence mental health outcomes. In particular, sleep quality and diet quality have emerged as two critical domains worthy of investigation due to their potential impact on mental health among university students. However, there is a research gap on the impact of academics on mental health issues. This research aims to contribute to the existing body of knowledge by exploring the impact of academic factors (CGPA and courses) on mental health (bipolar disorder, depression, and anxiety) among university students, with a particular focus on sleep quality and diet quality.

2.0 LITERATURE REVIEW

CGPA and depression

Several recent studies have found a significant link between poor academic performance and depression among students (Khan et al., 2023; Khanam et al., 2015). Consistent with previous research, these studies show a substantial positive link between lower self-reported grade point averages (GPAs) and a higher incidence of depression among students. This is consistent with research indicating that lower grades at the end of compulsory schooling are related to an increased risk of clinical depression. Furthermore, previous research has revealed that male university students have a higher risk of depression than female students, while female students perform better academically (Khanam et al., 2015). The findings of the current study provide more evidence in favor of the theory that students' depression is significantly predicted by their poor academic achievement. Furthermore, depression is more common in students who have overwhelming workloads and academic difficulties (Khan et al., 2023).

Courses and Depression

Several studies that examine the link between college coursework and depression have revealed that different subject areas can have varying impacts on students' mental well-being (Nezam et al., 2020; Fatimah et al., 2016; Moreira de Sousa J. et al., 2018). Academic disciplines like engineering and medicine often come with heavier workloads and more challenging assignments compared to other fields, which are likely to cause higher depression rates (Nezam et al., 2020; Fatimah et al., 2016). In particular, respected courses such as those in medicine, engineering and dentistry have been associated with higher rates of depression among students compared to other courses (Nezam et al., 2020; Fatimah et al., 2016; Moreira de Sousa J. et al., 2018). Two recent studies indicate that medical students in both Portugal and China often show higher levels of depressive symptoms compared to their nonmedical counterparts (Moreira de Sousa et al., 2018; Mao et al., 2019). Although engineering students are more likely than dental and medical students to report depressive symptoms in prestigious courses, the latter two groups are more prone to experiencing moderate and severe depressive symptoms (Nezam et al., 2020; Fatimah et al., 2016).

Furthermore, recent additional studies have supported these findings, revealing a troubling prevalence of depressive symptoms in various courses, with dentistry, medicine, applied medical sciences, and nursing students showing the highest rates (AlFaris et al., 2016). These study results underscore the importance of considering the workload and assignment requirements associated with certain courses, as they can significantly impact students' experiences with depression (Fatimah et al., 2016).

However, it is important to acknowledge that depression affects a large percentage of students across different courses, regardless of their reputation or renown. This suggests that it may not be accurate to assume that only prestigious courses lead to depression, as other courses also pose risks of depression among university students (Honney et al., 2010). Previous research revealed that medical students were less likely to report depressive symptoms, whereas nonmedical students had higher rates of severe depression, with 12.7% of non-medical students and 5.6% of medical students affected. Additionally, moderate depression were also higher among nonmedical students, at 17.7%, compared to 10.8% among medical students. This difference in depressive symptoms between medical and nonmedical students may be influenced by factors such as financial stress and ethnicity, which can have a greater impact on students' depression rates compared to their chosen courses (Honney et al., 2010).

Depression and Sleep Quality

Insufficient sleep in students, particularly university students, is widely recognized as a major health concern by renowned medical groups such as the American Medical Association and the American Academy of Sleep Medicine (Owens, 2014). Research suggests that depression, anxiety, and stress could negatively impact young people's sleep quality (Bernert et al., 2007; Curcio et al., 2006; Doan et al., 2019; Jiang et al., 2022; Tin et al., 2024).

Research has shown that mental health conditions such as stress, depression and anxiety (SAD) have a negative impact on sleep quality of sleep for female students enrolled in universities in the United States, Saudi Arabia, Portugal, Tehran University of Medical Sciences, Pakistan, medical schools and Middle Eastern, Asian, and Arabia. These findings highlight the cross-cultural influence of mental health on sleep among students pursuing higher education. (Lee et al., 2013; Wallace et al., 2017; Amaral et al., 2018; Almojali et al., 2017; Yarmohammadi et al., 2014; Waqas et al., 2015).

Although a previous study indicated that medical students in Eastern countries tend to experience higher levels of depression, anxiety, and stress compared to their counterparts in European countries (Doan et al., 2019), other studies suggest that children with mental health disorders, such as Sad Anxiety Depression (SAD), face various challenges. These challenges include sleep disturbances and lower academic performance (Lee et al., 2013; Wallace et al., 2017; Amaral et al., 2018; Almojali et al., 2017; Yarmohammadi et al., 2014; Waqas et al., 2015).

Depression and diet quality

Dietary practices and depression have been closely associated (Keck et al., 2020). A decrease in appetite is often the result of mental health issues such as depression (Georgia et al., 2020; Emre Serin and Mustafa Can Koç, 2020). Additionally, research indicates that a substantial percentage of university students tend to eat less when they feel intensely negative emotions such as stress, depression, anger, or sadness. This pattern is consistent with earlier research showing that non-obese people eat less when they are feeling down (Nolan et al., 2010; Tariq A. Alalwan et al., 2019).

Many studies have found that people who suffer from anxiety or depression consume more sugar and fewer calories overall (Georgia et al., 2020; Emre Serin and Mustafa Can Koç, 2020; Nolan et al., 2010; Tariq A. Alalwan et al., 2019; Keck et al., 2020). Interestingly, though, when symptoms of depression increased, men in particular were shown to consume a higher amount of fat while eating fewer fruits and vegetables (Keck et al., 2020). These results highlight the complex link between food decisions and mental health, indicating that depressive symptoms can have a major influence on people's appetite and eating habits.

Academics and anxiety

Extensive research has been conducted on the correlation between course academics and anxiety outcomes. Various studies that have explored the prevalence of anxiety among medical students, with factors such as academic pressure, clinical practice, and gender being significant contributors (Mao, 2019). This anxiety can have a negative impact on academic performance, and medical students experiencing higher levels of anxiety during clinical rotations (Saddik, 2020). The COVID-19 pandemic has further exacerbated anxiety levels among medical and non-medical university students, with medical students reporting higher anxiety during clinical rotations and lower anxiety during online learning (Saddik, 2020). These findings underscore the need for targeted support and interventions to address anxiety among medical students.

Furthermore, the study has also been researched and influenced by a variety of factors. Academic-related stress, a common experience for engineering students, can have a significant impact on mental health, including increased anxiety (Pascoe, 2020). This is further compounded by the prevalence of anxiety among university students, with academic life being a key risk factor. Identifies academic factors as a key theme in risk factors associated with anxiety among university students, further underscoring the potential impact of engineering courses on anxiety levels (Mofatteh, 2020).Therefore, more research is needed to explore whether other courses will affect anxiety.

Furthermore, various studies have emphasized the prevalence of anxiety among university medical students, noting that factors such as gender, academic performance, and self-confidence contribute to its manifestation (Shooraj & Mahdavi, 2021). Research has shown that mindfulness-based psychotherapy interventions can effectively reduce anxiety levels within this demographic (Ramadianto et al., 2022). However, there remains uncertainty regarding whether medical students experience anxiety more frequently than their nonmedical peers (Mirza, 2021).

Anxiety and sleep

Research consistently shows a relationship between anxiety and sleep quality, with anxiety often preceding poor sleep (Staines, 2021). Sleep disturbances are prevalent in students with anxiety disorders and, although the direction of the association is unclear, a reciprocal relationship is evident (Brown,2018).In university students, poor sleep quality is associated with higher levels of anxiety (Norbury, 2019). In the whole sample, 46% of participants reported having fairly poor or very poor sleep quality. Poor sleep was more common among first-year university students, who generally preferred university activities to start about two hours later than the current schedule. These findings suggest that a significant number of students suffer from chronic sleep deprivation, with the average student getting less than 7 hours of sleep per night on weekdays. This trend was particularly noticeable among first-year students (Norbury, 2019).

Anxiety and eating disorders

An increasing number of studies indicate a significant link between diet quality and mental health. Studies have found that healthy diet patterns, such as the Mediterranean and DASH diets, are associated with lower levels of depression and anxiety in university students (M, 2021). On the contrary, stress and anxiety can lead to poorer diet quality. A comprehensive search was conducted in the Cochrane Library and Web of Science using relevant keywords. The findings showed that most studies (36 out of 45) suggested a positive association between a healthy diet and better mental health among students, including reduced symptoms of depression, anxiety, and stress, as well as improved overall mental well-being. Furthermore, a majority of studies (19 out of 23) indicated that stress and anxiety among students were related to poorer diet quality (Solomou, 2022).

Research also found a high prevalence of mental health disorders, particularly eating disorders, among undergraduate students (González-Valero, 2019) and (Mofatteh, 2020), both of which underscore the prevalence of mental health issues, including anxiety, among students, with Mofatteh specifically identifying psychological and lifestyle factors as significant contributors. There are disorders among undergraduate students in the United States. A total of 12 studies were included in the final data extraction. Eating disorders showed the highest prevalence rates, with estimates ranging from 19% to 48% (Kang, 2020). This suggests that the rise of mental health issues may have a significant impact on the occurrence of eating disorders.

Course and bipolar disorder

The prevalence of bipolar disorder among college students is low, but is increasing, and early detection and accurate diagnosis are crucial (Khan et al., 2019). Research indicates a correlation between lower academic performance and increased risk for various mental health conditions such as non-affective psychoses, bipolar disorder, and depression, with physical education courses displaying the highest risk ratios. On the contrary, higher arts grades were associated with elevated risks of nonaffective psychoses and depression (Pedersen, 2019). Specifically, a study identified 80 of 298 medical students in particular from Pakistan, who were affected by bipolar spectrum disorder (BSD) (Ali et al., 2019). Interestingly, it is not confined to science stream students; a study comparing art students with peers from other disciplines found that more than half were positive for bipolar disorder using the mood disorder questionnaire (MDQ) (Demir et al., 2019). This highlights the importance of implementing comprehensive mental health screening and support services that meet the diverse needs of college students.

However, some colleges are taking proactive measures within their academic programs to address bipolar disorder. Xu & Li (2023) found that traditional music education significantly alleviated affective bipolar disorder, improved self-adjustment ability, and reduced anxiety and depression symptoms. Similarly, health education (Liu, 2023), psychology, curriculum thinking, and politics (Yang & Zhang, 2023) could effectively increase the level of emotional intelligence of bipolar disorder patients. Incorporating targeted interventions into the educational curriculum allows colleges to build a supportive environment that fosters both the mental health and academic achievement of students with bipolar disorder. Furthermore, the asynchronous teaching method approach helps students who suffer from bipolar affective disorder (Zhu, 2023). This flexible learning approach allows students to engage with course materials at their own pace, reducing stress and promoting academic engagement and success.

Academic performance and bipolar disorder

Studies have indicated a complicated connection between academic performance and bipolar disorder. The relationship between bipolar and borderline personality traits, impulsivity, and academic performance is less clear, with some studies finding a positive correlation between these traits and impulsivity but not with academic performance (Ailunli et al., 2021). Gyllenberg et al. (2022) also found no direct correlation between school performance and the later diagnosis of bipolar disorder.

However, certain studies propose a different perspective. They suggest that struggling academically could potentially lead to bipolar disorder. Sörberg Wallin et al. (2018) found a link between poor academic performance and depression, which is often comorbid with bipolar disorder. Szmulewicz et al. (2019) highlighted the presence of neurocognitive deficits in bipolar disorder, which could potentially impact academic performance. Therefore, while weak academic performance may not directly cause bipolar disorder, it could be a symptom or a result of cognitive deficits associated with the condition.

Bipolar disorder and sleep quality

Research consistently shows a strong link between bipolar disorder and poor sleep quality in students (Hasan & Junardi, 2020; Comsa et al., 2022). Individuals with a vulnerability to bipolar disorder, as indicated by higher hypomanic personality scale scores, are more likely to experience sleep disturbances such as insomnia and sleepiness (Hensch et al., 2019; Jermann et al., 2021). Individuals with bipolar disorder who experience poor sleep quality, especially in the evening, tend to exhibit elevated levels of residual depressive symptoms and behavioral inhibition (Caruso et al., 2019). Factors such as exposure to light at night can further exacerbate sleep disturbances in these individuals with bipolar disorder (Esaki et al., 2019). These findings underscore the importance of addressing sleep quality in the management of bipolar disorder, particularly in students.

Furthermore, Meyer et al. (2020) showed that individuals with bipolar disorder tend to have longer sleep times, as well as disturbed initiation and continuity of sleep. This is further exacerbated by factors such as exposure to evening light, which has been found to be associated with lower sleep efficiency and longer wakes after the onset of sleep (Esaki et al., 2020). These sleep disturbances, particularly in those with abnormal sleep patterns, are linked to cognitive abnormalities, including impaired attention and processing speed (Bradley et al., 2019).

Bipolar and Eating Disorders

Research suggests a strong link between bipolar disorder and eating disorders, particularly binge/purge pathology (McDonald et al., 2019). This connection is attributed to shared pathophysiological factors, such as dysregulation and impulsivity (McDonald et al., 2019; Tavormina G, 2020). The prevalence of eating disorders in people with bipolar disorder is high, with specific characteristics such as binge eating and overvaluation of weight or shape that significantly impact quality of life (Yakovleva et al., 2023; McAulay et al., 2021). Patients with bipolar disorder also tend to have unhealthy dietary patterns and lower adherence to the Mediterranean diet, which can contribute to comorbid obesity and disorders of carbohydrate metabolism (ojko 2019).

Academics and Sleep Quality

Meanwhile, academics also influence sleep quality among university students. Several studies have highlighted the significant impact of sleep quality on academic performance among university students. Poor sleep quality, including short sleep duration and sleep disturbances, has been associated with lower academic achievement (Hossain, 2020). Therefore, more research is needed among university students to determine the impact of sleep quality on different courses.

A study involving 1,951 participants classified them into a group with poor sleep quality, as determined by a Pittsburgh Sleep Quality Index (PSQI) score greater than 5. The results indicated that males had significantly higher scores for sleep duration and use of sleep medication, while females scored significantly higher on the Pittsburgh Sleep Quality Index (PSQI) total score and experienced more sleep disturbances (Li et al., 2020).

Conceptual Framework

Based on the literature review, a conceptual framework can be constructed to mediate mental health problems, which are sleep quality and eating disorder, with predictors, which are CGPA and courses, and dependent variables, which are bipolar disorder, depression, and anxiety. The conceptual framework is shown in figure 1, as follows:

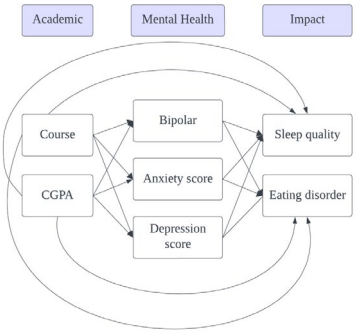

Figure 1: conceptual framework of predictor, mediator and dependent variable of this research.

The following hypotheses are constructed based on the conceptual framework:

H1: Courses significantly impact bipolar levels.

H2: Courses have a significant impact on anxiety levels.

H3: Courses significantly impact depression levels.

H4: CGPA significantly affects bipolar levels.

H5: CGPA positively affects anxiety levels.

H6: CGPA significantly affects depression levels.

H7: Bipolar mediates the relationship between CGPA and sleep quality significantly.

H8: Anxiety significantly mediates the relationship between CGPA and sleep quality.

H9: Depression significantly mediates the relationship between CGPA and sleep quality.

H10: Bipolar mediates the relationship between CGPA and eating disorder significantly.

H11: Anxiety significantly mediates the relationship between CGPA and eating disorder.

H12: Depression significantly mediates the relationship between CGPA and eating disorder.

H13: Bipolar mediates the relationship between course and sleep quality significantly.

H14: Anxiety significantly mediates the relationship between course and sleep quality.

H15: Depression significantly mediates the relationship between course and sleep quality.

H16: Bipolar mediates the relationship between course and eating disorder significantly.

H17: Anxiety significantly mediates the relationship between course and eating disorder.

H18: Depression significantly mediates the relationship between course and eating disorder.

H19: Course significantly affects sleep quality.

H20: Courses significantly impact eating disorders.

H21: CGPA significantly affects sleep quality.

H22: CGPA significantly affects eating disorders.

H23: The bipolar score positively impacts sleep quality.

H24: The bipolar score positively impacts eating disorders.

H25: Anxiety score positively impacts sleep quality.

H26: The anxiety score positively impacts eating disorders.

H27: Depression score positively impacts sleep quality.

H28: The depression score positively affects eating disorders.

3.0 RESEARCH METHODOLOGY

Our study population consists of Malaysian university students. This decision is motivated by the increasing incidence of mental health issues among university students in Malaysia. There is currently a shortage of research on this topic in Malaysia. As a result, our study intends to fill this gap by investigating the mental health condition of Malaysian university students and finding relevant factors influencing their mental well-being. By focusing on this population, we intend to obtain significant insights that may be used to improve mental health policies and interventions tailored to the specific needs of Malaysian university students.

Our sampling approach employs basic random sampling, which involves selecting a sample from the population such that each individual has an equal probability of being selected. This approach ensures that our sample is representative and that our findings are applicable to a larger population of Malaysian university students. To implement this sampling technique, we use a variety of channels to distribute our questionnaire, including on-line platforms such as Instagram, Facebook, and WeChat, as well as physical distribution by approaching students at TAR UMT and asking them to scan the QR code on the Google Form questionnaire. We intend to reach a diverse variety of university students from various states and backgrounds in Malaysia using both online and physical approaches.

The data gathering approach used in this study is a questionnaire distributed through Google Forms. This online platform enables quick data collection and the participation of a large number of respondents. The questionnaire is meticulously designed to collect pertinent information on university students' mental health state, such as their experiences with stress, anxiety, depression, and coping strategies. The questionnaire is also provided to university students in various Malaysian states, including Penang, Kuala Lumpur, and Johor, both online and in person. This technique enables the inclusion of a geographically diversified sample, which improves the external validity of our findings. The questionnaire is administered over one month, and a total of 200 respondents are recruited. We hope that this comprehensive data collection method will provide us with a deeper understanding of the mental health problems that university students in Malaysia encounter, as well as contribute to the development of targeted treatments to help them.

Table 1: Questions and section of the questionnaire.

Questionnaire item	Resources
Introduction What is your gender? (Male / Female) What is your Age ? (≤18 , 19-23 ,≥24) What is your course ? What is your CGPA ?	NA
Bipolar test (higher mark, more serious) 1. Has there ever been a period of time when you were not your usual self and you felt so good or hyper that other people thought you were not your normal self or so hyper that you got into trouble? (Yes / No) 2. Has there ever been a period of time when you were not your usual self and you were so irritable that you shouted at people or started fights or arguments? (Yes / No) 3. Has there ever been a period of time where you were not your usual self and you felt much more self-confident than usual? (Yes / No) 4. Has there ever been a period of time when you were not your usual self and you got much less sleep than usual and found that you did not really miss it ? (Yes / No)	(Mental Health America, 2024b)

5. Has there ever been a period of time where you were not your usual self and you were much more talkative or spoke much faster than usual? (Yes / No) 6. Has there ever been a period of time when you were not your usual self and thoughts raced through your head or you could not slow your mind down? (Yes / No) 7. Has there ever been a period of time when you were not your usual self and you were so easily distracted by things around you that you had trouble concentrating or staying on track? (Yes / No) 8. Has there ever been a period of time when you were not your usual self and you had much more energy than usual ? (Yes / No) 9. Has there ever been a period of time when you were not your usual self and you were much more social or outgoing than usual, for example, you called friends in the middle of the night? (Yes / No) 10. Has there ever been a period of time when you were not your usual self and you were much more interested in sex than usual? (Yes / No) 11. Has there ever been a period of time when you were not your usual self and did things that were unusual for you or that other people might have thought were excessive, foolish, or risky? (Yes / No) 12. Has there ever been a period of time where you were not your usual self and spending money got you or your family in trouble? (Yes / No) 13. If you checked yes to more than one of the above, have several of these ever occurred during the same period of time? (Yes / No) 14. What kind of problem did any of these cause you? Like being unable to work; having family, money, or legal troubles; getting into arguments or fights? (No problem/Serious problem) 15. Have any of your blood relatives had a manic-depressive illness or bipolar disorder? Children, siblings, parents, grandparents, aunts, and uncles. (Yes / No) 16. Has a health professional ever told you that you have a manic-depressive illness or bipolar disorder? (Yes / No)	
Anxiety score (higher mark, more serious) 1. Feeling nervous, anxious, or on edge. (Not at all / Nearly every day) 2. Not being able to stop or control the worry. (Not at all / Nearly every day) 3. Worrying too much about different things. (Not at all / Nearly every day) 4. Trouble relaxing. (Not at all / Nearly every day) 5. Being so restless that it is hard to sit still (not at all / Nearly every day) 6. Becoming easily annoyed or irritable. (Not at all / Nearly every day) 7. Feeling afraid, as if something awful might happen. (Not at all / Nearly every day)	(Mental Health America, 2024a)
Depression score (higher mark, more serious) 1. Little interest or pleasure in doing things. (Not at all / Nearly every day) 2. Feeling down, depressed, or hopeless. (Not at all / Nearly every day) 3. Trouble falling or staying asleep or sleeping too much. (Not at all / Nearly every day) 4. Feeling tired or having little energy. (Not at all / Nearly every day) 5. Poor appetite or overeating. (Not at all / Nearly every day)	(Mental Health America, 2024c)

6. Feeling bad about yourself or that you are a failure or have let yourself or your family down. (Not at all / Nearly every day) 7. Trouble concentrating on things such as reading the newspaper or watching television. (Not at all / Nearly every day) 8. Thoughts that you would be better off dead or of hurting yourself. (Not at all / Nearly every day) 9. If you checked any problems, how difficult have these problems been for you at work, home, or with other people? (Not at all / Nearly every day)	
Sleep quality test (higher mark, lower sleep quality) 1. How long (in minutes) has it taken you to fall asleep each night? (0 - <15 min, 1 - 16-30 min, 2 - 31-60 min , 3 - > 60 min) 2. How many hours of actual sleep did you get at night? (0 - >7, 1 - 6-7 , 2 - 5-6 , 3 - <5) 3. During the past month, how often have you had trouble sleeping because you cannot get to sleep in 30 minutes. (Not during the past month/ 3 or more times per week) 4. During the past month, how often have you had trouble sleeping because you wake up in the middle of the night or early morning (not during the past month/ 3 or more times per week) 5. During the past month, how often have you had trouble sleeping because you have to get up to use the bathroom? (Not during the past month/ 3 or more times per week) 6. During the past month, how often have you had difficulty sleeping because you cannot breathe comfortably? (Not during the past month/ 3 or more times per week) 7. During the past month, how often have you had trouble sleeping because you cough or snore loudly.(Not during the past month/ 3 or more times a week) 8. During the past month, how often have you had trouble sleeping because you feel too cold.(Not during the past month/ 3 or more times a week) 9. During the past month, how often have you had trouble sleeping because you feel too hot.(Not during the past month/ 3 or more times a week) 10. During the past month, how often have you had trouble sleeping because you have bad dreams? (Not during the past month/ 3 or more times per week) 11. During the past month, how often have you had trouble sleeping because of pain? (Not during the past month/ 3 or more times a week) 12. During the past month, how often have you had trouble staying awake while driving, eating meals, or participating in social activities? (Not during the past month/ 3 or more times per week) 13. During the past month, how much of a problem has it been for you to keep the enthusiasm to get things done?(Not during the past month/ 3 or more times a week) 14. During the past month, how would you rate your sleep quality overall?(Very good/Very Bad)	(Health Performance, 2020)
Eating Disorders Test (higher mark, better appetite) 1. My appetite is (very poor/ good) 2. When I eat, I feel full after eating only (1 - few mouthfuls, 2 - about a third of the meal, 3 - over half the meal, 4 - most of a meal, 5 - barely feel full)	(Wleklik et al., 2019)

3. I feel hungry (relatively / all the time) 4. Food tastes (very bad / very good) 5. Compared to when i was younger, food tastes (much worse/ much better) 6. Normally I eat (1 - less than one meal per day, 2 - one meal a day, 3 - Two meals a day, 4 - three meals a day, 5- More than 3 meals a day) 7. I feel sick or nauseated when I eat (most of the time/ more than three meals a day). 8. Most of the time my mood is (very sad /very happy).	

In this research, we are using IBM SPSS Statistics as an analysis tool to analyze the data obtained from the questionnaires. For **H1**-**H6** and **H21**-**H28**, we use Chi-Square. For **H7**–**H18**, we use mediating analysis to find direct and indirect effects between the predictor, mediator, and dependent variable.

4.0 RESULT

Table 2 reports Cronbach's alpha coefficients for five different questionnaire tests, along with the corresponding number of items in each test. The bipolar test, which comprises 16 items, has a reliability of 0.83. The anxiety test, with 7 items, exhibits a Cronbach's alpha of 0.88. The depression test, which contains 9 elements, has a slightly higher reliability of 0.89. The sleep quality test, with 14 items, shows an alpha of 0.92, indicating a high internal consistency. The eating disorder test has 8 items with a reliability of 0.79. The overall reliability for the 54 items across these tests is 0.93. These data were collected from a sample of 200 participants. In conclusion, the data collected are reliable.

Table 2: Reliability analysis of the questionnaire items using Cronbach's alpha

Questionnaire items sections	**Cronbach's alpha based on standardised items**	**Number of items**
Bipolar test	0.83	16
Anxiety test	0.88	7
Depression test	0.89	9
Sleep quality test	0.92	14
Eating disorder test	0.79	8
Overall	0.93	54
N = 200		

Table 3 provides information on the age, sex, study study course, and CGPA distribution among respondents. A total of 200 respondents were surveyed. The age distribution shows that most of the respondents are between 19 and 23 years of age, accounting for 88.6% of the total. A smaller group of respondents, 16 in total, are 24 years or older, making up 8%, while the youngest group, those aged 18 or under, comprises 3% of the respondents (6 individuals). Regarding gender, males form the majority with 126 respondents (62.7%), while females make up 74 respondents (36.8%).

Table 3: Demographics of the respondents

		No of respondent	**Percentage (%)**
Age	≤18	6	3%
	19-23	178	88.6%
	≥24	16	8%
Gender	Male	126	62.7%
	Female	74	36.8%
Course	Accounting and Finance	16	8%
	Architecture	2	1%

	Art	11	5.5%
	Biotechnology	1	0.5%
	Business	42	21%
	Computer Science	72	36%
	Construction	1	0.5%
	Education	2	1%
	Engineering	18	9%
	Fashion Design	1	0.5%
	Graphic	1	0.5%
	Information Security	1	0.5%
	Insurance	1	0.5%
	Law	4	2%
	Marine Environmental Chemistry	1	0.5%
	Media Studies	1	0.5%
	Medical Laboratory Technology	1	0.5%
	Medicine	2	1%
	Multimedia and broadcasting	8	4%
	Pharmacy	4	2%
	Quantity Survey	1	0.5%
	Science	8	4%
	Technology	1	0.5%
CGPA	1.76 - 2.00	4	2%
	2.01 - 2.25	1	0.5%
	2.26 - 2.50	1	0.5%
	2.51 - 2.75	1	0.5%
	2.76 - 3.00	24	12%
	3.01 - 3.25	14	7%
	3.26 - 3.50	40	20%
	3.51 - 3.75	33	16.5%
	3.76 - 4.00	82	41%

The study course has a varied distribution, with the most popular course being Computer Science, followed by 72 respondents (36%). Business is the next most common field, with 42 respondents (21%). Accounting and Finance are taken by 16 respondents (8%), while Engineering has 18 respondents (9%). Courses with lower representation include Architecture, Biotechnology, Construction, Education, Fashion Design, Graphic, Information Security, Insurance, Law, Marine Environmental Chemistry, Media Studies, Medical Laboratory Technology, Medicine, Multimedia and Broadcasting, Pharmacy, Quantity Survey, Science and Technology, each accounting for 1% or less of the total respondents.

The CGPA distribution shows a wide range of academic performance. Most of respondents have a CGPA between 3.76 and 4.00, with 82 respondents (41%). The next largest group has a CGPA between 3.26 and 3.50, with 40 respondents (20%). Follow closely, 33 respondents (16.5%) have a CGPA between 3.51 and 3.75. The remaining CGPA ranges contain fewer respondents, with 24 individuals (12%) between 2.76 and 3.00, 14 individuals (7%) between 3.01 and 3.25, and smaller numbers for other ranges.

According to Table 4, most of the hypotheses were not significant, including **H1**, **H2**, **H4**, **H5**, **H6**, **H21**, **H22**, **H23**, **H24**, **H26**, and **H28**. However, three hypotheses showed significant relationships. **H3**, which examined the relationship between course and depression, showed a significant direct effect of .039, suggesting a notable association between these two variables. Furthermore, **H25** (Anxiety

and Sleep Quality) had a highly significant result with a direct effect of .000, pointing to a strong correlation between anxiety levels and sleep quality. Similarly, **H27** (Depression and Sleep Quality) also had a significant direct effect of .000,

Table 4: Hypothesis test result using Chi-square

	Predictor	DV	DE	Result
H1	Course	Bipolar	.098	Reject
H2	Course	Anxiety	.347	Reject
H3	Course	Depression	.039*	Accept
H4	CGPA	Bipolar	.699	Reject
H5	CGPA	Anxiety	.690	Reject
H6	CGPA	Depression	.527	Reject
H21	CGPA	Sleep Quality	.420	Reject
H22	CGPA	Eating Disorder	.993	Reject
H24	Bipolar	Eating Disorder	.076	Reject
H25	Anxiety	Sleep Quality	.000***	Accept
H26	Anxiety	Eating Disorder	.313	Reject
H27	Depression	Sleep Quality	.000***	Accept
H28	Depression	Eating Disorder	.124	Reject

Note: * p < 0.05; ** p < 0.01; *** p< 0.001; DV: Dependent Variable;
DE: Direct Effect

According to Table 5, mediation analysis shows that all hypotheses tested did not exhibit significant mediation effects (**H7**-**H18**).

Table 5: Hypothesis Test Results Using Mediating Analysis

	Predictor	Mediator	DV	DE	IE (BOOTLLCI, BOOTULCI)	Result
H7	CGPA	Bipolar	Sleep Quality	-.0785	-.0322 (-.0924, .0171)	Reject
H8	CGPA	Anxiety	Sleep Quality	-.0799	-.0312 (-.0986, .0389)	Reject
H9	CGPA	Depression	Sleep Quality	-.0050	-.0890 (-.1749, -.0002)	Reject
H10	CGPA	Bipolar	Eating Disorder	.1431	-.0081 (-.0365, .0070)	Reject
H11	CGPA	Anxiety	Eating Disorder	.1291	-.0006 (-.0157, .0167)	Reject
H12	CGPA	Depression	Eating Disorder	.1236	-.0024 (-.0243, .0339)	Reject
H13	Course	Bipolar	Sleep Quality	.0117	.0075 (-.0505, .0637)	Reject
H14	Course	Anxiety	Sleep Quality	.0098	.0268 (-.0355, .0946)	Reject
H15	Course	Depression	Sleep Quality	.0061	.0638 (-.0268, .1558)	Reject
H16	Course	Bipolar	Eating Disorder	-.0012	.0018 (-.0183, .0196)	Reject
H17	Course	Anxiety	Eating Disorder	-.0010	.0003 (-.0162, .0139)	Reject
H18	Course	Depression	Eating Disorder	-.0006	-.0027 (-.0291, .0141)	Reject

Note: * p < 0.05; DV: Dependent Variable; DE: Direct Effect; IE: Indirect Effect; result based on 5000 bootstrap samples; 95% confidence intervals for the indirect effect

5.0 DISCUSSION

Depression

Based on the information provided, the research on anxiety in this context focuses on exploring the relationship between depression and various factors such as course of study, CGPA, and mental health problems. The study used hypothesis testing, chi-square analysis, and mediation analysis to examine these relationships.

The literature review highlights a consistent association between poor academic performance, as indicated by lower GPA, and increased levels of depression among students (Khan et al., 2023; Khanam et al., 2015). Numerous studies have demonstrated this link, emphasizing the detrimental impact of academic struggles on students' mental well-being. Furthermore, gender differences in depression risk are highlighted, with male students generally exhibiting a higher prevalence of depression compared to their female counterparts, who tend to perform better academically (Khanam et al., 2015). The findings of the current study align with existing research, providing additional evidence that depression is significantly influenced by academic achievement and the associated stressors of overwhelming workloads and academic difficulties (Khan et al., 2023). However, despite the hypothesis that CGPA has a significant impact on depression levels, the Chi-square test indicate that this relationship (H6) was not significant in the current study. This suggests that, while there is a well-established connection between academic performance and depression in the literature, other factors may also contribute to depression among students, which were not fully captured by the study's analysis. Further research may be needed to explore additional variables that could influence depression levels among university students.

The literature review between course and depression highlights the intricate relationship between these two, with various academic disciplines demonstrating differing impacts on students' mental well-being. Courses such as engineering and medicine, known for their rigorous demands and heavier workloads, are often associated with higher rates of depression among students (Nezam et al., 2020; Fatimah et al., 2016). In particular, highly regarded courses such as medicine, engineering, and dentistry have shown higher rates of depressive symptoms compared to other fields (Nezam et al., 2020; Fatimah et al., 2016). However, it is important to recognize that depression affects students across various courses, indicating that factors beyond course prestige contribute to depression risk (Honney et al., n.d.). Financial stress and ethnicity can also play significant roles in influencing the rates of depression among students (Honney et al., 2010). The hypothesis suggesting a significant impact of course on depression levels (H3) was supported by the hypothesis test result using Chi-square, which revealed a significant direct effect. This underscores the importance of considering the workload and requirements associated with different courses to understand students' experiences with depression. However, it is essential to acknowledge the complex interplay of various factors beyond course selection that contribute to depression among university students. Additional studies are required to examine these complex relationships and create holistic interventions that support the mental health of students in various academic disciplines.

The hypothesis stating a positive correlation between the depression score and sleep quality (H27) was supported by the hypothesis test result using Chi-square, which revealed a significant direct effect. This points to a significant link between depression and sleep quality among university students, further emphasizing that research from different countries and cultures has consistently shown a negative correlation between mental health problems and sleep quality. This highlights the broad impact these factors have on students in higher education (Lee et al., 2013; Wallace et al., 2017; Almojali et al., 2017; Amaral et al., 2018; Waqas et al., 2015; Yarmohammadi et al., 2014; Doğan et al., 2019). Despite variations in the prevalence of mental health issues among students from different regions, studies indicate a consistent pattern of poor sleep quality associated with conditions such as depression, anxiety, and stress (Doğan et al., 2019). Furthermore, the hypothesis is reinforced by research indicating that children with mental health problems often face a variety of issues, such as insufficient sleep and reduced academic performance (Lee et al., 2013; Wallace et al., 2017; Almojali et al., 2017; Amaral et al., 2018; Waqas et al., 2015; Yarmohammadi et al., 2014).

The literature review highlights a significant association between eating practices and depression, indicating that mental health issues such as depression can impact individual eating habits and overall diet quality (Keck et al., 2020; Georgia et al., 2020; Emre Serin and Mustafa Can Koç, 2020; Nolan et al., 2010; Tariq A. Alalwan et al., 2019). Research suggests that people experiencing depression may exhibit changes in appetite, often resulting in decreased food intake (Georgia et al., 2020; Emre Serin and Mustafa Can Koç, 2020). Furthermore, studies indicate that people with depression may consume more sugary foods and fewer overall calories, highlighting a potential link between depression and unhealthy dietary choices (Nolan et al., 2010; Tariq A. Alalwan et al., 2019; Keck et al., 2020). However, despite the significant associations observed in the literature, the hypothesis that a positive correlation between depression score and eating disorder (H28) was not supported by the result of the hypothesis test using Chi-square, indicating a lack of a clear correlation between depression and eating disorder among the study population. In summary, although there is evidence suggesting a complex relationship between depression and dietary practices, more research is needed to fully understand the mechanisms underlying this association and its implications for mental health interventions and diet interventions targeting individuals with depression.

Bipolar disorder

The results of the study indicate that certain relationships expected to link bipolar disorder with other factors, such as academic performance (CGPA), course, sleep quality and eating disorder, showed no significant results, leading to the rejection of multiple hypotheses. The rejection of H1 (course and bipolar, with a direct effect of 0.098) and H4 (CGPA and bipolar, 0.699) suggests that academic factors such as course selection and CGPA do not show a direct association with bipolar disorder. This result contradicts some earlier studies that have reported correlations between lower academic performance and mental health conditions, including bipolar disorder (Khan et al., 2019). It may be possible that other factors such as stress, personal circumstances, or external influences play a more significant role in these relationships.

Similarly, the rejection of H24 (bipolar and eating disorder, .076), H7 (CGPA, bipolar and sleep quality, -.0785), H10 (CGPA, bipolar, and eating disorder, .1431), and H13 (course, bipolar, and sleep quality, .0117) suggests that bipolar disorder does not significantly mediate the relationships between these factors. Despite the literature showing a strong link between bipolar disorder and sleep quality (Hasan & Junardi, 2020) or between bipolar disorder and eating disorders (McDonald et al., 2019), the rejected hypotheses imply that the specific contexts in which bipolar disorder acts as mediator require more exploration. Although the data suggest direct links between bipolar disorder and other conditions, these interactions might not serve as a bridge between academic performance, course type, sleep quality or eating disorders.

One possible explanation could be the complexity of mental health conditions and their influences. Relationships between academic performance, course type, and bipolar disorder could be affected by a myriad of other factors, such as lifestyle, external stressors, or genetic predispositions. The presence of significant differences in sleep quality by sex (Li et al., 2020) also adds another layer of complexity to these relationships.

Anxiety

The results of the hypothesis testing using Chi-square revealed a nonsignificant relationship between CGPA and anxiety (H5), leading to the rejection of the hypothesis. However, this outcome might seem unexpected given the existing literature suggesting connections between CGPA and anxiety level. Studies in medical students have consistently highlighted the significant impact of academic pressure on anxiety levels (Mao, 2019; Saddik, 2020). This suggests that there may be a complex interaction between academic performance and mental health, showing a stronger relationship with CGPA compared to anxiety (H5).

Additionally, the result of the hypothesis testing using Chi-square revealed a significant relationship between anxiety and sleep quality (H25). Similarly, dietary patterns have emerged as significant contributors to mental health outcomes, with healthy diets associated with lower levels of anxiety (M, 2021; Solomou, 2022). Research also found a high prevalence of mental health disorders, particularly eating disorders, among undergraduate students (González-Valero, 2019) and (Mofatteh, 2020), both of which underscore the prevalence of mental health issues, including anxiety, among students, with Mofatteh specifically identifying psychological and lifestyle factors as significant contributors.

Furthermore, the mediation analysis did not find any significant mediation effects between CGPA and anxiety (H8), further supporting the notion that the relationship between academic performance and anxiety may not be as pronounced as other factors. Sleep disturbances are prevalent in students with anxiety disorders and, although the direction of the association is unclear, a reciprocal relationship is evident (Brown, 2018).

In general, the nonsignificant findings from these analyses (H2, H11, H14, H17, and H26) suggest that anxiety may not play a significant role in mediating the relationships between academic performance, study course, and the presence of eating disorders. These results provide valuable information on the complex dynamics of anxiety and its interactions with other variables, highlighting the need for further research to elucidate these relationships and inform targeted intervention strategies.

6.0 CONCLUSION

In this study, we conducted hypothesis testing using Chi-square and mediation analysis to explore the relationships between predictors (CGPA and course), mediators (bipolar, anxiety, and depression) and dependent variables (sleep quality and eating disorder). Most of the Chi-square hypothesis result testing that involves predictors (course and CGPA) was rejected based on the direct effect (DE) values. However, significant interactions were observed between certain predictors and dependent variables, particularly in relation to sleep quality. In the mediation analysis, all the results are rejected for a sample of 200 university students.

Moreover, our study had some limitations that we needed to be aware of. First, we only examined a limited set of factors that could influence student mental health, such as the courses they take and their grades. We may have missed other important factors, such as family background or personal experiences, which could also play a role. Additionally, the number of students involved in our study was relatively small, which means that our findings may not represent all students accurately. Therefore, our results should be interpreted with caution, and future research should consider these factors more comprehensively.

In planning future research, it is crucial to recognize potential limitations. One issue is that we might overlook important factors that affect student mental health, even if we try to consider a broader range of things. We may not fully take into account cultural differences or how people handle stress. In addition, while we hope to use better tests and methods in future studies, some aspects of student well-being might still be difficult to accurately measure. Therefore, while we aim to address these limitations, it is essential to keep in mind how complex it can be to thoroughly study student mental health.

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