

PREVALENCE AND RISK FACTORS OF DEPRESSION AND ANXIETY, AND PERCEPTION OF MENTAL HEALTH DISORDERS AMONG UNIVERSITY STUDENTS IN BANGLADESH



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DECLARATION

I hereby solemnly declare that the research work presented in this dissertation titled “Prevalence and Risk Factors of Depression and Anxiety, and Perception of Mental Health Disorders among University Students in Bangladesh”, has been conducted by myself. I hereby certify that I am the sole author of this thesis manuscript and it has not been published or submitted to any other university or academic institution for an academic degree or certification previously. I also certify that this is the true copy of my thesis manuscript with final revisions and approved by my thesis review committee. I do hereby warrant that the work has been presented here does not breach any existing copyright and any material reproduced in this project has been properly acknowledged.

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This is to certify that Azizun Nahar worked on **“Prevalence and Risk Factors of Depression and Anxiety, and Perception of Mental Health Disorders among University Students in Bangladesh”**, under my supervision. I have gone through the manuscript. It is up to the mark and to my full satisfaction.

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ABSTRACT

Background: Mental health disorders are prevalent worldwide, affecting people of all ages, backgrounds, genders, and cultures. Depression and anxiety disorders are two most common mental health disorders among adults around the globe as well as in Bangladesh. University students, who are in a period of transition and stress, are particularly vulnerable to depression and anxiety disorders. The prevalence of depression and anxiety disorders is generally high among university students worldwide. These types of mental health disorders can affect how a person feels, thinks, and behaves, and these feelings can be so intense and profound that they interfere with daily activities such as work, school, relationships and overall quality of life.

This study aims to investigate the prevalence and risk factors of depression and anxiety disorders among university students in Bangladesh and students' knowledge and perception about mental disorders.

Method: A cross-sectional survey was conducted using a self-administered standardized questionnaire. The questionnaire was prepared based on questions related to socioeconomic-demographic information and also internationally accepted tools, such as PHQ-9 to assess the level and symptoms of depression, and GAD 7 to assess the level and symptoms of anxiety disorders. A total of 384 registered undergrad students, ages ranging from 18 to 24 years, studying in private universities and medical colleges located in Dhaka city and also Bangladeshi citizen were selected according to exclusion and inclusion criteria for this study. Statistical analysis of the surveyed data was performed using IBM SPSS, version 22 in three consecutive levels; univariate, bivariate and multivariate analysis.

Results: The study results from univariate analysis (percentage frequency distribution), bivariate analysis (Pearson Chi square test) and multivariate (binary logistic regression) logistic models indicated that students were experiencing heightened depression and anxiety disorders. Around 29.9%, 29.4 %, 18.8 % and 10.4 % of students experienced mild, moderate, moderately

severe and severe levels of depression, respectively, whereas 35.2 %, 24.0 % and 22.4 % of students experienced mild, moderate and severe levels of anxiety disorders, respectively. Socio-economic-demographic factors for this study included gender, area of study, original place of residence, type of accommodation, financial stress, social activity, physical activity, smoking habit and worries about future job insecurity due to economic recession. The binary logistic regression analysis reflected the significant impacts of financial stress (p-value = 0.015) and recession concern (p-value=0.001) on depression, and gender (p-value<0.00) and financial stress (p-value <0.00) on anxiety disorders. Female students were found to have higher odds of depression and anxiety disorders than male students. The study indicated that more than half (68.2%) of the participants perceived that mental health disorders (MHDs) happen due to disease in the brain and 87.2% of them thought MHDs were curable. In addition, among the surveyed students, 78.4% were willing to take MHD treatment or care and 83.9% had the knowledge that psychiatrists or clinical psychologists were the care providers for MHDs.

Conclusion and recommendations: The empirical evidence from this study indicates that a large percentage of university students in Bangladesh have been suffering from depression and anxiety disorders. To minimize the developing mental health problems of university students, the government, NGOs, university authorities and international organizations should work together to ensure financial and psychological support and to keep students engaged in inclusive educational programs for their mental wellbeing.

Key words: Mental health; Depression; Anxiety; University students; PHQ-9; GAD-7 tool; Bangladesh, Knowledge, Perception

CHAPTER 1: INTRODUCTION

1.1. Background

Mental health disorders are prevalent worldwide and affect people of all ages, backgrounds, genders, and cultures. According to the World Health Organization (WHO), mental health disorders account for approximately 14% of the global burden of diseases and are a significant public health concern globally, with an estimated 1 in 8 people or 970 million people around the world experiencing some form of mental illness during their lifetime, with depressive and anxiety disorders the most common (WHO Newsroom Fact sheets; June 8 2022).¹ The prevalence of mental health disorders rose significantly in 2020 due to the COVID-19 pandemic.

Mental health disorders refer to a range of conditions that affect an individual's emotional and psychological well-being, leading to significant distress and impairment in their daily life. These conditions can vary in severity, ranging from mild to severe and have a significant impact on an individual's quality of life, ability to work, and relationships.

Common mental health disorders include a) Anxiety Disorders including Generalized Anxiety Disorder (GAD), (b) Depression, (c) Attention-Deficit-Hyperactivity Disorder (ADHD), (d) Autism Spectrum Disorder (ASD), (e) Bipolar Disorder, (f) Borderline Personality Disorder (BPD), (7) Obsessive-Compulsive Disorder (OCD), (8) Seasonal Affective Disorder (SAD) and (9) Eating Disorders (ED), and more. These disorders arise from a combination of genetic, environmental, and social factors and require appropriate treatment and support to manage symptoms effectively. Each disorder has its unique symptoms and diagnostic criteria.

Depression and anxiety disorders (including GAD) are the two most common widespread mental health disorders that affect millions of people worldwide. Depression is a leading cause of disability that affects approximately 280 million people globally (WHO, 2023)², and anxiety disorders affect approximately 301 million people globally (WHO, 2021).^{1, 3} An estimated

3.8% population experience depression including 5% adults ² and 4.05% population suffer from anxiety disorders globally. Over 700000 people die due to suicide every year.^{1,3}

Depression and anxiety disorders are associated with significant impairments in daily functioning including work, school, and social interactions which affect the intellectual productivity of university students.

Global Prevalence of Depression and Anxiety Disorders among University Students:

The prevalence of depression and anxiety disorders among university students worldwide is high. University students, who are in a period of transition and stress, are particularly vulnerable to depression and anxiety disorders. Depression and anxiety disorders are becoming more common mental health problems among university students globally as well as in Bangladesh. The American College Health Association published a survey data report of over 54000 undergraduate students titled “College Student Mental Health Statistics” (Jessica Bryant and Lyss Welding, 2023) where it was found that in 2022, 77% of college students experienced moderate to serious psychological distress while 27% and 35% of students were diagnosed with depression and anxiety, respectively.⁴ A systematic review and meta-analysis of 64 studies by Li W et al., 2022, found that the pooled prevalence of depression and anxiety disorders among college students 33.6% and 39%, respectively, and the highest prevalence of depression and anxiety disorders was found among medical college students.⁵

Prevalence of Depression and Anxiety Disorders among University Students in Bangladesh:

The prevalence of these mental health disorders is particularly high in low- and middle-income countries like Bangladesh, where students face multiple stressors such as academic pressure, financial burden, and social isolation. In Bangladesh, there is not much research on depression and anxiety disorders among university students.

A systematic review & meta-analysis by Hosen I et al., 2021 found the pooled estimated prevalence of depression and anxiety disorders was 47% and 47%, respectively. They also found that university students were experiencing higher rates of depression (82.4%), and anxiety (81.8%) disorders in Bangladesh.⁶

A comparative study by Paul G et al., 2022 on depression and anxiety among university students between COVID-19 Pandemic Panic Period and Post-panic found depressive symptoms 49.4% and 52.4% during the panic period and post-panic period, respectively, whereas anxiety symptoms were 38.2% during panic and the percentage was almost similar in the post panic interval.⁷ Further research is needed to better understand the prevalence, impact, and treatment of these conditions among university students in Bangladesh. A study by Hasan M T et al. 2020 on medical students found depression in 38.9% of participants (with 3.6%, 14.5%, and 20.8% being severe, moderate, and mild depression, respectively) where 17.6% of medical students had suicidal tendencies or attempted suicide at least once after joining medical school.⁸ Other study by Mehareen J et al., 2021, found the prevalence of depressive and anxiety symptoms as 59.16% and 46.55% of public university students, respectively, and as 30.83% and 33.33% of private university students, respectively during the pandemic situation.⁹ The findings from the above studies indicate that high rates of depression and anxiety disorders are significant mental health issues among university students in Bangladesh.

Risk Factors Contributing to Depression and Anxiety among University Students:

Different studies found several risk factors have been associated with the high prevalence of depression and anxiety disorders among university students in Bangladesh. These include academic stress, financial constraints, social isolation, and lack of support services. A study by Islam S et al., 2020 found unsatisfactory sleep quality and lack of physical exercise as the main risk factors for depression and excessive internet use as the prime risk factor for anxiety.¹⁰

Knowledge and Perception about Mental Health Disorders among University Students:

Bangladesh has low levels of mental health literacy, which refers to knowledge and beliefs about mental health disorders. A study by Siddique M A B et al., 2022, found 62.1% of university students had high amounts of mental health literacy, but the researchers still believed that perception and knowledge about mental health disorders among university students in Bangladesh was insufficient. Students' low level of knowledge of mental illness prevents them from identifying problems properly and taking the support necessary. Interestingly, a vital number of students believed in superstitious acts like black magic or religious rituals rather than modern psychiatric treatment (MAB Siddique, 2022). The researchers suggested that increasing mental health literacy among students could help reduce stigma and improve help-seeking behavior. Many of the students' perceptions about mental health issues were that they were either the result of personal weakness or lack of willpower, rather than being caused by biological factors. Overall, many researchers suggest the need for increased awareness and understanding and perception about mental health among university students in Bangladesh.¹¹

1.2. Mental Health and Mental Health Disorders

Mental Health is a state of mental well-being that enables people to cope with the stresses of life, realize their abilities, learn well and work well, and contribute to their community (WHO, 2022).¹²

Determinants of Mental Health

Multiple individual, social & structural determinants may combine to protect or threaten our mental health throughout our lives and move the situation on the mental health continuance.

Psychological and biological factors such as emotional skills, substance use and genetics can make people more vulnerable to mental health disorders.

Risk Factors

Exposure to negative social, economic, geopolitical and environmental circumstances including inequality, violence, poverty, and environmental hardship etc. increase people's risk of experiencing mental health disorders.

Risks can be evident at all stages of life, but those which happen during developmentally sensitive periods, especially early childhood, are particularly harmful. For example, bad parenting, physical punishment, and bullying are known to undermine child's mental health and main risk factors for mental health disorders.

Protective Factors

Protective factors happen throughout our lives and serve to strengthen adaptability. These include people's individual, social and emotional skills and attributes as well as positive social interactions, quality education, decent work, safe neighborhoods and unity with others in the community.

Types of Mental Health Disorders

According to NIMH, USA the mental health disorders can be classified into following types-

- 1) Depression, 2) Anxiety Disorders including Generalized Anxiety Disorder (GAD),
- 3) Attention-Deficit/Hyperactivity Disorder (ADHD), 4) Autism Spectrum Disorder (ASD),
- 5) Bipolar Disorder, 6) Borderline Personality Disorder, 7) Obsessive-Compulsive Disorder,
- 8) Schizophrenia, 9) Seasonal Affective Disorder and 10) Eating Disorders.¹³

Depression

Depression is a mental health disorder that can cause persistent feelings of sadness, hopelessness, and lack of interest or pleasure in activities. It can affect how a person feels, thinks, and behaves, and can interfere to carry out daily activities such as work, school, and relationships. The causes of depression are complex and multifactorial. According to WHO, factors that may contribute to depression include biological, genetic, environmental, and psychological factors. A history of depression or other mental health issues in the family, stressful life events, chronic illness, and certain medications or substances are some common risk factors for depression.

Depression can range from mild to severe, and can appear with a variety of symptoms such as low mood, loss of interest in activities, changes in appetite and sleep patterns, fatigue, feelings of worthlessness or guilt, difficulty concentrating, and even suicidal thoughts or behaviors. The symptoms must be exist for at least two weeks to be diagnosed with depression.

Several forms of depression are slightly different or might be developed under unique circumstances (NIMH, USA).¹³ These are-

- a) **Persistent Depressive Disorder** (dysthymia): It is a depressed mood that lasts for at least two years.
- b) **Postpartum Depression**: Women with postpartum depression experience full-blown major depression during pregnancy or after delivery.

- c) **Psychotic Depression:** It occurs when a person has severe depression plus some form of psychosis. The symptoms typically have a depressive theme, such as delusions of guilt, poverty, illness or hallucinations.
- d) **Seasonal Affective Disorder:** This type is identified by the onset of depression during the winter months, since there is less natural sunlight and usually lifts during spring and summer. Winter depression increased sleep, and weight gain and followed by social disengagement (NIMH, USA).¹³

Anxiety Disorders

Anxiety disorders are a group of mental health conditions characterized by excessive and persistent feelings of fear, worry, and nervousness. These feelings can be so intense and profound that they interfere with daily activities, relationships, and overall quality of life.

Some common symptoms of anxiety disorders include restlessness, irritability, difficulty concentrating, muscle tension, fatigue, sleep problems, and physical symptoms like rapid heartbeat or sweating. These symptoms may be persistent or occur in response to specific situations or triggers. There are several types of anxiety disorders, including generalized anxiety disorder (GAD), panic disorder, social anxiety disorder (SAD), specific phobias, and obsessive-compulsive disorder (OCD). Each type has its own set of symptoms, triggers, and treatment options.

- a) **Generalized Anxiety Disorder (GAD):** Generalized Anxiety Disorder (GAD) show excessive anxiety or worry, fear which can cause significant problems in different areas of life, including social interactions, school and work. The symptoms involve feeling restless, easily being fatigued, having difficulty concentrating & controlling feelings or worry, muscle tension, sleep problems (NIMH, USA).¹³
- b) **Panic Disorder:** Panic disorder is recurrent panic attacks, an overwhelming combination of physical and psychological distress. During an attack some symptoms

occur in combination include palpitations, sweating, shaking, chest pain, shortness of breath, feeling dizzy or chocking, hot flash, nausea, fear of losing control or dying etc.

Many people believe panic attack as heart attack considering the severity of symptoms.

(American Psychiatric Association)

c) Phobia-related Disorder: People with phobia experience intense fear of aversion to specific objects or situations. There are several types of phobias and phobia-related disorders:

i) Simple Phobias: People with specific or simple phobia have an intense fear or anxiety about specific types of objects or situations including flying, heights, receiving injections, blood, specific animals like dogs, snakes, spiders etc.

ii) Social Anxiety Disorder or Social Phobia: People with social anxiety disorder have general intense fear or anxiety toward social or performance situations. They worry that actions associated with their anxiety will be negatively assessed by others, causing them to feel embarrassed. This worry usually causes them to avoid social activities and can manifest in a range of situations within the workplace or school environment.

iii) Agoraphobia: People with agoraphobia have an intense fear of two or more of the following situations including using public transportation, being in enclosed spaces or open spaces, being outside of the home alone or standing in a line or crowd etc. In the most severe form of agoraphobia, an individual can become homebound.

d) Separation Anxiety Disorder: People with separation anxiety disorders have fears about being parted from people to whom they are attached. They often worry that something wrong might happen to their closed ones while they are separated and this fear makes them avoid to stay alone or keep them away from their loves ones. Researchers found that both genetic and environmental factors contribute to the risk of

developing anxiety disorder. Anxiety disorders are generally treated with psychotherapy, medication, or both and cognitive behavioral therapy (NIMH, USA).¹³

Attention-Deficit/Hyperactivity Disorder (ADHD)

Attention-deficit/hyperactivity disorder (ADHD) is a brain disorder prominent by an ongoing pattern of **inattention** and/or **hyperactivity-impulsivity** that interferes with development or functioning. Some people with ADHD only have problems with one of the behaviors, while others have both inattention and hyperactivity-impulsivity but most children have the combined type of ADHD. ADHD is more common in males than females.

- a) **Inattention** means a person is disorganized, wanders off task, lacks persistence and has difficulty keeping focus and these do not happen due to confrontation or lack of knowledge.
- b) **Hyperactivity** means a person seems to move about continuously, even in the situations in which it is not appropriate, or excessively fidgets, taps, or talks. It may be extreme restlessness with constant activity in adults.
- c) **Impulsivity** means a person makes hasty actions that occur in the moment without first thinking which may have high potential for harm; or a desire for immediate rewards or inability to delay gratification. An impulsive person may be socially intrusive and excessively interrupt others or make important decisions without considering the long-term consequences (NIMH, USA).¹³

Autism Spectrum Disorder (ASD)

Autism Spectrum Disorder (ASD) is a developmental disorder that affects communication and behavior. It occurs in all ethnic, racial, and economic groups. ASD can be a lifelong disorder, & diagnosed at any age, and the symptoms generally appear in the first two years of life. Therefore, treatments and services can improve a person's symptoms and ability to function.

According to the American Psychiatric Association people with ASD may have the following symptoms –

- a) Difficulty with communication and interaction with other people
- b) Restricted interests and repetitive behaviors
- c) Hampers the person's ability to function properly in school, work, and other areas of life.

Bipolar Disorder

Bipolar disorder is a brain disorder that causes unusual shifts in mood, energy, activity levels, and the ability to carry out daily tasks. It is also known as manic-depressive illness. People with bipolar disorder experience moods range from periods of extreme high, euphoric or irritable known as manic episodes to episodes of extremely low moods known as depressive episodes whereas less severe manic periods are known as hypomanic episodes.

There are four basic types of bipolar disorder.

- a) **Bipolar I Disorder** is defined by manic episodes that last at least 7 days, or symptoms that are so severe when a person needs immediate hospital care.
- b) **Bipolar II Disorder** is explained by a pattern of depressive episodes and hypomanic episodes, but not the full-blown manic episodes as mentioned above.
- c) **Cyclothymic Disorder (Cyclothymia)** is defined by numerous periods of hypomanic symptoms as well as depressive symptoms lasting for at least 2 years (1 year in children and adolescents).
- d) **Other Specified and Unspecified Bipolar and Related Disorders** are defined by bipolar disorder symptoms that do not match the three categories mentioned above.
 - i) **Psychosis:** Sometimes, a person with severe episodes of mania or depression also has psychotic symptoms, like hallucinations or delusions.

- ii) **Anxiety and ADHD:** Anxiety disorders and attention-deficit hyperactivity disorders (ADHD) are often diagnosed among people with bipolar disorders.
- iii) **Brain Structure and Functioning:** Some studies showed that the brains of people with bipolar disorders may differ from the brains of healthy people or people with other mental disorders.
- iv) **Genetics:** Certain genes are more likely to develop bipolar disorder than others.
- v) **Family History:** Bipolar disorders tend to run in families. (NIMH, USA).¹³

Borderline Personality Disorders

Borderline personality disorder is a mental illness significant by a continuous pattern of varying moods, self-image, and behavior. These symptoms often result in impulsive actions and problems in relationships. People with borderline personality disorder may experience intense episodes of anger, depression, and anxiety that can last from a few hours to days.

The cause of borderline personality disorder is not clear at all, but research suggests that genetics, brain structure & function, environmental, cultural, and social factors may increase the risk for developing borderline personality disorder (NIMH, USA).¹³

Obsessive-Compulsive Disorder (OCD)

The Obsessive-Compulsive Disorder (OCD) is a common, chronic and long-lasting disorder in which a person has uncontrollable, obsessions (reoccurring thoughts) and compulsions (behaviors) where a person feels the pressure to repeat again and again. These symptoms can interfere with all aspects of life; work, school and personal relationships.

- a) **Obsessions** are repeated thoughts, or mental images that cause anxiety. Common symptoms include fear of germs or contamination, Unwanted forbidden thoughts involving sex, religion, and harm.
- b) **Compulsions** are repetitive behaviors that a person with OCD feels the pressure to do in response to an obsessive thought.

Common compulsions include:

- i) Excessive cleaning and/or handwashing, ordering and arranging things in a particular,
- ii) checking repeatedly to see if the door is locked or that the oven is off, compulsive counting
- iii) A person with OCD also have tic disorder such as repetitive eye blinking and other eye movements, facial grimacing, shoulder shrugging, and head or shoulder jerking throat-clearing, sniffing, or grunting sounds. (NIMH, USA)¹³

Schizophrenia

Schizophrenia is a chronic and severe mental disorder that affects how a person thinks, feels, and behaves. The Symptoms of schizophrenia usually start between ages 16 and 30 and fall into three categories: positive, negative, and cognitive.

Positive symptoms are psychotic behaviors not generally seen in healthy people including hallucinations, delusions, thought disorders, movement disorders.

Negative symptoms include flat affect (reduced expression of emotions via facial expression or voice tone), reduced feelings of pleasure in everyday life, difficulty beginning and sustaining activities, and reduced speaking.

Cognitive symptoms are subtle, they are more severe and patients may notice changes in their memory or other aspects of thinking that include poor executive functioning, trouble focusing or paying attention, problems with the ability to use information immediately after learning it..

Schizophrenia sometimes runs in families (NIMH, USA).¹³

Seasonal Affective Disorder

Seasonal Affective Disorder (SAD) is a type of depression that comes and goes with the seasons. This type of disorder typically starts in the late fall and early winter and going away during the spring and summer. The symptoms include hypersomnia, having low energy, overeating, weight gain, craving for carbohydrates and Social withdrawal etc. (NIMH, USA).¹³

Eating Disorders

Eating disorders are associated with severe disturbances in people's eating behaviors and related thoughts and emotions & caused by a complex interaction of genetic, biological, behavioral, psychological and social factors. Eating disorders can affect people of all ages, race or ethnicity, backgrounds, body weights, genders, and frequently appear during the teens. Common eating disorders include anorexia nervosa, bulimia nervosa, and binge-eating disorder (NIMH, USA).¹³

- a) **Anorexia Nervosa:** People with anorexia nervosa have intense fear of gaining weight & weigh themselves repeatedly, severely restrict the amount of food they eat, often exercise excessively which might result in extreme thinness, mild anemia and muscle weakness, dry & yellowish skin, brittle hair & nails, lanugo, severe constipation, feeling cold, lethargy or feeling tired all the time and infertility. Anorexia nervosa has the highest mortality rate of any mental disorder.
- b) **Bulimia Nervosa:** The symptoms also include swollen salivary glands in the neck and jaw area, chronically inflamed and sore throat, acid reflux & gastrointestinal problems, severe dehydration and electrolyte imbalance which can lead to stroke or heart attack
- c) **Binge-Eating Disorder:** People with binge-eating disorder lose control over their eating with the symptoms include eating unusually large amounts of food, fast eating till uncomfortably full, feeling upset, ashamed or guilty about eating (NIMH, USA).¹³

1.3. Literature Review

A study Rezvi M R et al. (2022) found that 37% of the students experienced moderate to severe anxiety while 54% faced moderate to severe depression. This study revealed that anxiety is significantly related to gender, students' current affiliation status in university (e.g. sophomore, masters) and time spent on watching TV while depression was related to family member's contact with COVID 19, performing multiple activities as hobbies & spending time in reading & writing.¹⁴

A study by Kamruzzaman M et al. (2022) found that the private university students are more likely to suffer from depression, anxiety & stress. Female students are more likely to suffer from severe/extreme levels of anxiety compared to male students & there exists high prevalence of mental illness among university students.¹⁵

A study by Hossain M J et al. (2022), revealed that more than 50% of Bangladeshi university students were suffering from depression and anxiety. The students from private universities were 2 times and 2.7 times more depressed and anxious, respectively than the students of public universities. In addition, students who became incomeless during COVID 19, had significantly more anxiety than the students who did not lose the source of income.¹⁶

A study by Faisal RA et al. (2022) found that 40% of the participants had moderate to severe anxiety, 72% had depressive symptoms and 53% had moderate to poor mental health status.¹⁷

A study by Rahman MM et al. (2022), found the prevalence of depression, anxiety and stress was 30.41%, 43.29% and 47.40% respectively. Students from Dhaka city were found to be more depressed & anxious than students outside of Dhaka.¹⁸

A study by Muzaffar R et al. (2022) found the prevalence of mild to severe anxiety disorder was 61.8% among females and 38.3% among males. Females were 2.21 times more likely to have anxiety compared to males. Participants who were worried about academic delays were

more anxious than those who were not (AOR 2.82). Participant's age was negatively associated with increased level of anxiety (AOR 0.17).¹⁹

A study by Siddique M A B et al. (2022) on 2036 university students in Bangladesh, found more than half (62.1%) of the students had higher knowledge and 85.1% of the students had higher awareness of mental health problems. Although mental health awareness is high among Bangladeshi university students, knowledge of mental health is insufficient. Female students (OR 1.41) and students managing their expenses by personal income & family support were significantly positively associated with the high knowledge of the mental health (OR 1.79). Similarly age (OR 1.47) was significantly associated with high awareness. Good mental health was significantly negatively associated with high knowledge (OR 0.72) & positively associated with high awareness (OR 1.48).¹¹

According to a systematic review and meta-analysis on 64 studies of college or by Li W et al. (2022), the pooled prevalence of depression and anxiety symptoms among college students was 33.6% and 39.0% respectively. The highest prevalence of depressive symptoms was found in Africa region 40.1%, lower middle income countries 42.5% and medical college students 39.4%. The prevalence of anxiety symptoms, the highest was observed in North America 48.3%, lower middle income countries 54.2%, medical college students 47.1%. The prevalence of depression symptoms (35.9%) and anxiety symptoms (40.7%) was higher in studies conducted after the coronavirus disease 2019 (COVID19) outbreak.⁵

According to a recent systematic review and meta-analysis by Hosen I et al. (2021), the pooled prevalence of depression, anxiety and stress was 47%, 47% and 44% respectively. The associated risk factors of mental health problems were gender, age, residence, family size, monthly family income, educational status, marital status, physical exercise, smoking, alcohol

use, and fear of COVID19, presence of chronic illness, unemployment status & exposure to social media.⁶

A study by Rasheduzzaman M et al. (2021) on depression in Bangladeshi university students found the prevalence was 28.7% where female participants had a higher rate of depression compared with male participants (39.3% vs 24.0%), whereas 35.0% of urban students reported to be depressed (27.8%, $p < 0.015$).²⁰

A study by Islam MA et al.(2020) on university students found the prevalence of depression & anxiety disorders are higher among male students with 67.35% & 66.33% respectively and lower in female students with 32.65% & 33.67% respectively. Around 15% of the students reportedly had moderately severe depression, whereas 18.1% were severely suffering from anxiety. Older students had greater depression and the students who provided private tuition in the pre-pandemic period had depression.²¹

A study by Tareq et al. (2020) on medical students found that 35.8% students had normal score, 25.1% had mild, 15.5% had borderline clinical depression, 18.0% had moderate depression, 5.3% had severe depression and one (0.3%) student was suffering from extreme depression. Overall 39.1% students were suffering from different levels of depression. Depression was prevalent more in female students (45.6%) than male students (31.3%). Suicidal tendency was present in 18.8% students in this study where 14.3% of them had thought of killing themselves but would not carry them, 3% would like to kill themselves & 1.5% would kill themselves if they had the chance. In addition suicidal tendency was bit higher in female students (19.3%) than male students (18.1%).²²

A study by Nahar Z et al. (2020), found the prevalence rate of loneliness, anxiety and depressive symptoms among female university students in Bangladesh was 55.88%, 69.18% and 45.23% respectively. This study also found mild, moderate and severe symptoms of

loneliness, generalized anxiety & depression were 36.90%, 40.48% & 22.62%; 48.08%, 22.44% and 29.48%; and 37.31%, 26.87% and 35.52%. According to the results of this study, marital status, financial condition, education level & family structure. Female students residing in urban areas in Bangladesh are more prone to developing mental health problems during any crisis.²³

A study by Islam S et al. (2020) revealed that the prevalence of depression & anxiety levels among 1st year students was high in this study and 1st year students are the vulnerable group for mental illness. The prevalence rates of moderate to extremely severe levels of depression & anxiety were 69.5% and 61% respectively with no gender differences. This study also identified the main risk factors for depression were unsatisfactory sleep quality and lack of physical exercise. The main risk factor for anxiety was excessive internet use.¹⁰

A study by Hasan M T et al. on medical students (2020) revealed that depression was found in 38.9% of participants, with 3.6%, 14.5% and 20.8% being severe, moderate and mild depression respectively. 17.6% of medical students had suicidal tendency or attempted suicide at least once after attending medical school. The sleeping hours were inadequate and altered after starting this stressful academic course. 33.5% of medical students had poor mental health status. There was a statistically significant association between poor mental health status in the age group less than 22 years old and initial academic study years (1st to 3rd MBBS).⁸

A study by Hossain S et al. (2019) found 13.9% respondents had poor self-rated body image dissatisfaction, 25.6% of the student reported to be overweight/obese where as 18.7% to be underweight. Poor & moderate SRH was found to be significantly associated with student's depression (AOR 6.700 & AOR 2.155) and anxiety (4.365 & AOR 1.776) SRBI dissatisfaction, underweight obese SRBI, overweight/obese SRBI, low blood pressure & hypertension were significantly linked students' depression and anxiety.²⁴

A study by Khan M H (2018) on mental health wellbeing among undergrad students of EWU found that the overall prevalence of poor mental health was 34.6% and was significantly higher among female (38.9%) than male (30.5%) students, and also among those who had no close friends for sharing problems, and also among those with low level of satisfaction about their current residences in Dhaka, academic performance and relationship with faculty members.²⁵

1.4. Rationale of the Study

Mental health problems such as depression and anxiety disorders among university students may have a significant impact on their academic performance, social relationships, and overall well-being. In Bangladesh, there are limited research on the mental health issues of university students and lack of mental health services & resources available to students.

As the high rates of mental health disorders among university students worldwide are a growing concern, it is needed to acquire a better understanding of the mental health status and needs of university students and identify potential risk factors and perceptions surrounding these disorders within the context of Bangladesh.

By identifying the prevalence and risk factors associated with these disorders, researchers may also be able to design and implement more effective prevention and provide evidence-based recommendations for mental health intervention programs, tailored to the unique needs and circumstances to mitigate depression and anxiety among university students in Bangladesh.

Overall, this study can be a valuable resource for policymakers, university authorities and mental health professionals to address the mental health needs of university students in Bangladesh to improve their well-being, promote greater understanding & awareness of mental health issues and acceptance of these conditions within the broader community.

1.5. Research Questions

1. a) Are the university going students in Bangladesh suffering from the Depression and Anxiety disorders? b) If yes, the levels of its severity and identifying the stressors that affecting the mental health of the students and their relative impacts on students mental wellbeing.
- c) What are the knowledge & perception of mental health disorder among university going students?

1.6. Research Objectives

General Objective

1. To find out the prevalence & Risk Factors of Depression, Anxiety and Perception of Mental Health Disorders among University Students in Bangladesh

Specific Objectives

2. To explore the prevalence of depression and anxiety disorders among university students in Bangladesh,
3. To identify the potential risk factors associated with the symptoms and
4. To learn about students' knowledge and perception about mental health disorders.

CHAPTER 2: METHOD

2.1. Research Design

This study used a cross-sectional design.

2.2. Data Source

Data were collected from registered university students by random sampling technique using standardized self-administered questionnaire.

2.3. Study Population and Area

The study was carried out among the university registered undergrad students of age ranged from 18–24 years residing in Bangladesh. Students from 3 different private universities and 2 private medical colleges in Dhaka, Bangladesh were the study population.

2.4. Study Period

The study period for this survey was in between February 19 and March 6, 2023.

2.5. Sample Size Calculation

391 students voluntarily participated in this survey through a random sampling technique. Among the collected survey data, 7 respondents' data were excluded which did not meet the inclusion criteria and finally we accepted 384 completed questionnaire with basic information including socio-economic and demographic information, valid PHQ-9²⁶ and GAD-7²⁷ responses.

2.6. Data Collection Process

Data were collected through self-administered questionnaire. A structured questionnaire was prepared based on the questions related to socioeconomic-demographic information and knowledge & perception about mental health, of the respondents. Internationally accepted tools PHQ-9²⁶ to assess the level of depression, and GAD-7²⁷ to estimate anxiety disorders were also included in the questionnaire. An informed consent letter for students was attached with the questionnaire. The survey was carried out among 391 respondents and the potential

respondents were participated voluntarily and anonymously in it and the participants' consents were obtained prior to the start of the survey. The participants were assured regarding the confidentiality of their responses. Participation of the respondents was ensured according to exclusion and inclusion criteria.

2.7. Inclusion Criteria

1. Participants who were registered university students.
2. Participants who participated in this survey voluntarily.
3. Participants who answered all survey questions and completed the questionnaire.

2.8. Exclusion Criteria

1. Students who were already taking treatment for mental illness.
2. Students who were not willing to participate.

2.9. Variables

Dependent Variables: Our dependent variables were depression and anxiety disorders, which were qualitative variables.

Independent Variables: Nine socioeconomic and demographic factors and four factors related to knowledge & perception of mental health disorders were considered as independent variables:

- Gender (male/female) – Binary qualitative variable
- Area of Study (Arts/Social Science/Business, Science/Applied science, Engineering & technology, Medical science) - Qualitative variable
- Place of Residence (rural /urban) - Binary qualitative variable
- Accommodation (Other accommodation/family) - Binary qualitative variable
- Financial Stress (no/yes)- Binary qualitative variable
- Social Activity (no activity/community service/ cultural activity) - Qualitative variable
- Physical Activity (no/yes) - Binary qualitative variable

- Smoking Habit (no/yes) - Binary qualitative variable
- Recession Concern (no/yes) - Binary qualitative variable
- Reason for MHD (supernatural forces, disease in the brain, sins/curse) - Qualitative variable
- MHD Curable or not (no/yes) - Binary qualitative variable
- Care Willingness (no/yes) - Binary qualitative variable
- Treatment/ Care provider (Spiritual leaders or traditional healers, Doctors (GP), Psychiatrist/Clinical Psychologist) - Qualitative variable

2.10. Data Management

Data were collected using a standardized questionnaire and detailed socio-economic demographic, depression and anxiety related records were strictly maintained by assigning confidential identification numbers' codes and electronic data were password protected.

2.11. Data Analysis Plan (Statistical Analysis)

Statistical analysis was performed using the Microsoft Excel and IBM Statistical Package for Social Sciences (SPSS), Version 22 (IBM Corporation, Armonk, NY, USA) software. All the influences of the variables were significant at 0.05 level.

Using SPSS (version 22) software, we performed the following analysis;

1. Univariate analysis i.e. descriptive analysis was performed to see the distribution of frequency and percentage frequency for each category of the selected dependent and independent variables since all the variables are qualitative in this study.
2. Bivariate analysis was done to see the measure of association between the dependent variables (level of depression & anxiety disorders) and the selected covariates, using Pearson Chi-Squared test since, the dependent variables are qualitative and all the independent variables are qualitative too in this study.

3. Multivariate logistic regression analysis to obtain Regression coefficient, p-value, Odds Ratio (OR) and Confidence Interval for OR since, the dependent variables (Depression and Anxiety) are qualitative binary random variables and more than one independent variables (factors) have been considered, for this study.

2.12. Ethics

This study was approved by the ethical review committee of IUB. The participants responded anonymously to this survey by filling up an informed consent letter prior to start filling up the questionnaire. In the consent form, all the participants were provided with information regarding the research purpose, confidentiality of information. Participants had the right to withdraw the participation without prior justification.

CHAPTER 3: DATA ANALYSIS AND RESULTS

In this study a total of 391 respondents (students) participated. Each response was tested for inclusion and exclusion principle. 7 responses which did not pass through the inclusion criteria were rejected. Finally, 384 valid responses were analyzed accordingly, as described in the data analysis plan in this study.

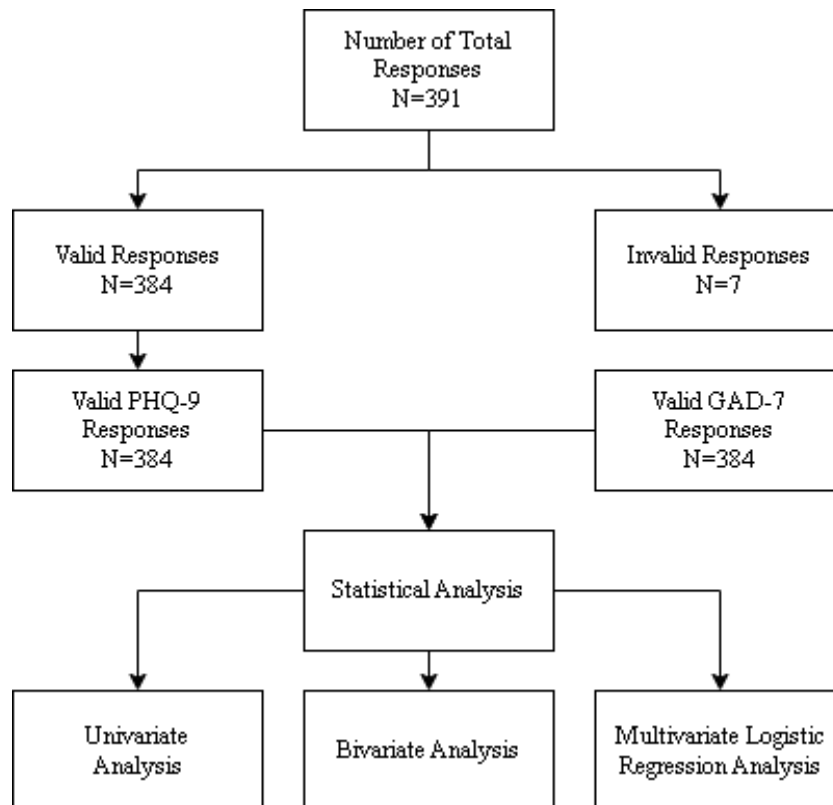


Figure 1: Flowchart

3.1. Univariate Analysis (Descriptive Statistics)

The selected dependent variables; levels of depression (minimal, mild, moderate, moderately severe and severe depression) and anxiety disorders (minimal, mild, moderate and severe anxiety disorders) were qualitative random variables and the selected covariates were qualitative too. Univariate analysis was conducted to see the prevalence and distribution of frequency, and percentage frequency for each category of selected socioeconomic and demographic characteristics of the respondents in this study [Table 1a and Table 1b].

**Table 1a: Distribution of Frequency and Percentage Frequency of Selected
Socio-economic and Demographic characteristics of the respondents**

Variables	Frequency (N)	Percentage Frequency (%)
Gender		
Male	180	46.9
Female	204	53.1
Area of Study		
Arts/ Social science /Business	136	35.4
Science/Applied science	108	28.1
Engineering &Technology	67	17.4
Medical Science	73	19.0
Place of residence (Original)		
Rural	86	22.4
Urban	298	77.6
Accommodation		
Other Accommodation	152	39.6
Family	232	60.4
Financial Stress		
No	197	51.3
Yes	187	48.7
Social Activity		
No Activity	245	63.8
Community Service	65	16.9
Cultural Activity	74	19.3
Physical Activity		
No	209	54.4
Yes	175	45.6
Smoking Habit		
No	291	75.8
Yes	93	24.2
Recession Concern		
No	107	27.9
Yes	277	72.1
Reason for MHD		
Supernatural forces	53	13.8
Disease in the brain	262	68.2
Sins/Curses	69	18.0
MHD curable or Not		
No	49	12.8
Yes	335	87.2
Care Willingness		
No	83	21.6
Yes	301	78.4
Treatment/Care Provider		
Spiritual leaders or traditional healers	8	2.1
Doctors (General Practitioner)	54	14.1
Psychiatrist/Clinical Psychologists	322	83.9

Univariate Analysis: Interpretation of the results of Table 1a

From the socio-economic and demographic data, as shown in Table 1a, it was found that among the students, 53.1 % were female. The data in Table1a, also reveals that 35.4%, 28.1%, 17.4%

and 19.0% students were from, arts/ social science /business, science/applied science, engineering/ technology and medical sciences backgrounds, respectively. Most of the students (77.6%) were found to be originated from urban areas and 60.4% of students were found to live with their families. Among the students, 48.7% had the financial stress. More than half (63.8%) of the students were not involved in any social activity where as 16.9% and 19.3% were found to be engaged in community service and cultural activity respectively. Less than half (45.6%) of students had the participation in physical activities. Only 24.2% of students was found to have smoking habit. About 72.1% of students had job insecurity due to economic recession. Analyzing the data in Table 1a, it was found that 13.8%, 68.2% and 18.0% of the students had the knowledge and perception that mental health disorders occur due to supernatural forces, disease in the brain and sins/curse, respectively. Most (87.2%) of the students thought that mental health disorders, curable and 78.4% of students had their willingness to take mental health treatment or care. Among the surveyed students 2.1%, 14.1% and 83.9% of students perceived spiritual leaders/traditional healers, doctors, psychiatrists/clinical psychologists as treatment or care providers for mental health disorders respectively. [Table1a]

Table 1b: Distribution of Frequency and Percentage Frequency of respondents' levels of Depression and Anxiety disorders based on PHQ-9 and GAD-7 Scores

Variables	Frequency (N)	Percentage Frequency (%)
Level of Depression (As per PHQ-9 Scores)		
Minimal (0-4)	44	11.5
Mild (5-9)	115	29.9
Moderate (10-14)	113	29.4
Moderately Severe (15-19)	72	18.8
Severe (20- 27))	40	10.4
Anxiety Disorders (As per GAD-7 Scores)		
Minimal (0-4)	71	18.5
Mild (5-9)	135	35.2
Moderate (10-14)	92	24.0
Severe (15-21)	86	22.4

Univariate Analysis: Interpretation of the results of Table 1b

Analyzing the data in Table 1b, it was found that among the students, the prevalence of minimal, mild, moderate, moderately severe and severe depression was 11.5%, 29.9%, 29.4%, 18.8% and 10.4% respectively, and the prevalence of minimal, mild, moderate and severe anxiety disorders was 18.5%, 35.2%, 24.0% and 22.4% respectively. [Table 1b]

3.2. Bivariate Analysis

The selected qualitative dependent variables depression and anxiety disorders (%) of students (written in the column) and the selected qualitative independent variables (written in the rows) that may influence the dependent variables (depressive & anxiety disorders) were gender, area of study, place of residence, accommodation, financial stress, social activity, physical activity, smoking habit, recession concern etc. in this bivariate analysis. Bivariate analysis was conducted to see the measure of association between the dependent variables (depressive & anxiety disorders) and the selected independent variables with Pearson Chi-squared test, since all the variables are qualitative for this study. [Table 2 and Table 3]

**Table 2: Distribution and Measure of Association between Dependent Variable
(Depression) and Selected Covariates using Pearson Chi-Squared Tests**

Variables categorized (covariates)	Total Frequency N	Levels of Depression (As per PHQ-9 Scores)					p-value
		Minimal n (%)	Mild n (%)	Moderate n (%)	Moderately severe n (%)	Severe n (%)	
Gender							<0.001
Male	180	29 (16.1)	61 (33.9)	57 (31.7)	23 (12.8)	10 (5.6)	
Female	204	15 (7.4)	54 (26.5)	56 (27.5)	49 (24.0)	30 (14.7)	
Area of Study							0.956
Arts/ Social science /Business	136	17 (12.5)	42 (30.9)	37 (27.2)	24 (17.6)	16 (11.8)	
Science/Applied science	108	11 (10.2)	29 (26.9)	37 (34.3)	23 (21.3)	8 (7.4)	
Engineering &Technology	67	9 (13.4)	20 (29.9)	18 (26.9)	11 (16.4)	9 (13.4)	
Medical Science	73	7 (9.6)	24 (32.9)	21(28.8)	14 (19.2)	7 (9.6)	
Place of residence (Original)							0.444
Rural	86	9 (10.5)	31 (36.0)	25 (29.1)	16 (18.6)	5 (5.8)	
Urban	298	35 (11.7)	84 (28.2)	88(29.5)	56 (18.8)	35 (11.7)	
Accommodation							0.398
Other Accommodation	152	20 (13.2)	39 (25.7)	49 (32.2)	31 (20.4)	13 (8.6)	
Family	232	24 (10.3)	76 (32.8)	64 (27.6)	41(17.7)	27(11.6)	
Financial Stress							<0.001
No	197	33 (16.8)	72 (36.5)	58 (29.4)	22 (11.2)	12(6.1)	
Yes	187	11 (5.9)	43 (23.0)	55 (29.4)	50 (26.7)	28 (15.0)	
Social Activity							0.590
No Activity	245	27 (11.0)	77 (31.4)	74 (30.2)	45 (18.4)	22 (9.0)	
Community Service	65	9 (13.8)	20 (30.8)	13 (20.0)	15 (23.1)	8 (12.3)	
Cultural Activity	74	8 (10.8)	18 (24.3)	26 (35.1)	12 (16.2)	10 (13.5)	
Physical Activity							0.196
No	209	22 (10.5)	53 (25.4)	68 (32.5)	43 (20.6)	23 (11.0)	
Yes	175	22 (12.6)	62 (35.4)	45 (25.7)	29 (16.6)	17 (9.7)	
Smoking Habit							0.143
No	291	29 (10.0)	91 (31.3)	80 (27.5)	60 (20.6)	31 (10.7)	
Yes	93	15 (16.1)	24 (25.8)	33 (35.5)	12 (12.9)	9 (9.7)	
Recession Concern							<0.001
No	107	24 (22.4)	44 (41.1)	19 (17.8)	13 (12.1)	7 (6.5)	
Yes	277	20 (7.2)	71 (25.6)	94 (33.9)	59 (21.3)	33 (11.9)	

***Level of significance 0.05**

Bivariate Analysis: Interpretation of the results of Table 2

Analyzing the results in Table 2 indicates that, the prevalence of levels of depression i.e. minimal, mild, moderate, moderately severe and severe depression were found among 16.1%, 33.9%, 31.7%, 12.8% and 5.6% of male, and 7.4%, 26.5%, 27.5%, 24.0% and 14.7% of female students, respectively. Students' gender was found to have highly significant (p-value =<0.001) influence on levels of depression. Table 2 also shows that, the prevalence of levels of

depression was found among 12.5%, 30.9%, 27.2%, 17.6% and 11.8% of students from arts/ social science/business; 10.2%, 26.9%, 34.3%, 21.3% and 7.4% of students from science/applied science; 13.4%, 29.9%, 26.9%, 16.4% and 13.4% of students from engineering and technology, and 9.6%, 32.9%, 28.8%, 19.2% and 9.6% of students from medical sciences, respectively. Area of study, had no significant (p -value = 0.956) association with students' levels of depression. Table 2 reveals that, the occurrence of minimal to severe levels of depression was found among 10.5%, 36.0%, 29.1%, 18.6% and 5.8% of students whose original place of residence were in rural areas, and 11.7%, 28.2%, 29.5%, 18.8% and 11.7% of students originated from urban settings, respectively. Students' place of residence had no significant (p -value = 0.444) influence on their levels of depression. In case of students' accommodation, minimal to severe levels of depression were prevalent among 10.3%, 32.8%, 27.6%, 17.7% and 11.6% of students living with their families, and 13.2%, 25.7%, 32.2%, 20.4% and 8.6% of students living in other accommodation, respectively. Students' accommodation had no significant (p -value = 0.398) association with levels of depression. Table 2 reveals that, the prevalence of minimal to severe levels of depression was found in 5.9%, 23.0%, 29.4%, 26.7% and 15.0% of students who had financial stress, and 16.8%, 36.5%, 29.4%, 11.2% and 6.1% of students who were not financially stressed, respectively. Financial stress of students was found to have highly significant (p -value = <0.001) influence on their levels of depression. The occurrence of minimal to severe depression was found in 11.0%, 31.4%, 30.2%, 18.4% and 9.0% of students who had no participation in social activities whereas, it was found in 13.8%, 30.8%, 20.0%, 23.1% and 12.3% of students who were involved in community service, and 10.8%, 24.3%, 35.1%, 16.2% and 13.5% of students who had their participation in cultural activities, respectively. Social activities had no significant (p -value = 0.590) impact on students' levels of depression. In case of physical activities, minimal to severe levels of depression were found in 12.6%, 35.4%, 25.7%, 16.6% and 9.7% of students

who had their participation in physical activities, and 10.5%, 25.4%, 32.5%, 20.6% and 11.0% of students who had no participation in physical activities, respectively. Students' physical activities did not have significant (p-value = 0.196) influence on their levels of depression. Table 2 also shows that the prevalence of minimal, mild, moderate, moderately severe and severe depression was found in 16.1%, 25.8%, 35.5%, 12.9% and 9.7% of students who were smokers, and 10.0%, 31.3%, 27.5%, 20.6% and 10.7% of students who were non-smokers, respectively. Smoking habit of students, was not found to have significant (p-value = 0.143) association with the levels of depression. Moreover, minimal to severe levels of depression were prevalent in 22.4%, 41.1%, 17.8%, 12.1% and 6.5% of students who had no recession concern, and 7.2%, 25.6%, 33.9%, 21.3% and 11.9% of students having recession concern, respectively. Recession concern of students was found to have highly significant (p-value = <0.001) influence on their levels of depression. [Table 2]

**Table 3: Distribution and Measure of Association between Dependent variable
(Anxiety) and Selected Covariates using Pearson Chi-Squared Tests**

Variables categorized (covariates)	Total Frequency N	Levels of Anxiety (As per GAD-7 Scores)				p-value
		Minimal n (%)	Mild n (%)	Moderate n (%)	Severe n (%)	
Gender						<0.001
Male	180	50 (27.8)	79 (43.9)	33 (18.3)	18 (10.0)	
Female	204	21 (10.3)	56 (27.5)	59 (28.9)	68 (33.3)	
Area of Study						0.004
Arts/ Social science /Business	136	27 (19.9)	51 (37.5)	32 (23.5)	26 (19.1)	
Science/Applied science	108	21 (19.4)	30 (27.8)	37 (34.3)	20 (18.5)	
Engineering &Technology	67	15 (22.4)	29 (43.3)	4 (6.0)	19 (28.4)	
Medical Science	73	8 (11.0)	25 (34.2)	19 (26.0)	21 (28.8)	
Place of residence (Original)						0.325
Rural	86	18 (20.9)	32 (37.2)	23 (26.7)	13 (15.1)	
Urban	298	53 (17.8)	103 (34.6)	69 (23.2)	73 (24.5)	
Accommodation						0.890
Other Accommodation	152	26 (17.1)	54 (35.5)	39 (25.7)	33 (21.7)	
Family	232	45 (19.4)	81 (34.9)	53 (22.8)	53 (22.8)	
Financial Stress						<0.001
No	197	52 (26.4)	71 (36.0)	44 (22.3)	30 (15.2)	
Yes	187	19 (10.2)	64 (34.2)	48 (25.7)	56 (29.9)	
Social Activity						0.632
No Activity	245	44 (18.0)	90 (36.7)	57 (23.3)	54 (22.0)	
Community Service	65	16 (24.6)	19 (29.2)	18 (27.7)	12 (18.5)	
Cultural Activity	74	11 (14.9)	26 (35.1)	17 (23.0)	20 (27.0)	
Physical Activity						0.087
No	209	36 (17.2)	64 (30.6)	55 (26.3)	54 (25.8)	
Yes	175	35 (20.0)	71 (40.6)	37 (21.1)	32 (18.3)	
Smoking Habit						0.652
No	291	50 (17.2)	102 (35.1)	72 (24.7)	67 (23.0)	
Yes	93	21 (22.6)	33 (35.5)	20 (21.5)	19 (20.4)	
Recession Concern						<0.001
No	107	29 (27.1)	47 (43.9)	15 (14.0)	16 (15.0)	
Yes	277	42 (15.2)	88 (31.8)	77 (27.8)	70 (25.3)	

***Level of significance 0.05**

Bivariate Analysis: Interpretation of the results of Table 3

Analyzing the data in Table 3 indicates that, the prevalence of minimal, mild, moderate and severe anxiety was found among 27.8%, 43.9%, 18.3% and 10.0% of male, and 10.3%, 27.5%, 28.9% and 33.3% of female students, respectively. Students' gender was found to have highly significant (p-value = <0.001) influence on their levels of anxiety. The occurrence of minimal to severe levels of anxiety was found among 19.9%, 37.5%, 23.5% and 19.1% of students from

arts/ social science /business; 19.4%, 27.8%, 34.3% and 18.5% of students from science/applied science; 22.4%, 43.3%, 6.0% and 28.4% of students from engineering and technology, and 11.0%, 34.2%, 26.0% and 28.8% of students from medical sciences, respectively. Students' area of study, was found to have significant (p-value = 0.004) association with their levels of anxiety. Table 3 also shows that, minimal to severe anxiety disorders were found among 20.9%, 37.2%, 26.7% and 15.1% of students originated from rural areas, and 17.8%, 34.6%, 23.2% and 24.5% of students originated from urban settings, respectively. Students' original place of residence had no significant (p-value = 0.325) impact on their anxiety disorders. In case of students' accommodation, minimal to severe levels of anxiety disorders were prevalent among 19.4%, 34.9%, 22.8% and 22.8% of students living with their families, and 17.1%, 35.5%, 25.7% and 21.7% of students living in other accommodation, respectively. Students' accommodation, had no significant (p-value = 0.890) association with their anxiety disorders. The occurrence of minimal to severe anxiety disorders was found in 10.2%, 34.2%, 25.7% and 29.9% of students who had financial stress, and 26.4%, 36.0%, 22.3% and 15.2% of students who were not financially stressed, respectively. Financial stress of students was found to have highly significant (p-value = <0.001) influence on their levels of anxiety. The prevalence of minimal to severe anxiety disorders was found among 18.0%, 36.7%, 23.3% and 22.0% of students who had no participation in social activities; 24.6%, 29.2%, 27.7% and 18.5% of students who were involved in community services, and 14.9%, 35.1%, 23.0% and 27.0% of students who had the participation in cultural activities, respectively. Students' social activities had no significant (p-value = 0.632) association with their levels of anxiety. In case of physical activities, minimal to severe anxiety disorders were found among 20.0%, 40.6%, 21.1% and 18.3% of students who had their participation in physical activities, and 17.2%, 30.6%, 26.3% and 25.8% of students who did not have the participation, respectively. Students' participation in physical activities had no significant

(p-value = 0.087) association with their anxiety disorders. Minimal to severe anxiety disorders were prevalent among 22.6%, 35.5%, 21.5% and 20.4% of students who were smokers, and 17.2%, 35.1%, 24.7% and 23.0% of students who were non-smokers, respectively. Smoking habit of students had no significant (p-value = 0.652) association with their anxiety disorders. In addition, occurrence of minimal to severe levels of anxiety was found in 27.1%, 43.9%, 14.0% and 15.0% of students who had no recession concern, and 15.2%, 31.8%, 27.8% and 25.3% of students having recession concern, respectively. Recession concern of students was found to have highly significant (p-value = <0.001) influence on their levels of anxiety.

[Table 3]

3.3. Multivariate Logistic Regression Analysis

The selected qualitative dependent variables; levels of depression and anxiety were recoded into two categories as a qualitative binary random variable and defined as, 1 = if the depression and anxiety disorders were present = PHQ 9 score and GAD score were 5 and above (Else) and 0 = no depression and anxiety disorders = PHQ 9 score and GAD score were ≤ 4 . Among the selected independent variables or covariates which were not binary, were recoded into binary random variables. Therefore, a binary logistic regression analysis was conducted in this study, since the dependent variables (Depression and Anxiety) were qualitative binary random variables and all qualitative covariates were binary too, as shown in Table 4 and Table 5. A multivariate binary logistic regression model (more than one independent variables) was appropriate for this study to see the odds ratio corresponding to the selected independent variables. Table 4 and 5 showing Regression Coefficient, p-value, Odds Ratio and 95% Confidence Interval for Odds Ratio, corresponding to the selected independent variables. Gender, Area of study, Original place of residence, Accommodation, Financial stress, Social activity, Physical activity, Smoking habit and Recession Concern. [Table 4 and Table 5].

Table 4: Binary Logistic Regression Model Fitted to presence of Depression based on PHQ-9 Scores with Selected Socio-economic and Demographic Factors

Covariates (Variables categorized)	Regression Coefficient	p-value	OR	95% Confidence Interval for odds ratio (lower - upper)
Constant	0.629	0.296	1.875	
Gender				
Male (Ref)	-	-	-	-
Female	0.737	0.094	2.090	(0.883 - 4.948)
Area of Study				
Arts/ Social science /Business (Ref)	-	-	-	-
Science/Applied science	-0.215	0.637	0.807	(0.331 - 1.967)
Engineering &Technology	-0.055	0.910	0.947	(0.366 - 2.448)
Medical Science	0.089	0.874	1.093	(0.366 - 3.266)
Original Place of residence				
Rural (Ref)	-	-	-	-
Urban	-0.072	0.863	0.931	(0.410 - 2.113)
Accommodation				
Other Accommodation (Ref)	-	-	-	-
Family	0.438	0.223	1.549	(0.767 - 3.132)
Financial Stress				
No (Ref)	-	-	-	-
Yes	0.964	0.015	2.623	(1.204 - 5.713)
Social Activity				
No Activity (Ref)	-	-	-	-
Community Service	-0.034	0.940	0.967	(0.403 - 2.320)
Cultural Activity	-0.133	0.775	0.876	(0.352 - 2.180)
Physical Activity				
No (Ref)	-	-	-	-
Yes	-0.006	0.988	0.994	(.485 - 2.038)
Smoking Habit				
No (Ref)	-	-	-	-
Yes	-0.279	0.506	0.757	(0.333 - 1.720)
Recession Concern				
No (Ref)	-	-	-	-
Yes	1.128	0.001	3.088	(4.550 - 6.152)

***Level of significance 0.05**

Multivariate Binary Logistic Regression Analysis: Interpretation of the results of

Table 4

The data in Table 4, reveals that the odds of having depression was found 109% higher (OR= 2.090, p-value = 0.094, 95% CI) among female students than that of male (Ref. group) students with no statistical significance. Besides, the odds of having depression were found 19.3% lower (OR = 0.807, p-value = 0.637, 95% CI) in students from science/applied science, 5.3% lower (OR= 0.947, p-value = 0.910, 95% CI) in students from engineering and technology, and 9.3%

higher (OR=1.093, p-value = 0.874, 95% CI) in students from medical sciences, compared to that of students from arts/social science/business (Ref. group), respectively, and these findings were not statistically significant. Table 4 also shows, that the odds of having depression were found 6.9% lower (OR=0.931, p-value = 0.863, 95% CI) among the students originated from urban settings than that of students originated from rural (Ref. group) areas with no statistical significance; 54.9% higher (OR= 1.549, p-value = 0.223, 95% CI) among the students living with families compared to that of students living in other accommodation (Ref. group) with no statistical significance and also significantly 162.3% higher (OR=2.623, p-value=0.015, 95% CI) among students having financial stress compared to that of students with no financial stress (Ref. group), respectively. In addition, the odds of having depression were found 3.3% lower (OR= 0.967, p-value = 0.940, 95% CI) among students involved in community service and 12.4% lower (OR = 0.876, p-value = 0.775, 95% CI) among students involved in cultural activities, compared to that of students involved in no activities (Ref. group), respectively, with no statistical significance. Analyzing the data in Table 4, the odds of having depression were found 0.6% lower (OR=0.994, p-value=0.988, 95% CI) among the students who had the participation in physical activities compared to that of the students had no participation (Ref. group) in any activities, and 24.3% lower (OR = 0.757, p-value =0.506, 95% CI) odds among the students who had smoking habit compared to that of students did not have smoking habit (Ref. group), with no statistical significance respectively, and also significantly 208.8% higher (OR = 3.088, p -value = 0.001, 95% CI) among the students who had recession concern compared to that of students with no recession concern (Ref. group), respectively. [Table 4]

Table 5: Binary Logistic Regression Model Fitted to presence of Anxiety based on GAD-7 Scores with Selected Socio-economic and Demographic Factors

Covariates (Variables categorized)	Regression Coefficient	p-value	OR	95% Confidence Interval for odds ratio (lower - upper)
Constant	- 0.060	0.906	0.941	
Gender				
Male (Ref)	-	-	-	-
Female	1.295	< 0.001	3.650	(1.816 - 7.335)
Area of Study				
Arts/ Social science /Business (Ref)	-	-	-	-
Science/Applied science	- 0.378	0.307	0.685	(0.332 - 1.415)
Engineering &Technology	0.034	0.933	1.034	(0.472 - 2.267)
Medical Science	0.450	0.360	1.569	(0.599 - 4.111)
Place of residence (Original)				
Rural (Ref)	-	-	-	-
Urban	0.174	0.598	1.190	(0.624 - 2.269)
Accommodation				
Other Accommodation (Ref)	-	-	-	-
Family	- 0.027	0.930	0.974	(0.537 - 1.765)
Financial Stress				
No (Ref)	-	-	-	-
Yes	1.110	< 0.001	3.035	(1.625 - 5.669)
Social Activity				
No Activity (Ref)	-	-	-	-
Community Service	- 0.177	0.628	0.838	(0.409 - 1.715)
Cultural Activity	0.163	0.685	1.178	(0.535 - 2.594)
Physical Activity				
No (Ref)	-	-	-	-
Yes	0.139	0.647	1.149	(0.635 - 2.078)
Smoking Habit				
No (Ref)	-	-	-	-
Yes	0.266	0.450	1.305	(0.654 - 2.603)
Recession Concern				
No (Ref)	-	-	-	-
Yes	0.471	0.121	1.602	(0.883 - 2.909)

***Level of significance 0.05**

Multivariate Binary Logistic Regression Analysis: Interpretation of the results of

Table 5

The data in Table 5, reveals that the odds of having anxiety disorders was found significantly 265% higher (OR = 3.650, p –value = <0.001, 95% CI) among female students than that of male (Ref. group) students. Besides, the odds of having anxiety disorders was found 31.5% lower (OR = 0.685, p-value = 0.307, 95% CI) in students from science/applied science, 3.4% higher (OR = 1.034, p-value = 0.933, 95% CI) in students from engineering & technology and

56.9% higher (OR = 1.569, p-value= 0.360, 95% CI) in students from medical sciences, as compared to that of students from arts/social science/business (Ref. group), respectively and these findings were not statistically significant. Table 5 also shows, that the odds of having anxiety disorders were found 19% higher (OR = 1.190, p-value = 0.598, 95% CI) among the students originated from urban settings compared to that of students originated from rural areas (Ref. group) with no statistical significance; 2.6% lower (OR= 0.974, p-value = 0.930, 95% CI) among the students living with their families compared to that of students living in other accommodation (Ref. group) with no statistical significance, and significantly 203.5% higher (OR= 3.035, p-value = <0.001, 95% CI) among the students having financial stress compared to that of students with no financial stress (Ref. group). Moreover, the odds of having anxiety disorders were found 16.2% lower (OR= 0.838, p-value = 0.628, 95% CI) among students involved in community service and 17.8% higher (OR= 1.178, p-value= 0.685, 95%CI) among the students participated in cultural activities as compared to that of students who had no participation (Ref. group) in social activities, respectively, with no statistical significance. Analyzing the data in Table 5, the odds of having anxiety disorders was found 14.9% higher (OR= 1.149, p-value = 0.647, 95% CI) among the students who had the participation in physical activities than that of the students had no participation (Ref. group) in any activities; 30.5% higher (OR= 1.305, p-value= 0.450, 95% CI) among the students who had smoking habit compared to that of students with no smoking habit (Ref. group), and also 60.2% higher (OR=1.602, p-value = 0.121, 95% CI) among the students who had recession concern compared to that of students having no recession concern (Ref. group), respectively with no statistical significance. [Table 5]

***In the above multivariate binary logistic regression analysis, when a covariate was considered, other factors were kept adjusted. [Table 4 & 5]**

CHAPTER 4: DISCUSSION

4.1. Discussion

This research aimed to examine the prevalence of depression and anxiety disorders and selected socioeconomic and demographic factors that impact the occurrence of depression and anxiety disorders among university students in Bangladesh, as well as their knowledge and perception about mental health disorders. The study period for this survey was between February 19 and March 6, 2023. The survey was conducted on registered undergrad students of private universities and private medical colleges located in Dhaka, Bangladesh. Students' age ranged from 18 to 24 years and all of them were Bangladeshi citizens by birth. Surveys were given to a population of 391 sampled students. After applying inclusion and exclusion criteria, 384 valid responses were used for data analysis.

Depression and anxiety disorders are tied to negative mental and physical health and life outcomes for individuals, such as increased mood swing, loss of interest in activities, changes in appetite and sleep patterns, fatigue, feelings of worthlessness and guilt, difficulty concentrating, physical symptoms like restlessness, rapid heartbeat, sweating, chest pain, shortness of breath, dizziness, choking, hot flashes, nausea, fear of losing control, and even suicidal thoughts or behaviors. It has consequential impacts on public health and economic challenges at the national level, including lower economic growth, lower labor force participation rate, and decreased productivity.

Our study found the prevalence of mild to severe depression and anxiety disorders among the surveyed students was 88.5% and 81.6% respectively. The findings of this study were consistent with some existing literature, though there are some aspects that differ. These high rates of depression and anxiety disorders were comparable to a study by Islam MA et al. (2020) that found that the rate of mild to severe depression and anxiety disorders among university students in Bangladesh was 82.4% and 87.7%, respectively.²¹ Other studies of Rezvi et al.

(2022)¹⁴ and Islam S et al. (2020)¹⁰ found moderate to severe depression and anxiety disorders among university students were 54% and 37%, and 69.5% and 61%, respectively. Several other studies also found that a large number of Bangladeshi university students were suffering from depression and anxiety disorders (Hossain MJ¹⁶, Faisal RA¹⁷, Nahar Z²³, Mamun FA²⁸ et al.). Based on PHQ-9²⁶ score results from our study, 29.9%, 29.4%, 18.8% and 10.4% of the university students experienced mild, moderate, moderately severe, and severe levels of depression, respectively. Based on our GAD-7²⁷ score results, 35.2%, 24.0% and 22.4% of the students experienced mild, moderate, and severe levels of anxiety disorders, respectively.

Among the socio-economic and demographic characteristics of our study, students' financial stress and recession concerns (worries about future job insecurity due to economic recession) were found to have significant impacts on the occurrence of depressive disorders, while students' gender and financial stress were found to have a significant association with anxiety disorders for university students in Bangladesh.

From regression analysis results of our study, we found higher (109%) odds of depression in female students as compared to male students, though these results were not statistically significant (p-value 0.094). However, our bivariate analysis showed highly significant (p-value<0.001) gender differences. These might have happened due to confounding factors, such as our limited sample sizes. Nonetheless, a study done by Islam S et al. (2020) also didn't find statistically significant gender differences.¹⁰ A separate study by Tareq S Ret al. (2020), found that that depression was more prevalent in female medical students and that suicidal tendency was also higher among female students.²² Our study also found that female students had significantly higher (265%, p-value<0.001) odds of anxiety disorders compared to male students and our findings were consistent with the findings of Muzaffar R et al. (2022)¹⁹, Md. Kamruzzaman et al. (2022)¹⁵, and Paul G et al. (2022)⁷. Several other studies have found gender differences in prevalence of depression and anxiety prevalence among the university students

both in Bangladesh and abroad (Hosen I⁶, Islam S¹⁰, Rahman M¹⁸, Nahar Z²³, Mamun FA²⁸, Ochnik D²⁹, Esmat³⁰ et al.). Collating the aforementioned studies with our own findings, we can say that female students are more likely to suffer from different levels of anxiety disorders. Female students generally have to face additional social challenges when compared to male students, which may be a cause of this disparity. Further effort must be put into determining the causes that lead to increased anxiety and depression in female students, as it could help close this gender gap.

Regression analysis results of our study showed that students from science/applied science and engineering and technology had lower odds of depression compared to students of art/social science. Medical students, on the other hand, had higher odds of depression compared to art/social science students. However, these results were not statistically significant. Students from science/applied science had lower odds and students from engineering/technology and medical students had higher odds of anxiety disorders compared to arts/social science/business, respectively, also with no statistical significance. Our study findings were consistent with the existing literature of Islam S et al. (2020).¹⁰ The bivariate analysis of our study showed 90.5% of the medical students had mild to severe depression and 89% of the medical students had mild to severe anxiety disorders. Some other studies on medical students also found higher levels of depression and anxiety disorders, such as Tareq SR et al.(2020)²² and Hasan MT et al.(2020)⁸, complementing our study's findings.

Our study also found that students who originated from urban areas had lower odds (6.9%) of depression and higher odds (19%) of anxiety disorders compared to those of rural areas. These results were not statistically significant. These findings have similarities with the findings of Islam M A et al. (2020)²¹ and Islam S et al. (2020)¹⁰. In other studies, Nahar Z et al. (2022)²³, found that females residing in urban areas are more vulnerable to developing Mental health problems and Rahman M et al.(2022)¹⁸ found the students living in Dhaka city were more

depressed and anxious compared to those living outside Dhaka. In another study, Paul G et al. (2022)⁷ found that urban students have significantly higher levels of depression and anxiety disorders. Since urban life, especially the life of Dhaka city, is faster, more competitive and more stressful, students have to go through a lot of challenges in addition to their academic activities and preparation for their future careers. This could be an explanation for the additional anxiety they face when compared to students from rural areas.

In this study, regression analysis showed that students living with families had higher (54.9%) odds of depression and lower (2.6%) odds of anxiety compared to those students living in other accommodation; these results had no statistically significant association. Once again our findings had the similarity with the findings of Muzaffar R et al. (2022), which also did not find a statistically significant association between the covariates and depression and anxiety disorders.¹⁹ A study by Mehareen J et al. (2021) found that university students living in nuclear families and those who spent less time with family reported having higher depression and anxiety.⁹ It might be that if a university student starts spending less time with family, a communication gap arises gradually that leads to the student becoming lonely mentally. Since a student needs family support in times of crisis, handling the challenging situation of a communication gap with family might be the reason for loneliness that initiates depression as well as anxiety disorders.

Regression analysis of our study showed that university students with financial stress had significantly (162.3%, p-value = 0.015) higher odds of depression and also significantly higher odds (203.5%, p-value<0.001) of anxiety disorders compared to students with no financial stress. Our findings were consistent with the findings of Islam MA et al. (2020)²¹, Nahar Z et al. (2022)²³ and Hossain MJ et al. (2022)¹⁶ as these studies also found financial stress as a risk factor for mental health disorders. Hossain MJ et al. (2022) also found that students who were incomeless had more anxiety.¹⁶

From the logistic regression analysis of our study, we found students involved in community services (3.3%) and cultural activities (12.4%) had lower odds of depression when compared to students with no social activities. Besides, students involved in community services had lower (16.2%) odds and students involved in cultural activities had higher (17.8%) odds of anxiety disorders compared to students who were not involved in any social activities, without statistical significance. To our knowledge from literature review, none of these previously cited studies have looked at impacts of social activities on depression and anxiety in university students. Students participating in physical activities had lower (0.6%) odds of depression and higher (14.9%) odds of anxiety disorders than students who had no participation in physical activities. Interestingly, our study showed that physical activity had no significant impact on depression and anxiety disorders. Similarly, Islam MA et al. (2020) also did not find physical activities or exercise as identifying factors influencing the depression and anxiety disorders of university students in Bangladesh.²¹ However, studies of Mamun FA et al.(2021)²⁸ and Islam S et al.(2020)¹⁰ found the lack of physical exercises was associated with mental health disorders. Surprisingly, students having smoking habits had lower (24.3%) odds of depression and higher (30.5%) odds of anxiety disorders compared to students with no smoking habits - this result was not statistically significant. A study by Mamun FA et al. (2021) also found that smoking was associated with mental health disorders.²⁸

In this study, regression analysis showed that students with recession concerns (concerns about future job insecurity due to economic recession) had significantly higher odds (208.8%, p-value 0.001) of depression than students with no recession concerns, while students with recession concerns had non significantly higher odds (60.2%) of anxiety disorders compared to students with no recession concerns. To our knowledge, no existing literature has looked at the impacts of recession concern on depression and anxiety disorders among university students in Bangladesh to date.

Our study also aimed to find out some important information about the basic knowledge and perception of mental health disorders among university students in Bangladesh. Analyzing our survey data of 384 undergrad students, we found that more than half (68.2%) of the students thought that the reason for mental health disorders was disease in the brain, while the rest of the participants thought that supernatural forces (13.8%) and sins or curse (18.0%) was the reasons for mental health disorders. Most (87.2%) of the respondents thought that mental health disorders were curable and 78.4% of the students displayed willingness to take mental health treatment if they or their family were to suffer from mental health problems. The survey data also revealed that 83.9% of students had a clear idea that psychiatrists or clinical psychologists should be mental health care or treatment providers, though 2.1% & 14.1% of students perceived that spiritual leaders or traditional healers should be care providers. A study by Siddique M A B et al. (2020) found more than half (62.1%) of students had adequate knowledge of the causes and treatments for mental health disorder, and that female students who manage their own expenses had significantly higher knowledge of mental health. The researchers indicated that knowledge of mental health among students was insufficient, though the study did not look for university students' perception regarding mental health disorders.¹¹

4.2. Strength and Limitation of the Research

The **strengths** of this study are as follows:

1. The data were collected physically (in person) through a self- administered standardized questionnaire which included the questions to collect socioeconomic & demographic information, knowledge & perception of students about mental health disorders, and internationally accepted tools to measure the level of depression & anxiety disorders and the questionnaire was reviewed by experts.
2. The data were collected randomly without any biasness. Each respondent was informed about the purpose of this research and had the independence of attending or rejecting the

participation in this survey and every participant had to sign the informed consent letter where data privacy was ensured before taking part in the survey.

3. Participants were the registered students of private universities and private medical colleges and willingly participated in this survey.

4. Since the investigator was physically present during the survey so students didn't face any problem to understand the questionnaire and got their required time to read, think and answer the questions therefore, the chances of correct answer representing his/her mental health problem was expected to be more accurate.

5. The study complements some previous studies by including some detailed variables that have impacts about mental health.

The **limitations** of this study are as follows:

1. Since the research methodology could not reach people with medically examined depression and anxiety disorders, the provision of the results may not fully reflect the severity of depression and anxiety disorders among the university students in Bangladesh.

2. The data were collected in a short span of time so it might not be reflection of the entire student population.

3. The sample size was not too large (384), therefore it might not have reflected the actual scenario of the entire university student population in Bangladesh.

CHAPTER 5: CONCLUSION

5.1. Conclusion

Depression and anxiety disorders are common mental health problems among university students which have impacts on academic performance, social relationships, communication and overall well-being. This study found that the prevalence of depression and anxiety disorders among university students are very high in Bangladesh. Our study analysis has shown that financial stress and recession concern have significant impacts on depressive disorders whereas gender and financial stress have significant influence on anxiety disorders among university students in Bangladesh.

There is still lack of research on depression and anxiety disorders of university students in Bangladesh and further research is required to know the perfect scenario of the prevalence, impact, and treatment of these mental health conditions. It is also essential to promote awareness and access to mental health services to support these mental health conditions for university students in Bangladesh.

5.2. Recommendations

To minimize the developing mental health problems of the university students, the government and the university authorities, should work together to deliver financial and psychological support as promptly as possible. From a broader perspective government, NGO's in coordination with WHO, UNESCO, and CDC need to intensify community awareness, specifically for the students, by continuously collecting and analyzing the data, then take evidenced-based and appropriate scientific measures to mitigate the above mentioned problems.

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Conflict of Interest

There is no possible conflict of interest

Funding Source

Not received

APPENDIX

Appendix 1: Questionnaire for collecting Socio-Economic and Demographic Information (Part 1).

Questionnaire

ID: _____

Part 1

Socio-Economic and Demographic Information Q

Put a cross (X) beside any of the options that indicates your answer:

1. Gender:

a) *Male* _____ b) *Female* _____

2. Age:

a) *18–24 years* _____ b) *Above 24 years* _____

3. What type of University are you attending?

a) *Private* _____ b) *Public* _____

4. What is your level of study?

a) *Under grad* _____ b) *Post grad* _____

5. What is your area of study?

a) *Arts/ Social science /Business* _____ b) *Science/Applied science* _____

c) *Engineering &Technology* _____ d) *Medical Science* _____

6. Where is your place of residence (Permanent residence's location)?

a) *Urban* _____ b) *Rural* _____

7. Are you staying with Family or Other accommodation?

a) *Family* _____ b) *Other accommodation* _____

8. Are you facing financial hardship/constraints/stress?

a) *Yes* _____ b) *No* _____

9. Do you have any participation in Social activity?

a) *Community service* _____ b) *Cultural activity* _____ c) *No activity* _____

10. Do you have participation in Physical activity/Exercise?

a) *Yes* _____ b) *No* _____

11. Do you have smoking habit?

a) *Yes* _____ b) *No* _____

12. Are you worried about your future job due to Economic recession (downturn)?

a) *Yes* _____ b) *No* _____

Mental Health knowledge and perception Q

Put a cross (X) beside any of the options that indicates your answer:

1. Which of the following do you think can be a possible reason for mental health disorders?

a) *It is caused due to disease in the brain* _____ b) *It is caused due to the sins/curse* _____

c) *It is caused due to the effect of supernatural forces* _____

2. Is mental illness curable?

a) *Yes* _____ b) *No* _____

3. If you or anyone of your family will suffer from mental health problem will you take any treatment / counseling?

a) *Yes* _____ b) *No* _____

4. Who do you think can treat mental disorders?

a) *Doctors (General practitioner)* _____ b) *Psychiatrist/Clinical psychologist* _____

c) *Spiritual leaders (Huzur) or Traditional healers (Ozha)* _____

Appendix 2: Internationally accepted tool “PHQ9” to collect data for the assessment of levels of Depression (Part 2).

Part 2

Patient Health Questionnaire (PHQ-9)

Put a cross (X) in the right box that indicates your answers.

Over the last 2 weeks, how often have you been bothered by any of the following problems?	Not at all	Several days	More than half the days	Nearly everyday
1. Little interest or pleasure in doing things?				
2. Feeling down, depressed, or hopeless?				
3. Trouble falling or staying asleep or sleeping too much?				
4. Feeling tired or having little energy?				
5. Poor appetite or overeating?				
6. Feeling bad about yourself or that you are a failure or have let yourself or your family down?				
7. Trouble concentrating on things, such as reading the newspaper or watching television?				
8. Moving or speaking so slowly that other people could have noticed. Or the opposite—being so fidgety or restless that you have been moving around a lot more than usual?				
9. Thoughts that you would be better off dead or of hurting yourself in some way?				
Total score for each column				

Total Score (adding all column scores): _____

If you checked off any problems, how difficult have these made it for you to do your work, take care of things at home, or get along with other people? **Circle one option below.**

Not difficult at all Somewhat difficult Very difficult Extremely difficult

Appendix 3: Internationally accepted tool “GAD7” to collect data for the assessment of levels of General Anxiety disorders (Part 3).

Part 3

Generalised Anxiety Disorder (GAD-7) Questionnaire

Put a cross (X) in the right box that indicates your answers.

Over the last 2 weeks, how often have you been bothered by the following problems?	Not at all	Several days	More than half the days	Nearly every day
1. Feeling nervous, anxious or on edge?				
2. Not being able to stop or control worrying?				
3. Worrying too much about different things?				
4. Trouble relaxing?				
5. Being so restless that it is hard to sit still?				
6. Becoming easily annoyed or irritable?				
7. Feeling afraid as if something awful might happen?				
Total score for each column				

Total Score (adding all column scores): _____

If you checked off any problems, how difficult have these made it for you to do your work, take care of things at home, or get along with other people? **Circle one option below.**

Not difficult at all Somewhat difficult Very difficult Extremely difficult

Appendix 4: Informed Consent Letter for Participants.

Consent Letter

Title of the research project: Prevalence & Risk Factors of Depression, Anxiety and Perception of Mental Health Disorders among University Students in Bangladesh.

This survey is being conducted as part of a course work in Independent University Bangladesh. The purpose of this study is to explore the knowledge and perception about the level of depression & anxiety disorders among the university students. The research output from this survey is intended to benefit the planning and services provision for the university students suffering from depression and anxiety disorders in Bangladesh.

All information of the participants will be completely confidential and used solely for the purpose of this research. We urge you to take a little time to think carefully and answer the questions so that the results of this survey can be dependable.

If you agree to participate in the survey, please sign the consent letter and then fill out the following questionnaire.

Participant's Consent:

I have read and understood the information provided in this consent letter, and I voluntarily agree to participate in the survey.

Participant's Name & Signature: _____

Date: _____

ID: _____

Appendix 5: Certificate of Approval of Institutional Review Board (IRB), IUB.



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Institutional Review Board (IRB) Certificate of Approval

March 27, 2023

Dr. Zenat Zebin Hossain

Assistant Professor
Department of Public Health, IUB

Research Project Name:

"Prevalence and Risk Factors of Depression, Anxiety and Perception of Mental Health Disorders Among University Students in Bangladesh"

Dear Principal Investigator,

The above referenced application has been reviewed and approved by the university's IRB. Please report any changes in the protocol or adverse events to the IRB immediately.

Your research records may be audited at any time during or after the implementation of your project. If you have any questions, contact Assistant Director and Officer in Charge, Sponsored Research, Office of the Pro-Vice Chancellor.

Good luck with your work.

Sincerely,

A handwritten signature in black ink, appearing to read 'Niaz Ahmed Khan'.

Professor Niaz Ahmed Khan, Ph.D.
Pro-Vice Chancellor & Member
Institutional Review Board, IUB

A handwritten signature and the date '27.3.23' in black ink.

INDEPENDENT UNIVERSITY, BANGLADESH

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