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The Prevalence of Depression, Anxiety, and Stress and Their Associated Factors Among University Students in Sana'a-Yemen

A graduation research project submitted as partial fulfillment for the requirements of the bachelor's degree in Pharm-D

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

قال تعالى

**(يَرْفَعُ اللَّهُ الَّذِينَ آمَنُوا مِنْكُمْ وَالَّذِينَ أُوتُوا الْعِلْمَ دَرَجَاتٍ
وَاللَّهُ بِمَا تَعْمَلُونَ خَبِيرٌ)**

سورة المجادلة (11)

صدق الله العظيم

Dedication

This research project is dedicated to our parents, whose unwavering love, support, and encouragement have been the foundation of our academic journey. Your belief in us has provided the strength and motivation needed to reach this milestone.

To our family members, your constant support and understanding have been invaluable. Your encouragement has been a source of inspiration throughout this process.

We also extend this dedication to our esteemed professors, whose guidance, expertise, and dedication to teaching have greatly enriched our educational experience. Your mentorship has been instrumental in shaping the direction and quality of this research.

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Abstract

Background: Mental health disorders, including depression, anxiety, and stress, are increasingly prevalent among university students, particularly in conflict-affected regions such as Yemen. Understanding the sociodemographic factors and lifestyle behaviors associated with these conditions is crucial for developing effective interventions. **Aims:** This study aimed to assess the prevalence and associated factors of depression, anxiety, stress, insomnia, and self-esteem among university students in Yemen.

Methods: A cross-sectional study was conducted among 2,612 students from both public and private universities in Yemen. Data on sociodemographic characteristics, health behaviors, and mental health status were collected using a structured questionnaire, including the Depression Anxiety Stress Scale (DASS-21), the Rosenberg Self-Esteem Scale, and an insomnia assessment tool. Statistical analyses were performed to identify associations between mental health outcomes and various participant characteristics.

Results: Among the participants, 57.6% were male, and the median age was 21 years. The prevalence of mild to extremely severe depression was 71.5%, anxiety was 67.4%, and stress was 60.9%. Insomnia affected 81.5% of the students, with moderate to severe cases constituting 39.6%. High self-esteem was reported by 58.1% of participants. Significant associations were found between gender and all mental health outcomes, with females showing higher levels of depression, anxiety, and stress ($p < 0.001$). Other factors such as age, study field, family income, khat chewing, and insomnia were also significantly associated with depression ($p < 0.05$).

Conclusion: The study reveals high prevalence rates of depression, anxiety, stress, and insomnia among university students in Yemen, with notable gender disparities and associations with various sociodemographic and lifestyle factors. These findings underscore the need for targeted mental health interventions and support services tailored to the specific needs of this population.

Keywords: Depression, Anxiety, Stress, Insomnia, University Students, Yemen, Mental Health.

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List of abbreviation and acronyms

GAD	Generalized Anxiety Disorder
SAD	Social Anxiety Disorder
SUD	Substance Use Disorder
UK	United Kingdom
COVID-19	Corona
MSSP	Medical Students Stress Profile
MSSQ	Medical Students Stress Questionnaire
MSWBI	Medical Student Well-Being Index
PMSS	Perceived Medical School Stress
PSSMS	Perceived Stress Scale for Medical Students
OLBI-MS	Oldenberg Burnout Inventory-Medical Student
FUMC	Foundation University Medical College
KUSMS	Kathmandu University Medical School
MCOMS	Manipal College Of Medical Science
DASS-21	Depression, Anxiety, Stress Scale-21
QOL	Quality Of Life
P-value	Probability value
SAS	Self-Rating Anxiety Scale
SDS	Self-Rating Depression Scale
EIU	Emirate International university
DASS-D	Depression, Anxiety, Stress Scale -Depression
DASS-A	Depression, Anxiety, Stress Scale -Anxiety
DASS-S	Depression, Anxiety, Stress Scale -Stress
ISI	Insomnia Severity Index
RSES	Rosenberg Self-Esteem Scale
NY	New York
US	United States
IBM CORP	International Business Machine Corporation
IQR	Interquartile Range
YR	Yemeni Rial
BMI	Body Mass Index
N	Number
HPA	Hypothalamic Pituitary Adrenal

Chapter I: Introduction

Introduction

1.1 Background

Mental illnesses: are health conditions involving changes in emotion, thinking or behavior (or a combination of these). They can be associated with distress and/or problems functioning in social, work or family activities. Mental illness does not discriminate; it can affect anyone regardless of your age, gender, geography, income, sociodemographic, race, ethnicity, religion/spirituality, sexual orientation, background or other aspect of cultural identity [1]. While mental illness can occur at any age, three-fourths of all mental illness begins by age 24. Mental illnesses take many forms. Some are mild and only interfere in limited ways with daily life, such as some phobias (abnormal fears) [1]. Other mental health conditions are so severe that a person may need care in a hospital. Similar to other medical illnesses, the optimal ways to provide care depend on the illness and the severity of its impact [1] .

1.1.1 General anxiety disorder: is an emotional state commonly caused by the perception of real or perceived danger that threatens the security of an individual. Anxiety can produce uncomfortable and potentially debilitating psychological (e.g., worry or feeling of threat) and physiologic arousal (e.g., tachycardia or shortness of breath) if it becomes excessive [2]. Some individuals experience persistent, severe anxiety symptoms and possess irrational fears that significantly impair normal daily functioning. These persons often suffer from an anxiety disorder [2].

1.1.1.1 Epidemiology

Anxiety disorders, as a group, are the most commonly occurring psychiatric disorders as approximately 34% of the population are affected by an anxiety disorder during their lifetime [3]. According to the National Comorbidity Survey Replication which assessed the prevalence, severity, and comorbidity estimates of mental disorders in the United

States, the most recent one-year prevalence rate for anxiety disorders was 21.3% in persons aged 18 years and older [3]. Specific phobias were the most common anxiety disorder, with a 12-month prevalence of 10.1%. The 1-year prevalence of generalized anxiety disorder (GAD) was 2.9%, and social anxiety disorder (SAD) was 8.0% [3]. In general, anxiety disorders are a group of heterogeneous illnesses that develop before age 30 years and are more common in females, individuals with social issues, and those with a family history of anxiety and depression. Patients often develop another anxiety disorder, major depression, or SUDs [2-4]. The clinical picture of mixed anxiety and depression is much more common than an isolated anxiety disorder.

1.1.1.2 Causes Of Anxiety

1. Panic disorder: In addition to anxiety, common symptoms of panic disorders are palpitations (feeling your heartbeat), dizziness, and shortness of breath. These same symptoms also can be caused by coffee (caffeine), amphetamines ("speed" is the street slang for amphetamines when they are not prescribed by a doctor), other stimulants such as cocaine, an overactive thyroid, abnormal heart rhythms, and other heart abnormalities (such as mitral valve prolapse).
2. Phobic disorders
3. Stress disorders
4. Stress at work
5. Stress from school
6. Financial stress
7. Medication side effect [5]

1.1.1.3 Risk factors

1. Shyness, feeling distressed or nervous in a new situation in childhood.
2. Exposure to stressful and negative life or environmental events.

3. A history of anxiety or other mental disorders in biological relatives [6].

1.1.2 Depression: is a depressed mood or loss of pleasure or interest in activities for long periods of time . Depression is one of the most widespread diseases across the world and a major factor in problems of mental health. The issue of students' mental health is a global problem that covers all developed and non-developed societies, both modern and traditional [7]. A study reported that students with symptoms of depression achieve lower grades and are less active in the classroom relative to students who do not have these symptoms[8].

1.1.2.1 Epidemiology

While the actual prevalence of depressive disorders, including undiagnosed cases, is unknown, the estimated rate has increased over the past 25 years, with additional increases since 2020.5–8 Overall, the lifetime prevalence of depression is estimated at 7% to 15% with rate in females 1.5 to 2.5-fold higher than males., And the prevalence of depression is highest in those less than 60 years of age. Depression is increasingly common with an annual prevalence (2015) of 19.4% in females and 6.4% in males between 12 and 17 years of age (up from 13.1% and 4.5%, respectively, in 2004) [9-10] .

1.1.2.2 Common causes of depression among students

The first serious cause associated with the depression among students is socio-economic status. A limited number of studies have investigated the effect of socio-economic factors on depression in the student population [11]. Students' socio-economic level has been shown to play a significant role in the symptoms of depression in students [12]. The study showed that students originally from the countryside recorded higher levels of depression than students who live in cities [7]. The second most common cause, reported as a serious factor for the rate of depression in students, is living away from home or transition to new environment, such as university or college. For some students, separation from home or

family might cause psychological distress, especially depression. The third main cause of depression among students is study satisfaction. That means that students who are not satisfied with their course of study have greater rate of depression than students who are satisfied [7].

1.1.2.3 Risk Factors of Depression

1-Biochemistry: Differences in certain chemicals in the brain may contribute to symptoms of depression.

2-Genetics: Depression can run in families. For example, if one identical twin has depression, the other has a 70 percent chance of having the illness sometime in life.

3-Personality: People with low self-esteem, who are easily overwhelmed by stress, or who are generally pessimistic appear to be more likely to experience depression.

4-Environmental factors: Continuous exposure to violence, neglect, abuse or poverty may make some people more vulnerable to depression.[13]

1.1.3 Stress :is feeling of emotional or physical tension. It can come from any event or thought that makes you feel frustrated, angry, or nervous.

Stress is your body's reaction to challenge or demand. In short bursts, stress can be positive, such as when it helps you avoid danger or meet a deadline. But when stress lasts for a long time, it may harm your health.[14-15-16]

stress has to be divided into eustress, distress, and sustress. Here, eustress means good stress, that is, homeostasis has been mildly challenged by moderate levels of stressors (for instance, the levels of stressors within the “hermetic zone” [17]. Eustress might induce a mild stress response, enhance the buffering capacity of homeostasis [18], and benefit health. Distress means bad stress, that is, homeostasis has been strongly challenged by high levels of stressors, which might induce a severe stress response, impair homeostasis,

and endanger health. Sustress might shrink the buffering capacity of homeostasis [18], and threaten health[19-20]

1.1.3.1 Epidemiology

A study in 2018 was an online poll undertaken by YouGov with a sample size of 4,619 respondents. This is the largest known study of stress levels in the UK. 74% of people have felt so stressed they have been overwhelmed or unable to cope. 30% of older people reported never feeling overwhelmed or unable to cope in the past year, compared to 7% of young adults. Behavioral effects: 46% reported that they ate too much or ate unhealthily due to stress. 29% reported that they started drinking or increased their drinking, and 16% reported that they started smoking or increased their smoking. 51% of adults who felt stressed reported feeling depressed, and 61% reported feeling anxious. Of the people who said they had felt stress at some point in their lives, 16% had self-harmed, and 32% said they had had suicidal thoughts and feelings. 37% of adults who reported feeling stressed reported feeling lonely as a result [21-22-23-24].

1.1.3.2 Causes of stress

36% of all adults who reported stress in the previous year cited either their own or a friend/relative's long-term health condition as a factor. This rose to 44% of adults over 55 years. Of those who reported feeling stressed in the past year, 22% cited debt as a stressor. Of people who reported high levels of stress, 12% said that feeling like they needed to respond to messages instantly was a stressor. 49% of 18-24-year-olds who have experienced high levels of stress felt that comparing themselves to others was a source of stress, which was higher than in any of the older age groups. 36% of women who felt high levels of stress-related this to their comfort with their appearance and body image, compared to 23% of men. Housing worries are a key source of stress for younger people (32% of 18-24-year-olds cited it as a source of stress in the past year). This is less so for

older people (22% for 45-54-year-olds and just 7% for over 55s). Younger people have higher stress related to the pressure to succeed. 60% of 18-24-year-olds and 41% of 25-34-year-olds cited this, compared to 17% of 45-54s and 6% of over 55s) [21-22-23-24] .

1.1.3.3 Risk Factors

Research has identified several factors that impact the likelihood of experiencing traumatic stress reactions when exposed to sufficient stressors. These are:

1. The nature and intensity of traumatic events experienced in the past: There is no escaping our own personal histories completely when it comes to stressful and traumatic events. While a desire to help others in need can spring from our greatest personal wounds, it is important to recognize that confronting the trauma of others can trigger our own memories of hurt and betrayal. This is important to keep in mind, since recent research suggests that at least a third of humanitarian workers have undergone traumatic events prior to any experiences they may encounter in the field.
2. The nature and intensity of the traumatic or stressful event that triggers the current reaction: The type of stressful event influences the likelihood of experiencing stress and trauma reactions. Experiencing or witnessing a man-made disaster involving human cruelty (such as an armed attack) is usually more stressful than experiencing or witnessing natural disasters.
3. The number of stressors experienced: Those who are experiencing multiple significant life events and changes (such as the death of a parent or moving internationally) tend to be more vulnerable.
4. The length of exposure to stressful situations: As exposure lengthens, risk increases.

5. Organizational factors: Preliminary research suggests that humanitarian workers identify organizational factors such as team relationships, leadership, clarity of mission objectives, and agency structure, as their primary cause of chronic stress.
6. History of previous psychiatric illness: Those with a prior history of psychiatric illness, especially those who have experienced acute stress disorder or post-traumatic stress disorder, tend to be more vulnerable.
7. Lack of social support: Social support is very important in protecting humans from the effects of stress and trauma. Recent research suggests that, compared to those with medium to high levels of social support, those with compromised social support are 4 times more likely to experience traumatization and 2.5 times more likely to experience some form of physical illness. Individuals without partners are also at greater risk.
8. Pronounced introversion: People who are introverted are typically more vulnerable.
9. Negativity and pessimism: Habitually negative, pessimistic individuals are more vulnerable to stress-related dysfunction. In addition, the more negative their appraisal of the meaningfulness of their humanitarian mission or work assignment, the more vulnerable they are [25].

1.2 Problem Statement

Depression, anxiety , and stress disorders are significant issues that adversely affect quality of life .These psyychological distressors can negatively impact student`s self-esteem, potentially leading to various personal and professional challenges.such challenges may include college dropout , impaired work performance , poor academic achievement, disrupted relationships , and an increased risk of suicide.

1.3 Justification of study

1. No previous study about depression, anxiety and stress among Yemeni college students.
2. Little knowledge about depression, anxiety and stress in Yemen.
3. Reporting, the results, recommendations and suggestions of this study may be used as a baseline for studies and health planner.
4. The study clarifies the problems and difficulties facing Yemeni students.

1.4 Rationale of this study

Despite the evident importance of mental health among university students in Yemen, there remains a notable gap in research addressing this issue comprehensively. Existing studies often focus on specific aspects of mental health or target narrower populations, thereby limiting our understanding of the broader context and factors influencing students' well-being [26-27]. By conducting a comprehensive examination of depression, anxiety, and stress among university students in Yemen, this study seeks to fill this gap and contribute to the growing body of literature on mental health in the region.

1.5 Significance of this study

1. Provides essential data on the prevalence of depression, anxiety, and stress among university students in Sana'a City.
2. Reveals key factors contributing to mental health issues, guiding targeted interventions.
3. Informs the development of effective mental health policies and support systems at universities.
4. Enhance students' academic performance by addressing mental health challenges.
5. Establishes a basis for future research on mental health among university students.

1.6 Study Objectives

1.6.1 General objective

To determine the prevalence of depression, anxiety, and stress among university students in Sana'a Yemen.

1.6.2 Specific objective

1. To investigate socio-demographic, academic, and environmental factors associated with depression, anxiety, and stress among Yemeni university students.
2. To assess the effect of insomnia on the prevalence of depression, anxiety, and stress among Yemeni university students.
3. To assess the effect of frequent internet use on the prevalence of depression, anxiety, and stress among Yemeni university students.
4. To assess the effect of exercise on the prevalence of depression, anxiety, and stress among Yemeni university students.
5. To assess the association between self-confidence and the prevalence of depression, anxiety, and stress among Yemeni university students.

Chapter II: literature Review

Literature review

2.1 Literature review

Pu Peng et al. (2023) conducted a meta-analysis of 201 studies on medical students' mental health during the COVID-19 pandemic, involving around 198,000 students. Key findings include high rates of depression (41%), anxiety (38%), stress (34%), sleep disorders (52%), psychological distress (58%), PTSD (34%), suicidal ideation (15%), and burnout (38%). Risk factors identified include being female, being in preclinical years, residing in high COVID-19 prevalence areas, low academic performance, and several other factors. the study emphasizes the need for regular mental health screening and targeted interventions for medical students [28] .

Braz-José et al. (2023) conducted an observational study to Depression, anxiety and stress in dental students. With the emergence of COVID-19, dental medicine students were faced with a new reality, as a modification of the learning methods in Dentistry colleges happened. The aim of this study was to characterize the possible effects of Covid-19 pandemic in terms of anxiety, depression, and stress among students of dentistry. This cross-sectional study, A total of 1115 participants. An online self-reported questionnaire was applied through Google Forms® platform. The questionnaire. Being female was the most significant and strong predictor of anxiety and stress, and for depression, not feeling fulfilled in the course they were in was the most significant variable. The participants presented high values of anxiety, depression, and stress, during the pandemic state. Gender and not feeling fulfilled in the course were important predictors [29] .

Hykal KA et al. (2022) conducted a study on medical student distress found that wellness questionnaires are being used by medical schools to identify and support at-risk students. A scoping review of literature from 1999 to 2021 identified 23 relevant studies out of 5,001 reviewed. It highlighted six validated questionnaires for assessing student wellness:

the Medical Student Stress Profile (MSSP), Medical Student Stress Questionnaire (MSSQ), Medical Student Well-Being Index (MSWBI), Perceived Medical School Stress (PMSS), Perceived Stress Scale for Medical Students (PSSMS), and Oldenburg Burnout Inventory—Medical Student Version (OLBI-MS). The study advises that schools choose tools based on their specific context and student population, as direct comparisons between these tools are not possible [30] .

Chomon RJ et al (2022) said that depression is a major mental health issue impacting medical students globally, with heightened stress from rigorous academic demands and the COVID-19 pandemic. The World Health Organization identifies depression as the second most prevalent mental health condition, with suicide being a leading cause of death, particularly among young adults. In Bangladesh, rising suicide rates are attributed to underdiagnosis and poor treatment. A study of 237 medical students from Enam Medical College revealed that 58.6% experienced depression, with many exhibiting mild to severe symptoms. Contributing factors include individual and professional stress, financial struggles, and family issues. The findings highlight the urgent need for improvements in the educational system to mitigate these mental health challenges among students [31] .

Wang Q et al. (2022) conducted a cross-sectional survey of 1,282 medical students in Inner Mongolia investigated anxiety and depression and their influencing factors. Using Zung's Self-Rating Anxiety Scale (SAS) and Self-Rating Depression Scale (SDS), the study found that 10.36% of students had anxiety and 24.43% had depression, with average scores indicating moderate levels of both. Significant factors affecting these conditions included age, fixed meal times, grade, birthplace, and eating habits. Specifically, birthplace and meal regularity were linked to both anxiety and depression, while age and delivery mode were independent risk factors for depression. The study highlights a high

prevalence of mental health issues among these students and suggests targeted interventions to improve their psychological well-being [32].

Sangeetha Raja et al. (2021) conducted a study on 1,015 paramedical and medical students at a South Indian medical college, revealing high rates of mental health issues: 59% had depression, 43% anxiety, and 11% stress. The study attributed these issues to training duration, academic pressures, and clinical rotations, with additional contributions from excessive social media use. Higher prevalence was noted among females and medical students, particularly in their final year. The study suggests implementing regular mental health assessments and providing extra support for final-year students [33].

Alsoufi MA et al. (2021) conducted a systematic review of interventions aimed at reducing stress, anxiety, and depression among undergraduate nursing students analyzed 38 articles, with 22 focusing on relevant interventions. Out of these, 18 reported significant improvements. Mindfulness practices were identified as the most effective intervention. Despite limitations such as small sample sizes and short follow-up periods, the review emphasizes the importance of addressing mental health in nursing students. The findings suggest that mindfulness interventions hold promise for future research and implementation, highlighting their potential to enhance the overall wellbeing of nursing students and improve the healthcare system [34].

Frank T. Spradley (2021) conducted a cross-sectional study to assess depression, anxiety, and stress among university students in Ethiopia during the early COVID-19 pandemic (June 30 to July 30, 2020). The survey, completed by 423 students, revealed prevalence rates of 46.3% for depression, 52% for anxiety, and 28.6% for stress. Factors significantly associated with depression included female gender, poor self-efficacy in preventing COVID-19, and lack of access to information and internet. For stress, significant factors included female gender, being in the first or second year, doubts about COVID-19

preventability, and lack of access to professional reading materials. The study found higher levels of mental health issues compared to pre-pandemic reports and suggests that improving access to accurate information and enhancing self-efficacy could help mitigate these problems [35].

Ahmad A. et al. (2021) conducted a cross-sectional study to compare depression, anxiety, and stress between medical and non-medical students in Saudi Arabia. The study involved 1,317 medical students and 1,109 non-medical students. Results showed that 54% of participants had depression, 53% had anxiety, and 38% had stress. There was no significant difference in depression and stress levels between the two groups, but non-medical students had significantly higher anxiety scores compared to medical students. The study highlights that high levels of psychological issues are prevalent among both groups, with anxiety being notably higher in non-medical students [36].

Shaik Riyaz (2021) conducted a cross-sectional study to assess depression, anxiety, and stress among 450 medical students at a private medical college in Oman from August 2019 to January 2020. The study found that 58.2% of students experienced depression, 68.7% had anxiety, and 35.3% suffered from stress. Moderate depression and severe anxiety were the most common, while moderate stress was prevalent. The study identified that being in a joint family and being an undergraduate were significantly associated with higher stress levels. Although these findings indicate high rates of mental health issues among the students, they may not be generalizable to other medical colleges [37].

Demench et al. (2020) said that this study addresses the high prevalence of psychological distress among Brazilian undergraduate students, focusing on anxiety, depression, and suicidal behavior. A systematic review and meta-analysis were conducted using data from scientific electronic databases. Forty-seven articles were included, with 44 meta-analyzed,

covering 37,486 students. The pooled prevalence rates were 37.75% for anxiety, 28.51% for depression, and 9.10% for suicidal behavior. Meta-regression revealed higher anxiety prevalence in probabilistic samples and higher depression rates in studies from public institutions and among medical students. Limitations include the inability to establish causality due to cross-sectional data and high study heterogeneity. The findings underscore the urgent need for standardized research methodologies and comprehensive mental health care for Brazilian undergraduates [38].

Shah et al. (2020) said that depression and anxiety are prevalent mental disorders among young people, often due to academic and societal pressures. A study involving 400 college students aged 18-25 used a self-made questionnaire and Beck's Depression and Anxiety Inventory to assess these issues. The study found that 26.5% of students had clinically significant depression, and 6.14% had concerning levels of anxiety. Additionally, 9% of students had borderline clinical depression requiring attention. The findings highlight the importance of early detection using simple questionnaires and suggest universities can play a key role in promoting mental health through their various services and activities [39].

Gan et al. (2019) conducted an observational study to Anxiety, depression and quality of life of medical students in Malaysia .In this study, we aim to determine the prevalence of anxiety and depression of the senior medical students and to assess their QOL.This is a cross-sectional study which involved medical students in their final two years of study at a public university in Malaysia. A total 149 students participated. The prevalence rates of anxiety and depression were 33% and 11% respectively. Malay students had significantly more anxiety compared to the other ethnic groups, $P<0.05$. Female students had significantly lower psychological score compared to male; 70.73 vs 66.32($P<0.05$). It is

recommended that medical schools implement measures which can identify students at risk and to offer comprehensive intervention and preventive programmers to improve the students' wellbeing [40].

Azad N et al. (2017) conducted a study at Foundation University Medical College (FUMC) assessed the prevalence of anxiety and depression among 500 students using the Beck Anxiety Scale and Beck Depression Inventory. The results revealed that 64.24% of students experienced mild to severe depression, with women reporting higher levels than men. Depression and anxiety are significant health issues in developing countries like Pakistan, where depression is projected to be the second leading cause of morbidity. The study highlights the need for early diagnosis and treatment of psychological issues to prevent adverse effects on students' personal and professional lives and reduce the risk of suicidal thoughts. It underscores the necessity for interventions to alleviate student stress [41].

Basudan S et al. (2017) conducted a study at King Saud University found high levels of depression, anxiety, and stress among 247 dental students, with significant proportions experiencing severe symptoms. Stressors include academic and clinical demands, financial issues, and personal factors, with gender, relationship satisfaction, and whether dentistry was their first choice being key predictors. Female students reported higher anxiety and stress levels. Common coping strategies were watching TV, reading, and seeking support from peers and family. The study emphasizes the need for support programs and preventive measures in dental schools to improve students' mental health and well-being [42].

Mohamed Fawzy and Sherifa A. Hamed (2017) conducted a cross-sectional study to estimate the prevalence of depression, anxiety, and stress among 2,178 medical students

at Assiut University in Upper Egypt. The study achieved a 100% response rate from 700 students (452 females and 248 males) with an average age of 21.2 years. The results indicated significant levels of depression, anxiety, and stress among these students. The study, however, notes that its findings may not be broadly generalizable and suggests the need for similar research with diverse and larger samples, including both genders and students from different income settings, as well as postgraduate students [43].

Kunwar D, Risal A, and Koirala S (2016) conducted a cross-sectional study to evaluate depression, anxiety, and stress among 538 medical students from Kathmandu University Medical School (KUSMS) and Manipal College of Medical Sciences (MCOMS) in Nepal. Using the Depression Anxiety and Stress Scale (DASS), they found that 29.9% of students had depression, 41.1% had anxiety, and 27% had stress. Depression was notably linked to living conditions, but no significant associations were found with age, socioeconomic status, or family support. The study highlights the higher emotional disturbances among medical students compared to other university students and emphasizes the need for early and ongoing mental health interventions [44].

A cross-sectional study by **Ivana Lúcia et al. (2014)** at the Federal University of Juiz de Fora, Brazil, assessed the prevalence of anxiety, depression, and stress among 761 medical students. The study found that 34.6% of students reported depressive symptoms, 37.2% had anxiety symptoms, and 47.1% experienced stress. Stressors included the demanding nature of medical training, which affected students' quality of life and mental health. Significant variations in mental health were observed across different academic stages, with gender and religiosity being influential factors. The study suggests the need for strategies to promote well-being and a more balanced medical curriculum to address these issues [45].

Chapter III: Methods

Methods

3.1 Study design

A cross-sectional study of the prevalence of depression, anxiety, stress and associated factors will be carried out in a population of current college students in public and private universities in Sana'a, Yemen.

3.2 Study Setting and Duration:

The study will be conducted in Sana'a City, encompassing a selection of public and private universities. These include Sana'a University, 21 September University, Emirates International University, University of Science and Technology, Lebanese International University, Al-Nasser University, Al-Hikmah University, Al-Rashid Smart University, Al-Razi University, National University, Azal University, Yemeni Jordanian University, International University of Technology Twintech, Civilization University, Queen Arwa University, Saba University, Alsaedah University, Alyamania University and Future University. The study will be conducted over a period of three months starting from January to the end of the March during the academic year 2024.

3.3 Eligibility Criteria

3.3.1 Inclusion Criteria:

This study will encompass students presently enrolled in universities who have not yet completed their academic programs.

3.3.2 Exclusion Criteria:

This study will exclude students attending non-university educational institutions, as well as those who decline to provide consent forms.

3.4 Pilot study:

A pilot test will be conducted with a sample of 50 participants from Emirates International University (EIU) representing various academic levels.

This pilot study will help us assess the practicality and effectiveness of the research design, and participant recruitment strategies in a real- world setting.

3.5 Study population

This study will encompass students from diverse academic levels within both public and private universities in Sana'a city. It will include students from all disciplines, encompassing both medical and non-medical fields.

3.6 Study Tool:

The study tool was designed after reviewing previous literature [46-48] with slight modifications to the setting. Subsequently, it was translated into Arabic using forward and backward methods. This questionnaire comprises six sections. The first section will gather sociodemographic data, including age, gender, college name, study major, place of residence, academic level, marital status, height, weight, income, health insurance status, and habits.

The second section will employ the Depression Anxiety and Stress Scale 21 (DASS-21), consisting of 21 items divided into three subscales: depression (DASS-D), anxiety (DASS-A), and stress (DASS-S). Respondents will rate the applicability of each statement over the past week on a 4-point Likert scale ranging from "never" to "always." Scores for each subscale will be evaluated based on severity ratings. Interpretation of scores will categorize anxiety, depression, and stress levels accordingly. The DASS-21 has previously demonstrated validation in Spanish college students, exhibiting high consistency across all three subscales [49].

The third section will utilize the Insomnia Severity Index. Insomnia presence and severity will be evaluated using the Insomnia Severity Index (ISI), a 7-item self-report questionnaire gauging the nature, severity, and impact of insomnia within the past two weeks. Responses will be rated on a 5-point Likert scale (0 = no problem; 4 = very severe problem), resulting in a total score ranging from 0 to 28. Interpretation of the ISI total score will categorize absence of insomnia (0–7), sub-threshold insomnia (8–14), moderate insomnia (15–21), and severe insomnia (22–28) [47].

The fourth part will include the Rosenberg Self-Esteem Scale. Participants' self-esteem will be evaluated using the Rosenberg Self-Esteem Scale (RSES), comprising 10 items, with half positively stated and half negatively stated. Before analysis, negative items will be scored in reverse. Responses will be rated on a 4-point scale (1 = strongly disagree; 2 = disagree; 3 = agree; 4 = strongly agree), resulting in total scores ranging from 10 to 40. Participants will be categorized into three self-esteem levels: high (30 or more points), medium (26–29 points), and low (25 or fewer points) [50].

The fifth part will consist of the Physical Activity Questionnaire. This section contains three questions about the type, frequency, and duration of exercise, with responses recorded as "yes" or "no," along with details regarding the type of activity and daily and weekly practice times.

The last section will evaluate internet usage patterns through eight questions. The objective of the Internet Usage Test is to assess individuals' satisfaction, dependency, and perceived influence of internet usage on different life domains, such as communication, daily activities, and information seeking. It also aims to grasp the frequency and scope of individuals' internet engagement for leisure and practical purposes, with response options ranging from "never" to "always" [51].

3.7 Sample size calculation and sampling methods

The sample size will be determined by considering the study population along with the inclusion and exclusion criteria for both students and educational institutions. Calculations will be performed using OpenEpi, utilizing parameters such as a 50% estimated prevalence for anxiety and depression disorders, a 5% margin of error, a design effect of 1.0, and a significance level of 5%. The sample size required to meet these parameters is 384 students. Data collection will employ the convenience sampling technique.

3.8 Data collection

Sixteen students enrolled in the 6th year of clinical pharmacy will undergo comprehensive training, to maintain consistency in data collection. This training will equip them with the necessary skills and understanding of the research objectives. Subsequently, these students will conduct visits to both public and private universities in Sana'a city. Upon introduction, they will clearly articulate the purpose of the research, emphasizing participant confidentiality and ethical considerations. Utilizing self-administered questionnaires, including the validated Arabic version of the Depression Anxiety Stress Scale (DASS-21), the Insomnia Severity Index, Rosenberg Self-Esteem Scale (RSES), International Physical Activity Questionnaire, and the Internet Usage Range Test, data will be collected on various aspects of mental health and related factors.

3.9 Ethical approval

The study protocol submitted to the Ethical Committee at the University of Science and Technology and obtained approval.

3.10 Statistical analysis

The data will be imported from an Excel sheet into IBM SPSS Statistics version 27.0 for Windows® (IBM Corp., Armonk, NY, USA). Categorical variables, such as age, gender, education level, study major, marital status, family income, insurance, and social habits, will be presented as frequencies and percentages. Continuous data will be assessed for normality and categorized into normal and abnormal variables. Chi-square tests will be used to determine the prevalence of depression, anxiety, and stress among categorical variables. A p-value of less than 0.05 will be considered statistically significant.

Chapter IV: Results

Results

4.1 Sociodemographic data

Table 1 shows the results of sociodemographic data collected from 2612 participants, revealing differences in social and demographic factors. Among the participants, 57.6% (n=1505) were male, while 42.4% (n=1107) were female. The median age was 21 years with an interquartile range (IQR) of 3. The median height was 163cm with an IQR of 13, and the median weight was 55kg with an IQR of 11. In terms of BMI, 25.5% (n=667) had a low BMI, 61.8% (n=1614) had a normal BMI, and 12.7% (n=331) were obese.

Regarding sector type, 26.9% (n=703) of participants attended public universities, while 73.1% (n=1909) attended private universities. Study fields varied, with 53.1% (n=1387) in the medical field and 46.9% (n=1225) in non-medical fields.

In terms of residency, 8.7% (n=228) lived alone, 11.2% (n=292) lived with friends, and 80.1% (n=2092) lived with family members. Study levels were distributed as follows: level 1: 31.1% (n=812), level 2: 25.3% (n=662), level 3: 19.6% (n=511), level 4: 16.6% (n=434), level 5: 4% (n=105), level 6: 1.2% (n=32), and level 7: 2.1% (n=56). Marital status distribution was as follows: single - 88.7% (n=2317), married - 7.9% (n=207), other - 3.4% (n=88). Family income distribution among participants was less than 60000 YR/month for 13.7% (n=357), more than 60000 YR but less than 120000 YR/month for 32.5% (n=850), and more than 120000 YR/month for 53.8% (n=1405). Regarding health insurance coverage, 20.6% (n=538) had coverage while 79.4% (n=2074) did not. Smoking habits among participants included smokers - 13.4% (n=349), non-smokers - 82.6% (n=2158), and those with a history of smoking - 4.0% (n=105). For khat chewing habits among participants, khat chewers accounted for 33.6% (n=878), non-khat chewers for 62.5% (n=1633), and those with a history of khat chewing for 3.9% (n=101).

Figures

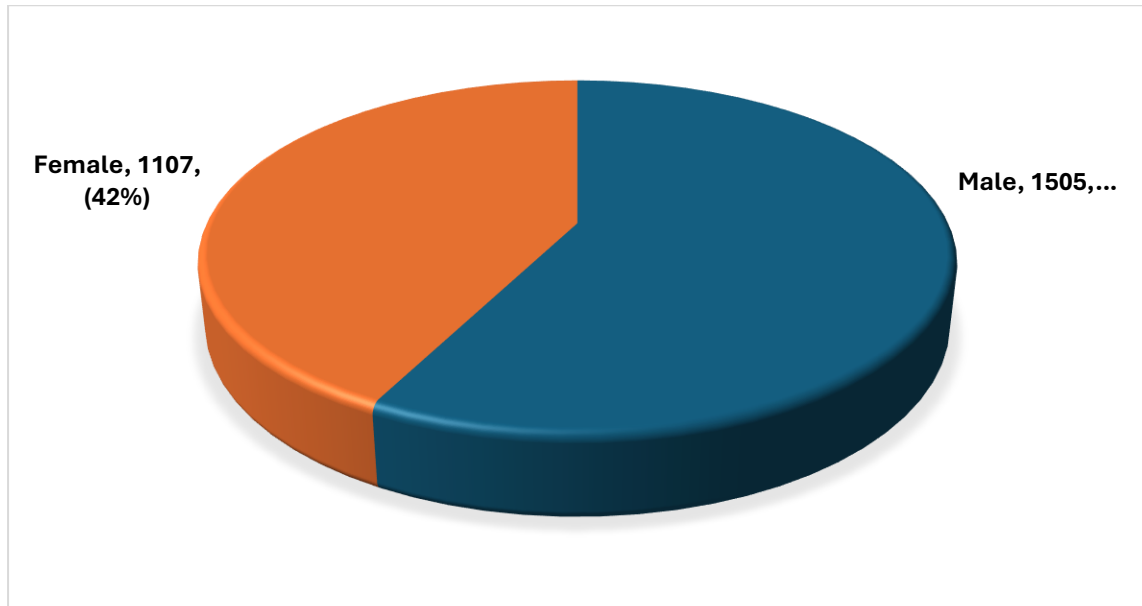


Figure 1: Gender distribution

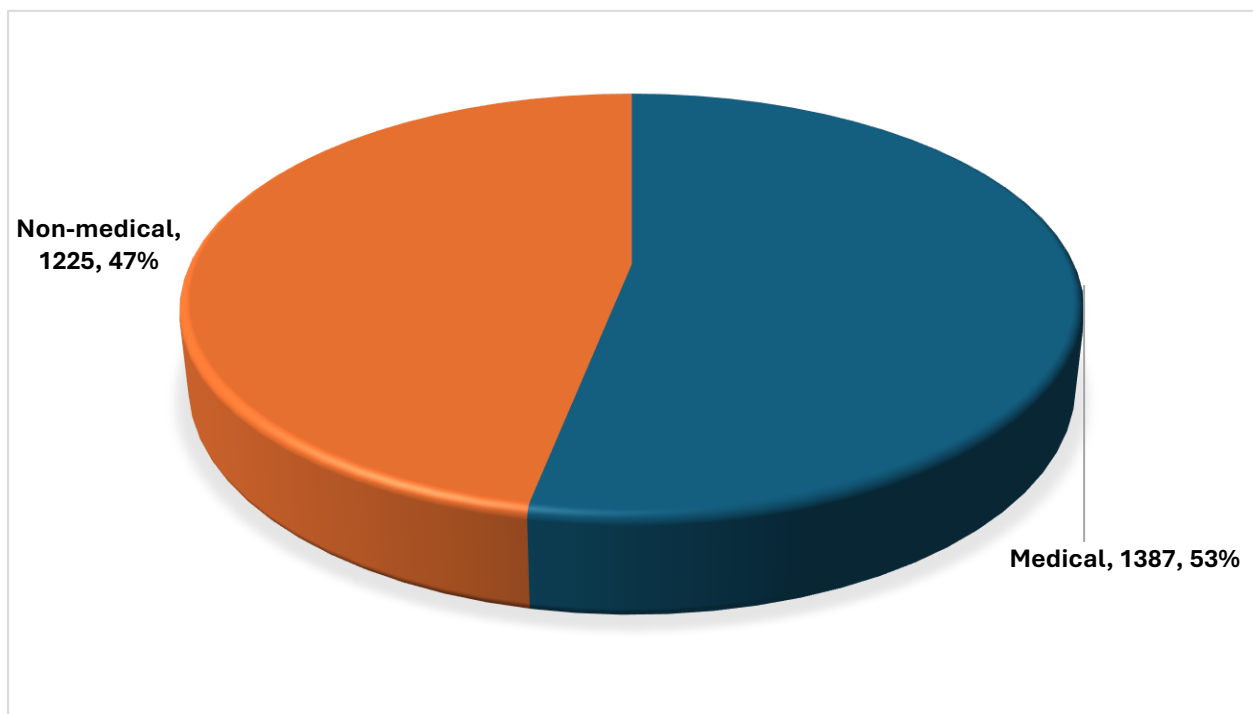


Figure 2: Study field

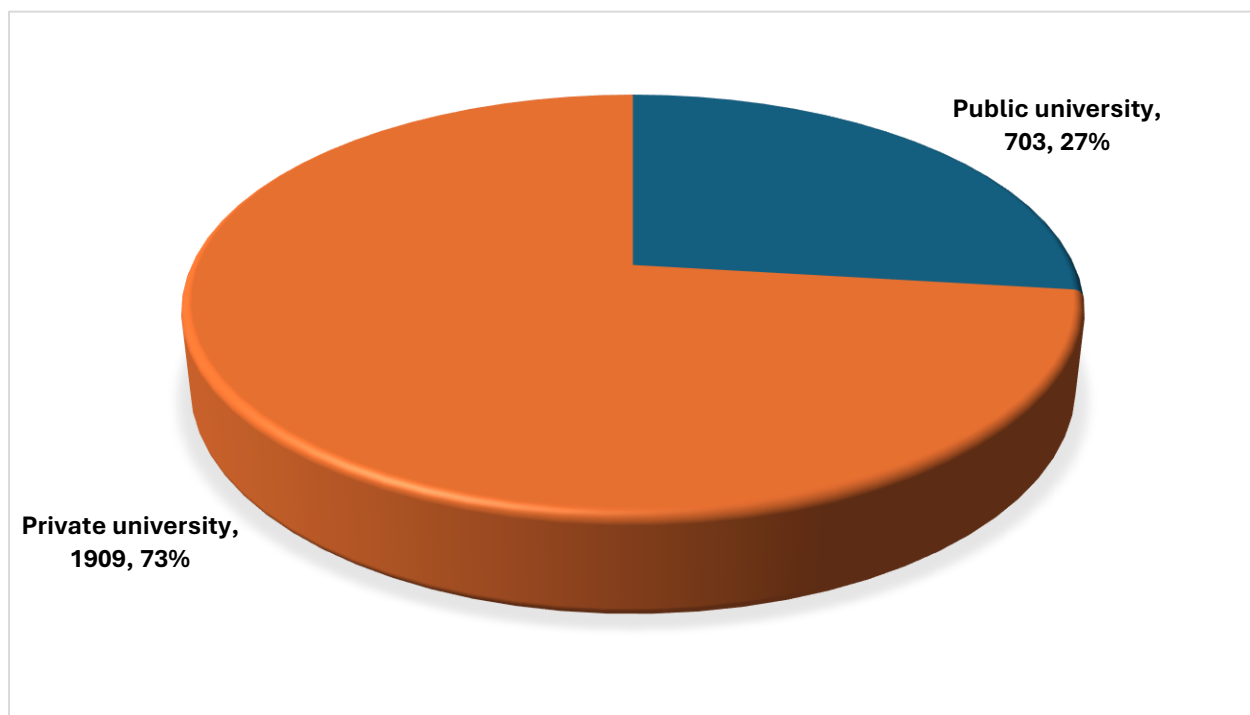


Figure 3: Sector

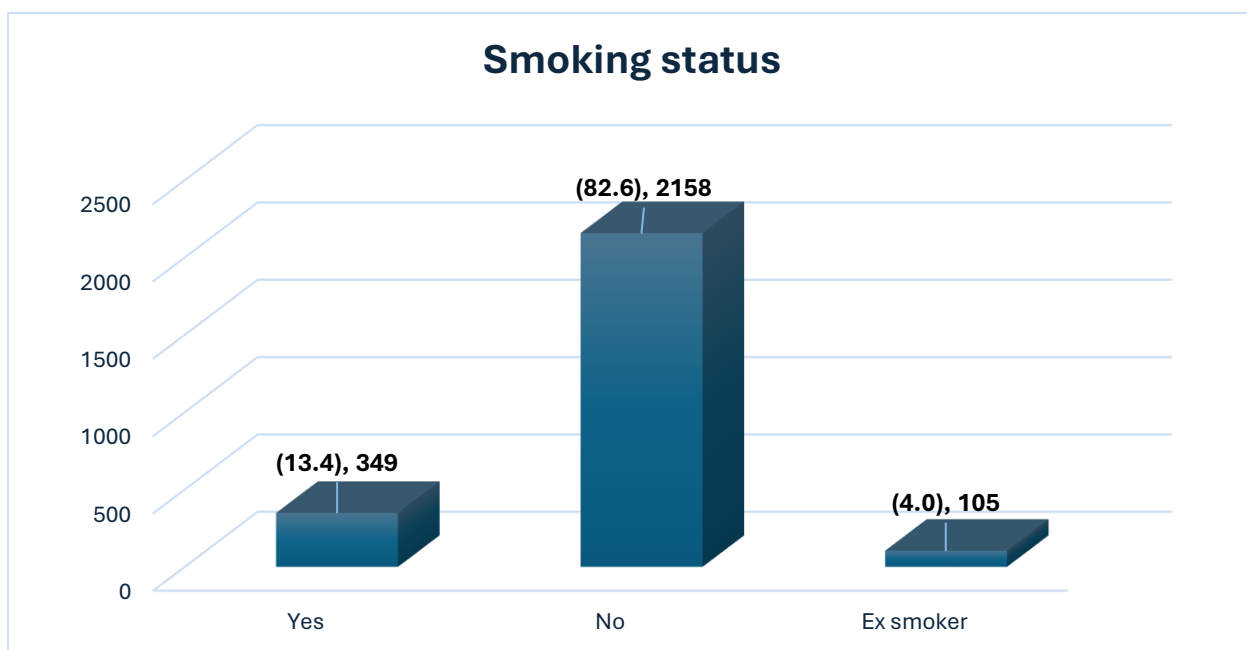


Figure 4: Smoking status

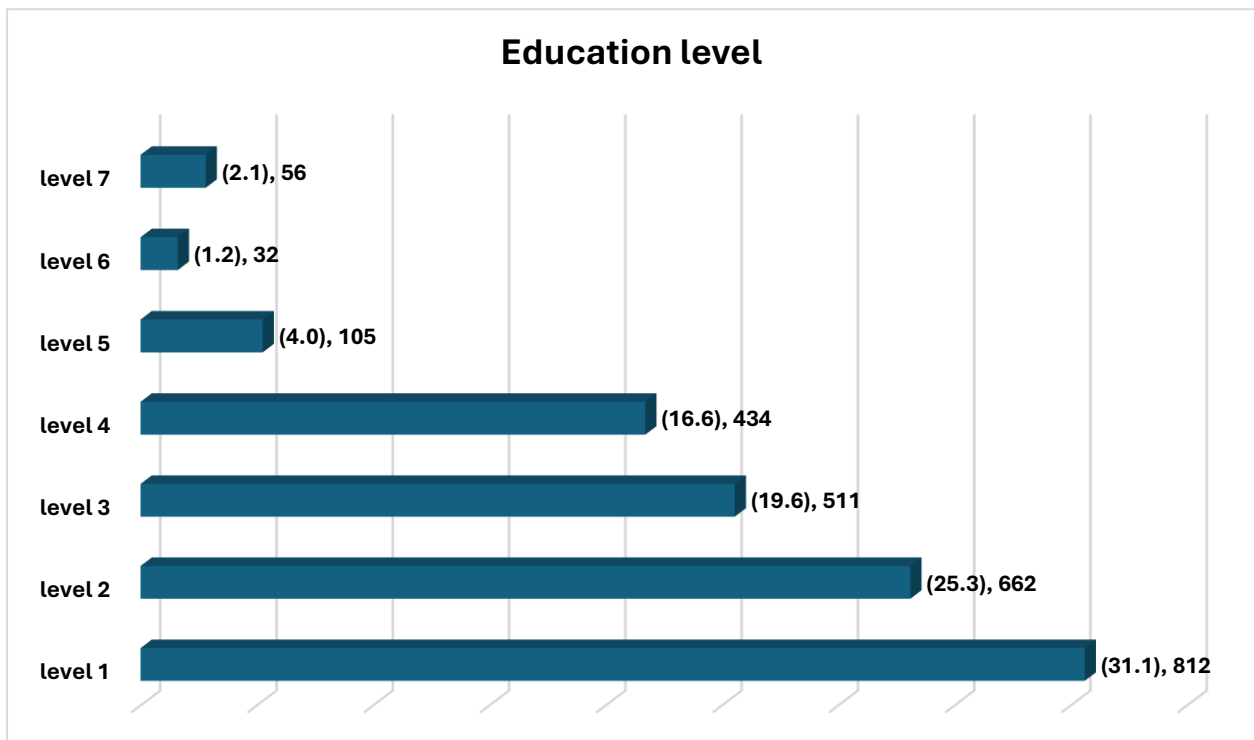


Figure 5: Education level

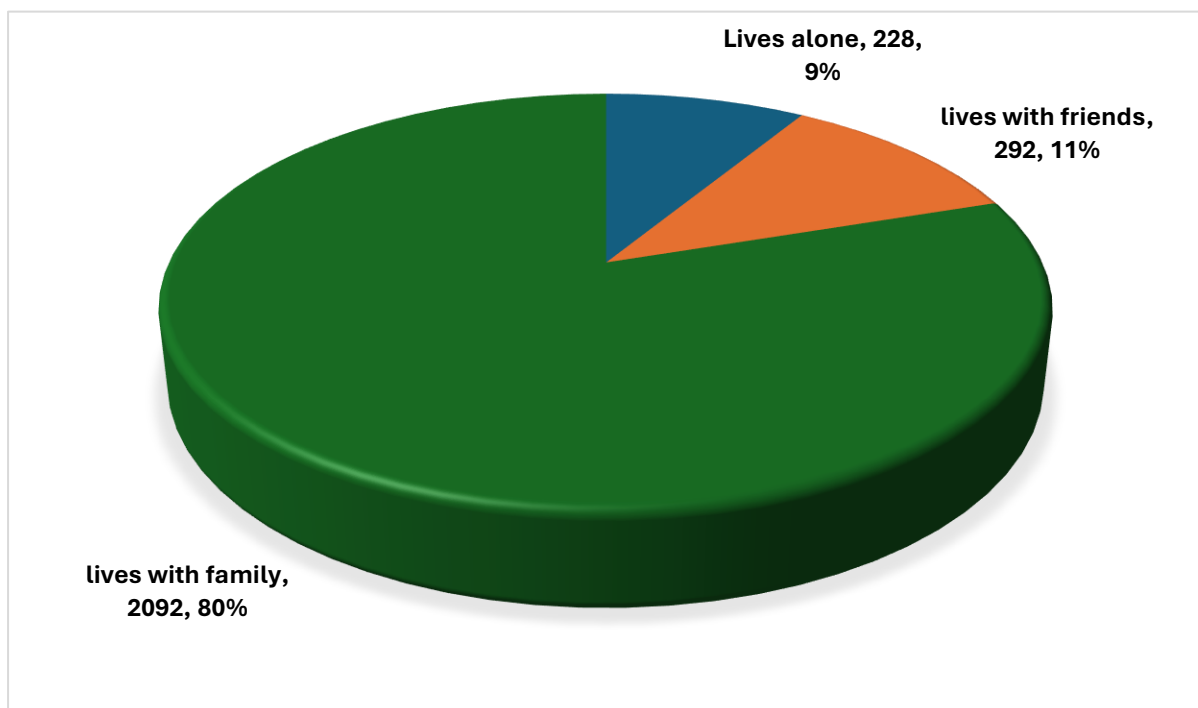


Figure 6: Residency

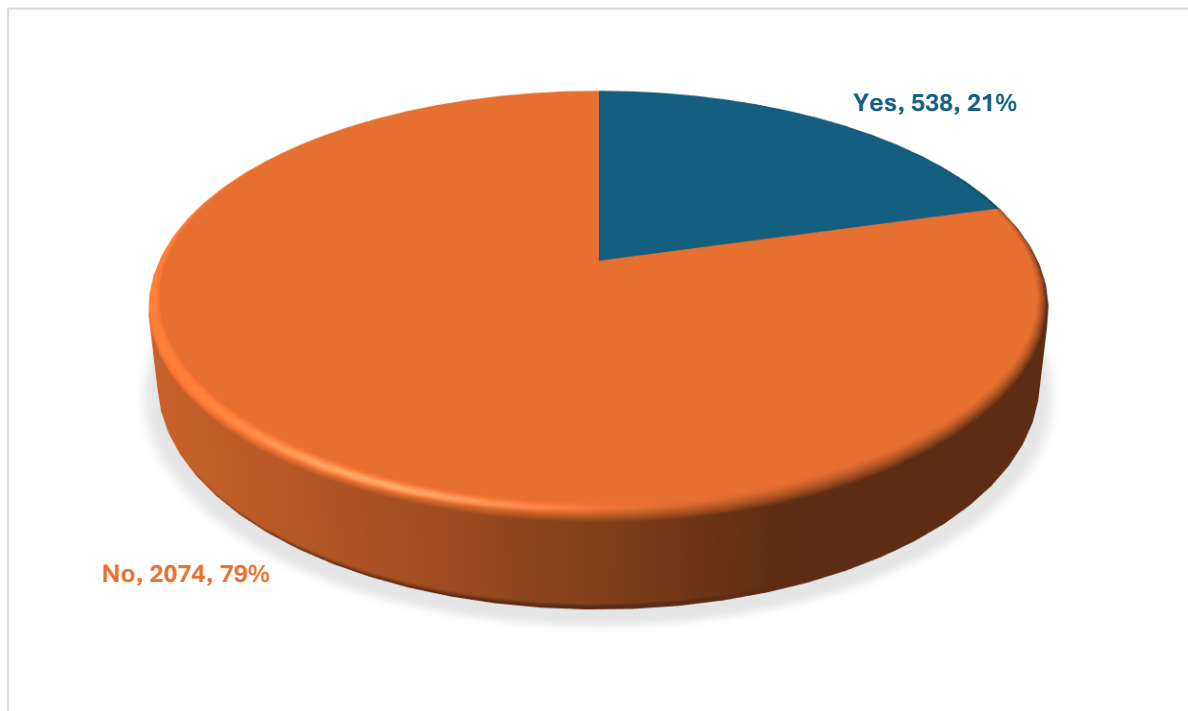


Figure 7: Health insurance

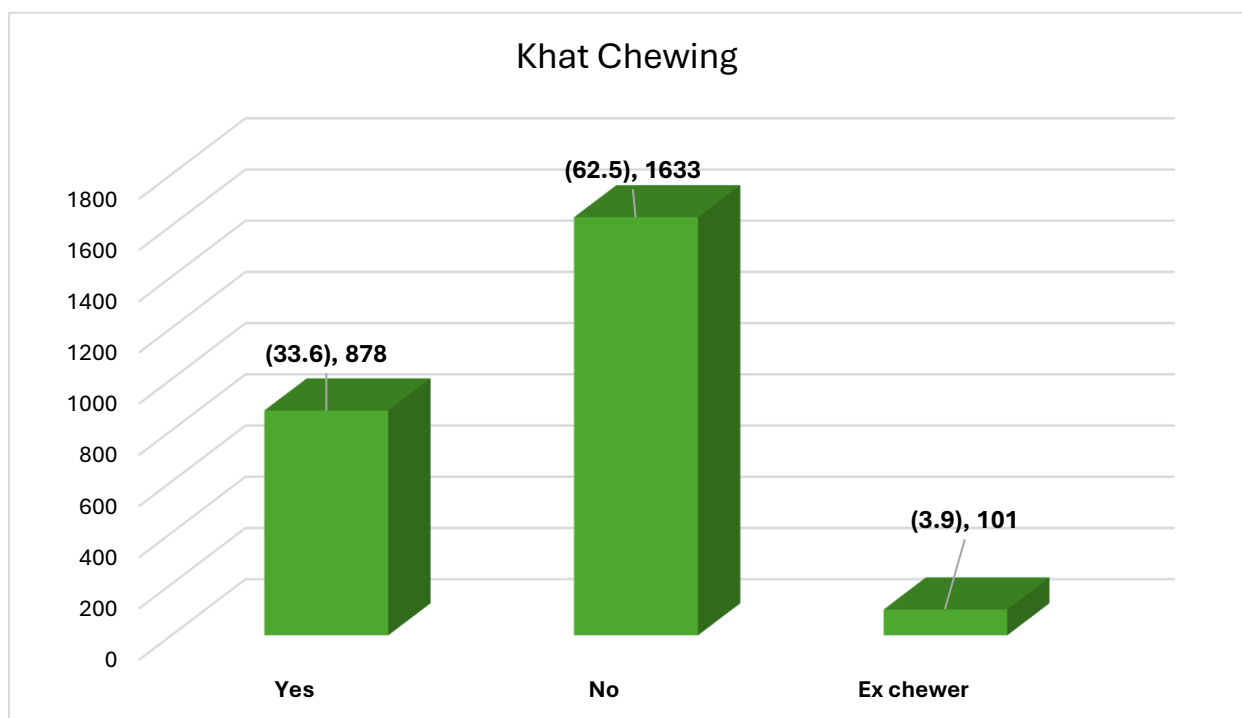


Figure 8: Khat chewing

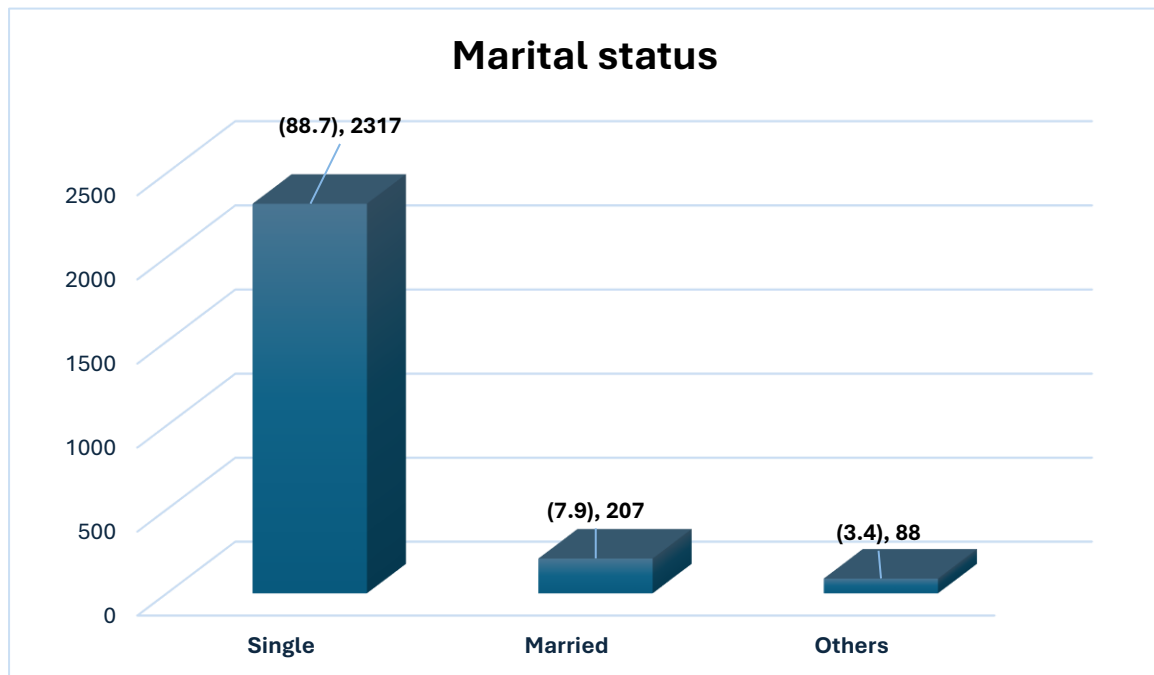


Figure 9: Marital status

4.1 Table 1: Participants' sociodemographic data (n= 2612)

Variable		Count	(%)
Gender	Male	1505	(57.6)
	Female	1107	(42.4)
Age, Median (IQR)	21 (3)		
Height, Median (IQR)	163 (13)		
Weight, Median (IQR)	55 (11)		
BMI	low BMI (<18.5 kg/m ²)	667	(25.5)
	normal BMI (18.5–24.9 kg/m ²)	1614	(61.8)
	obese (≥25 kg/m ²).	331	(12.7)
Sector	Public university	703	(26.9)
	Private university	1909	(73.1)
Study field	Medical	1387	(53.1)
	Non-medical	1225	(46.9)
Residency	Lives alone	228	(8.7)
	lives with friends	292	(11.2)
	lives with family	2092	(80.1)
Study level	level 1	812	(31.1)
	level 2	662	(25.3)
	level 3	511	(19.6)
	level 4	434	(16.6)
	level 5	105	(4.0)
	level 6	32	(1.2)
	level 7	56	(2.1)
Marital status	Single	2317	(88.7)
	Married	207	(7.9)
	Others	88	(3.4)
Family income	< 60000 YR/Month	357	(13.7)
	< 60000-120000 YR/Month	850	(32.5)
	>120000 YR/Month	1405	(53.8)
Health insurance	Yes	538	(20.6)
	No	2074	(79.4)
Smoking	Yes	349	(13.4)
	No	2158	(82.6)
	Ex-smoker	105	(4.0)
Khat chewing	Yes	878	(33.6)
	No	1633	(62.5)
	Ex-khat chewer	101	(3.9)

Note: 1 US dollar = 525 Yemeni Rial

Abbreviation: YR, Yemeni Rial; IQR, Interquartile range

4.2 Depression, anxiety, stress and other characteristics of the participants

Table 2 shows the findings from the DASS-21 assessment among 2612 participants reveal diverse mental health conditions. For depression, 28.5% (n=744) of participants reported no depression or normal levels, while 15.3% (n=400) had mild depression. Moderate depression was presented in 27.3% (n=714), severe depression in 13.4% (n=349), and extremely severe depression in 15.5% (n=405). Anxiety levels varied, with 32.6% (n=852) reporting no anxiety, 8.9% (n=233) experiencing mild anxiety, 25.0% (n=653) moderate anxiety, 11.3% (n=295) severe anxiety, and 22.2% (n=579) extremely severe anxiety. Regarding stress, 39.1% (n=1022) had no stress, 15.3% (n=400) had mild stress, 19.6% (n=511) moderate stress, 17.5% (n=456) severe stress, and 8.5% (n=223) extremely severe stress.

Insomnia was prevalent, with 18.5% (n=482) having no insomnia, 42.0% (n=1097) sub-threshold insomnia, 30.9% (n=806) moderate insomnia, and 8.7% (n=227) severe insomnia. Self-esteem varied, with 14.4% (n=376) having low self-esteem, 27.5% (n=718) medium self-esteem, and 58.1% (n=1518) high self-esteem. Exercise habits showed that 70.0% (n=1828) practiced exercise, with 45.7% (n=836) exercising three times or less per week and 54.3% (n=992) more than three times per week. Internet use was split, with 55.8% (n=1458) using the internet less than the median of 22 points and 44.2% (n=1154) using it more than the median.

4.2 Table 2: DASS-21 of the participants (n=2612)

Variable		Count	(%)
DASS-D	No depression/Normal	744	(28.5)
	Mild depression	400	(15.3)
	Moderate depression;	714	(27.3)
	Severe depression;	349	(13.4)
	Extremely severe depression)	405	(15.5)
DASS_A	No anxiety/normal	852	(32.6)
	Mild anxiety	233	(8.9)
	Moderate anxiety	653	(25.0)
	Severe anxiety	295	(11.3)
	Extremely severe anxiety	579	(22.2)
DASS_S	No stress/normal).	1022	(39.1)
	Mild stress	400	(15.3)
	Moderate stress	511	(19.6)
	Severe stress	456	(17.5)
	Extremely severe stress	223	(8.5)
Insomnia categories	Absence of insomnia (0–7)	482	(18.5)
	sub-threshold insomnia (8–14)	1097	(42.0)
	moderate insomnia (15–21)	806	(30.9)
	severe insomnia (22–28)	227	(8.7)
Rosenberg Self-Esteem Scale score	low self-esteem (≤ 25 points)	376	(14.4)
	medium self-esteem (26–29 points)	718	(27.5)
	high self-esteem (≥ 30 points),	1518	(58.1)
Practice exercise	Yes	1828	(70.0)
	No	784	(30.0)
Exercise	≤ 3 times /week	836	(45.7)
	> 3 times/week	992	(54.3)
Internet use	less internet use ($\leq$ Median (22 points)	1458	(55.8)
	More internet use ($>$ Median (22 points)	1154	(44.2)

Note : 1 US dollar = 525 Yemeni Rial

Abbreviation: YR, Yemeni Rial; IQR, Interquartile range

4.3 Association of gender with the DASS-21

Table 3 displays the relationship between gender and the prevalence of depression, anxiety, and stress among 2612 participants. For depression, 34.2% (n=514) of male participants had no depression, while 20.8 % (n=230) of female participants had no

depression. Depression was observed in 65.8% (n=991) of male participants and in 79.2% (n=877) of female participants. The chi-square value was 56.022 with a p-value 0.000

Regarding the prevalence of anxiety, male participants showed no anxiety 38.1% (n=574), while females were 25.1% (n=278). Anxiety was reported in 61.9% of males (n=931) and in 74.9% of females (n=829). The chi-square value for this analysis was calculated as 49.246, with a p-value 0.000

The relationship between stress prevalence and gender revealed that no stress were observed in male participants at a rate of 48.2% (n =726) compared 26.7% (n =296) for female participants. stress levels were reported by 51.8 % of male participants (n =779), whereas it affected 73.3%of female participants (n =811). The chi-square value for this analysis was 123.793, with a p-value 0.00.

4.3 Table 3: Association of gender with the DASS-21 (n= 2612)

Variable		Gender				Chi-square	P-value
		Male		Female			
		Count	(%)	Count	(%)		
DASS_D b	No depression	514	(34.2)	230	(20.8)	56.022	0.000*
	Depression	991	(65.8)	877	(79.2)		
DASS_A c	No anxiety	574	(38.1)	278	(25.1)	49.246	0.000*
	Anxiety	931	(61.9)	829	(74.9)		
DASS_S d	No stress	726	(48.2)	296	(26.7)	123.793	0.000*
	Stress	779	(51.8)	811	(73.3)		

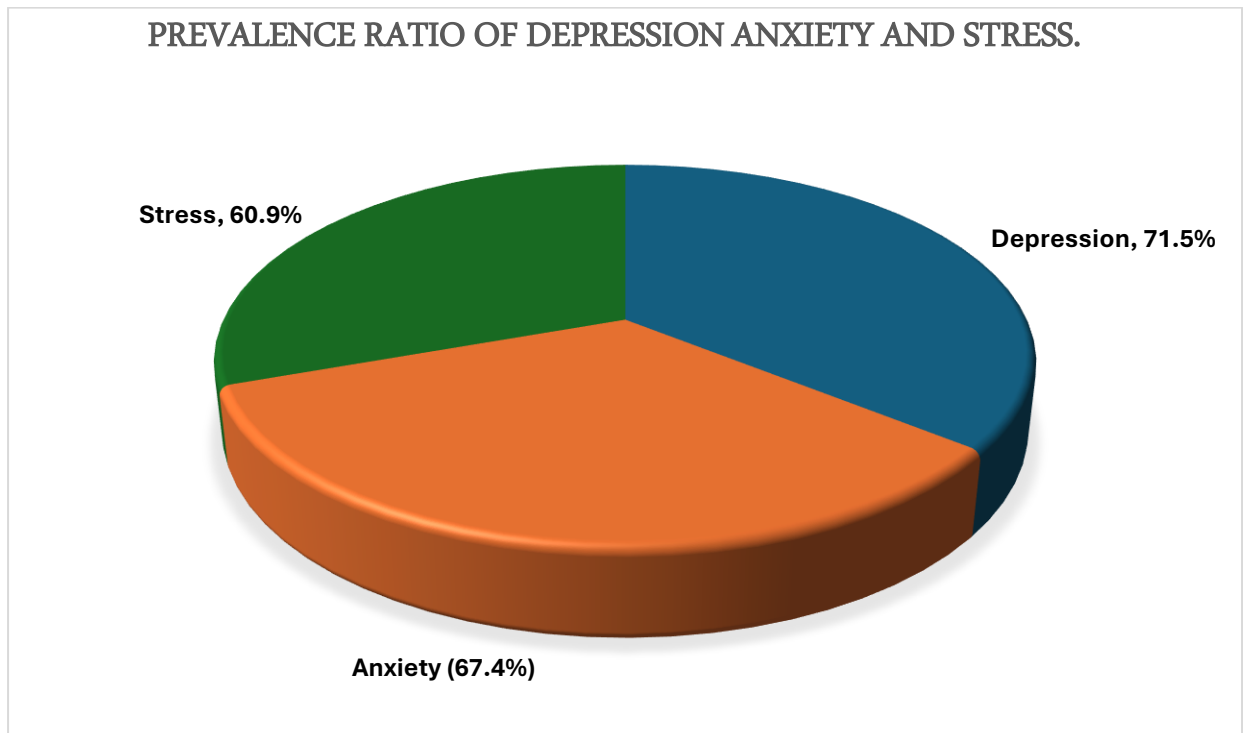


Figure 10: Prevalence Ratio OF Depression, Anxiety and Stress

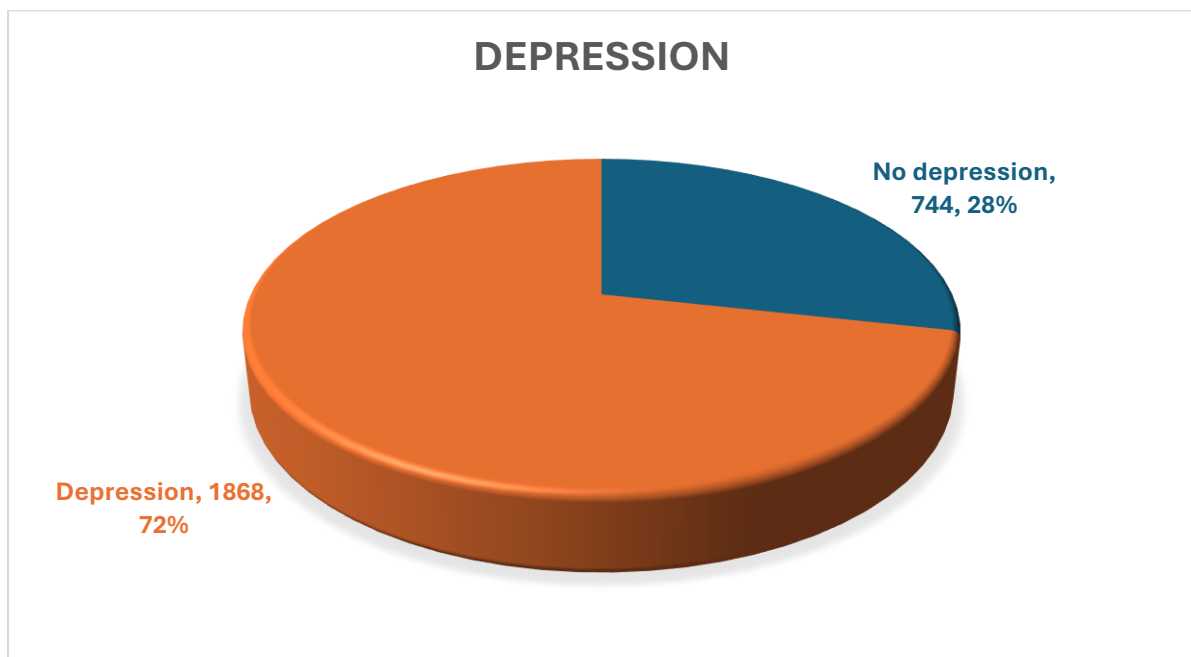


Figure 11: Prevalence of depression

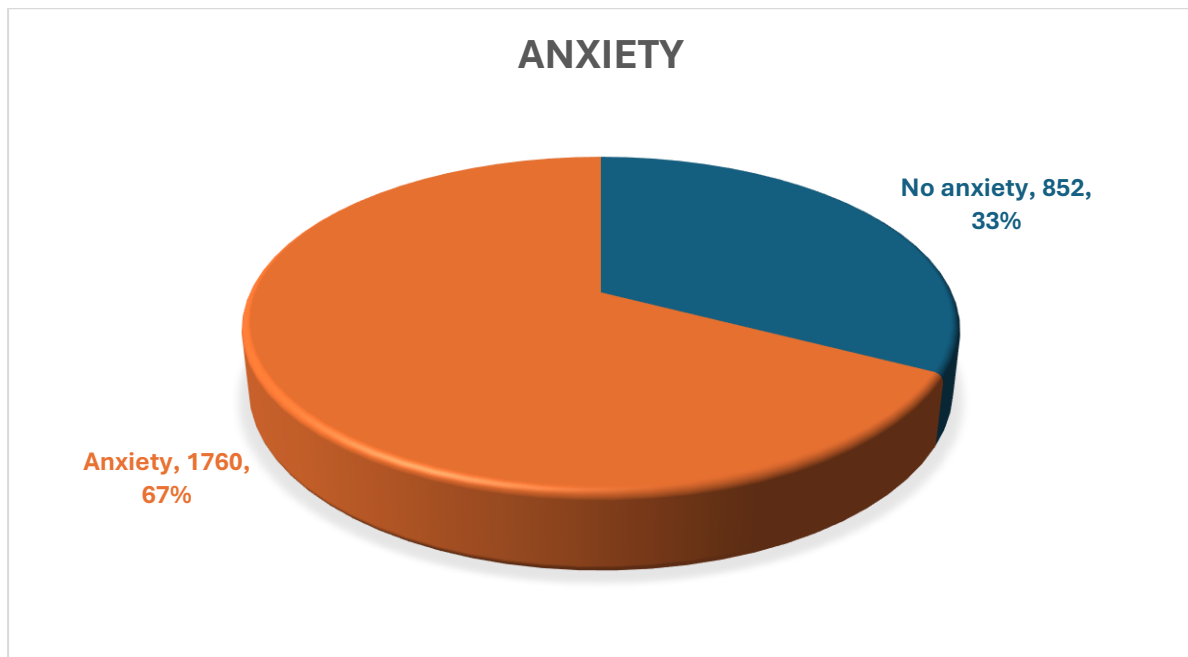


Figure 12: Prevalence of Anxiety



Figure 13: Prevalence of Stress

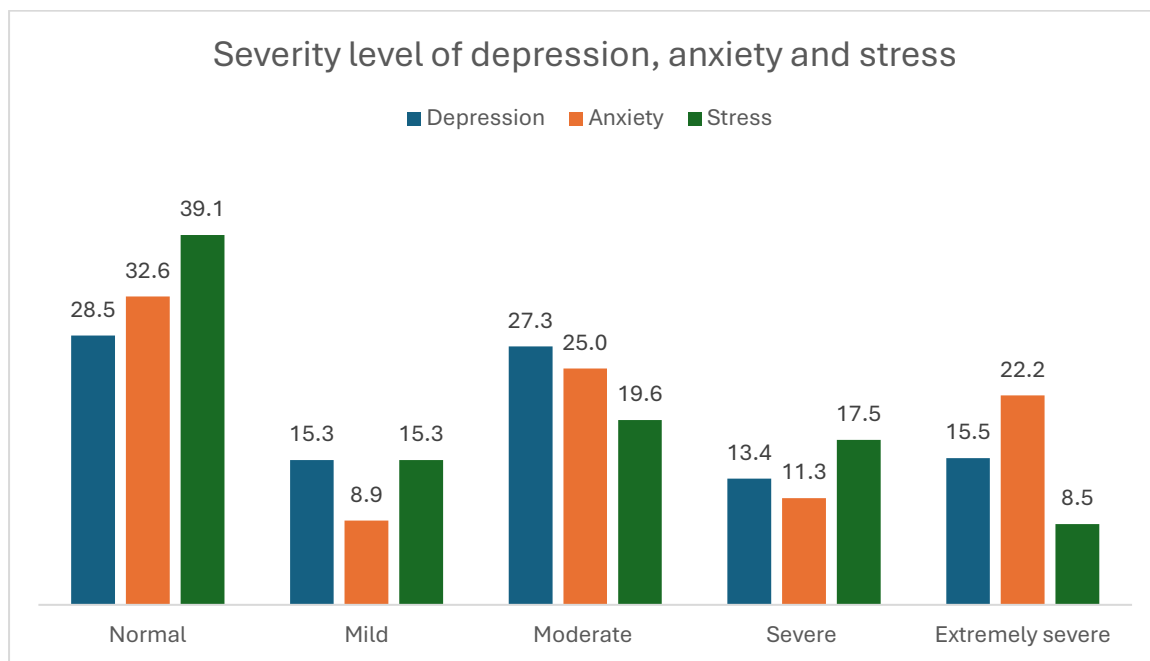


Figure 14: Severity Level of Depression, Anxiety and Stress

4.4 Association between participant characteristics and depression:

Table 4 displays the relationship between participant characteristics and depression. The association between age and depression among participants indicates that those aged 21 years and younger had 26.3% (n=397) in a normal state and 73.7% (n=1110) depressed, while participants above 21 years had 31.4% (n=347) in a normal state and 68.6% (n=758) depressed. The Chi-square value is 8.010 with a p-value of 0.005 Regarding gender and depression association, males with a normal status were at 34.2% (n=514) and depressed males were at 65.8% (n=991), whereas females with a normal status were at 20.8% (n=230), and depressed females were at 79.2% (n=877). The Chi-square value is 56.022 with a p-value less than 0.001.

The association between sector type and depression reveals that participants in public universities had 29.7% (n=209) in a normal state and 70.3% (n=494) in a depressed state, while participants in private universities had 28.0% (n=535) in a normal state and 72.0% (n=1374) in a depressed state. The Chi-square value is 0.733 with a p-value of 0.392.

The relationship between field of study and depression shows that medical student participants with a normal status were at 31.1% (n=431), while those with depression were at 68.9% (n=956). For non-medical students, the normal status was found in 25.6% (n=313) of participants, while depression was observed in 74.4% (n=912). The Chi-square value is 9.741 with a p-value of 0.002.

The association between residency status and prevalence of depression indicates that participants who lived alone had a normal status of 23.7% (n=54) and depression of 76.3% (n=174). Participants living with friends had a normal status of 31.8% (n=93) and depression of 68.2% (n=199), while those living with family had a normal status of 28.5% (n=597) and depressed status of 71.5% (n=1495). The Chi-square value is 4.205 with a p-value of 0.122.

Regarding marital status, participants who were single had a normal status of 28.1% (n=652) and depressed status of 71.9% (n=1665). Married participants had a normal status of 33.3% (n=69) and depressed status of 66.7% (n=138), while others had a normal status of 26.1% (n=23) and depressed status of 73.9% (n=65). The Chi-square value is 2.762 with a p-value of 0.251.

In the relationship between BMI and depression prevalence, participants with low BMI had a normal status of 28.9% (n=193) and depression of 71.1% (n=474). Participants with normal BMI had a normal status of 28.6% (n=461) and depression of 71.4% (n=1153), while those who were overweight or obese had a normal status of 27.2% (n=90) and depressed status of 72.8% (n=241). The Chi-square value is 0.344 with a p-value of 0.842.

Regarding the relationship between family income and the prevalence of depression, the data showed that participants with an income less than 60,000YR/month had a normal status of 23.0% (n=82) and a depression rate of 77.0% (n=275). For participants with an

income between 60,000YR/month and 120,000YR/month, the normal status was 30.7% (n=261) and the depression rate was 69.3% (n=589). Participants with an income greater than 120,000YR/month had a normal status of 28.5% (n=401) and a depression rate of 71.5% (n=1004). The Chi-square value was 7.392 with a p-value of 0.025.

In terms of the relationship between health insurance coverage and depression prevalence, participants with health insurance had a normal status of 31.0% (n=167) and a depression rate of 69.0% (n=371), while those without health insurance had a normal status of 27.8% (n=577) and a depression rate of 72.2% (n=1497). The Chi-square value was 2.175 with a p-value of 0.140.

When examining the association between smoking habits and depression among participants, smokers had a normal status of 25.2% (n=88) and a depression rate of 74.8% (n=261), while non-smokers or those with a history of smoking had a normal status of 29.0% (n=656) and a depression rate of 71.0% (n=1607). The Chi-square value was 2.113 with a p-value of 0.146.

The relationship between khat chewing habits and the prevalence of depression among participants indicated that khat chewers had a normal status of 34.2% (n=300) and a depression rate of 65.8% (n=578), whereas non-khat chewers or those with a history of khat chewing had a normal status of 25.6% (n=444) and a depression rate of 74.4% (n=1290). The Chi-square value was 20.89 with a p-value less than 0.001, indicating that participants who chewed khat had a lower prevalence of depression compared to non-chewers or ex-chewers (65.8% vs. 74.4%, $p < 0.001$).

The association between different categories of insomnia and the prevalence of depression revealed that participants without insomnia had a normal status of 53.5% (n=258) and a depression rate of 46.5% (n=224). Participants with sub-threshold insomnia had a normal

status of 31.0% (n=340) and a depression rate of 69.0% (n=757). Those with moderate insomnia had a normal status of 15.9% (n=128) and a depression rate of 84.1% (n=678), while participants with severe insomnia had a normal status of 7.9% (n=18) and a depression rate of 92.1% (n=209). The Chi-square value was 261.713 with a p-value less than 0.001.

Regarding the variation in self-esteem and the prevalence of depression among participants, those with low self-esteem had a normal status of 11.7% (n=44) and a depression rate of 88.3% (n=332). Participants with medium self-esteem had a normal status of 20.8% (n=149) and a depression rate of 79.2% (n=569), while those with high self-esteem had a normal status of 36.3% (n=551) and a depression rate of 63.7% (n=967). The Chi-square value was 118.553 with a p-value less than 0.001.

The association between exercise habits and the prevalence of depression showed that participants who practiced exercise had a normal status of 30.9% (n=564) and a depression rate of 69.1% (n=1264), whereas participants who did not practice exercise had a normal status of 23.0% (n=180) and a depression rate of 77.0% (n=604). The Chi-square value was 16.785 with a p-value less than 0.001.

In terms of the relationship between internet use and the prevalence of depression, participants who used the internet less had a normal status of 33.8% (n=493) and a depression rate of 66.2% (n=965), while those who used the internet more had a normal status of 21.8% (n=251) and a depression rate of 78.2% (n=903). The Chi-square value was 46.015 with a p-value less than 0.001.

4.4 Table 4: Association Between Participant Characteristics and Depression

		Depression status				Chi-square	P value
		Normal		Depressed			
		Count	(%)	Count	(%)		
Age	≤ 21 years	397	(26.3)	1110	(73.7)	8.010	0.005*
	>21 years	347	(31.4)	758	(68.6)		
Gender	Male	514	(34.2)	991	(65.8)	56.022	<0.001*
	Female	230	(20.8)	877	(79.2)		
Sector	Public university	209	(29.7)	494	(70.3)	0.733	0.392
	Private university	535	(28.0)	1374	(72.0)		
Study field	Medical	431	(31.1)	956	(68.9)	9.741	0.002*
	Non-medical	313	(25.6)	912	(74.4)		
Residency	Lives alone	54	(23.7)	174	(76.3)	4.205	0.122
	lives with friends	93	(31.8)	199	(68.2)		
	lives with family	597	(28.5)	1495	(71.5)		
Marital status	Single	652	(28.1)	1665	(71.9)	2.762	0.251
	Married	69	(33.3)	138	(66.7)		
	Others	23	(26.1)	65	(73.9)		
BMI	Low BMI	193	(28.9)	474	(71.1)	0.344	0.842
	Normal BMI	461	(28.6)	1153	(71.4)		
	Overweight/Obese	90	(27.2)	241	(72.8)		
Family income	< 60000 YR/Month	82	(23.0)	275	(77.0)	7.392	0.025*
	< 60000-120000 YR/Month	261	(30.7)	589	(69.3)		
	>120000 YR/Month	401	(28.5)	1004	(71.5)		
Health insurance	Yes	167	(31.0)	371	(69.0)	2.175	0.140
	No	577	(27.8)	1497	(72.2)		
Smoking	Yes	88	(25.2)	261	(74.8)	2.113	0.146
	No/Ex-smoker	656	(29.0)	1607	(71.0)		
Khat chewing	Yes	300	(34.2)	578	(65.8)	20.981	<0.001*
	No/Ex-Khat chewer	444	(25.6)	1290	(74.4)		
Insomnia categories	Absence of insomnia	258	(53.5)	224	(46.5)	261.713	<0.001*
	Sub-threshold insomnia	340	(31.0)	757	(69.0)		
	Moderate insomnia	128	(15.9)	678	(84.1)		
	Severe insomnia	18	(7.9)	209	(92.1)		
Rosenberg Self-Esteem Scale score	Low self-esteem	44	(11.7)	332	(88.3)	118.553	<0.001*
	Medium self-esteem	149	(20.8)	569	(79.2)		
	High self-esteem	551	(36.3)	967	(63.7)		
Practice exercise	Yes	564	(30.9)	1264	(69.1)	16.785	<0.001*
	No	180	(23.0)	604	(77.0)		
Internet use	less internet use	493	(33.8)	965	(66.2)	46.015	<0.001*
	More internet use	251	(21.8)	903	(78.2)		

4.5 Association between participants characteristics and anxiety status:

Table 5 illustrates the relationship between participant characteristics and anxiety status. For age, participants aged 21 years and younger had a normal anxiety status of 30.7% (n=462) and an anxious status of 69.3% (n=1045). Participants older than 21 years had a normal anxiety status of 35.3% (n=390) and an anxious status of 64.7% (n=715). The chi-square value is 6.237, with a p-value of 0.013.

Regarding gender, male participants had a normal anxiety status of 38.1% (n=574) and an anxious status of 61.9% (n=931), while female participants had a normal anxiety status of 25.1% (n=278) and an anxious status of 74.9% (n=829). The chi-square value is 49.246, with a p-value less than 0.001.

The association between sector type and prevalence of anxiety revealed that participants in public universities had a normal anxiety status of 38.4% (n=270) and an anxious status of 61.6% (n=433), while participants in private universities had a normal anxiety status of 30.5% (n=582) and an anxious status of 69.5% (n=1327). The chi-square value is 14.662, with a p-value less than 0.001.

In terms of study field, medical participants had a normal anxiety status of 35.8% (n=497) and an anxious status of 64.2% (n=890), while non-medical participants had a normal anxiety status of 29.0% (n=355) and an anxious status of 71.0% (n=870). The chi-square value is 13.900, with a p-value less than 0.001.

Regarding residency status, participants who lived alone had a normal anxiety status of 24.6% (n=56) and an anxious status of 75.4% (n=172), participants who lived with friends had a normal anxiety status of 38.7% (n=113) and an anxious status of 61.3% (n=179), and participants who lived with family had a normal anxiety status of 32.6% (n=683) and

an anxious status of 67.4% (n=1409). The chi-square value is 11.646, with a p-value of 0.003.

The relationship between marital status and the prevalence of anxiety shows that single participants had a normal anxiety status of 32.5% (n=753) and an anxious status of 67.5% (n=1564). Married participants had a normal anxiety status of 35.7% (n=74) and an anxious status of 64.3% (n=133), while participants with other marital statuses had a normal anxiety status of 28.4% (n=25) and an anxious status of 71.6% (n=63). The chi-square value is 1.647, with a p-value of 0.439.

Examining the relationship between BMI among participants and anxiety status reveals that participants with low BMI had a normal anxiety status of 31.0% (n=207) and an anxious status of 69.0% (n=460). Participants with a normal BMI had a normal anxiety status of 33.4% (n=539) and an anxious status of 66.6% (n=1075), while participants who were overweight or obese had a normal anxiety status of 32.0% (n=106) and an anxious status of 68.0% (n=225). The chi-square value is 1.258, with a p-value of 0.533.

The association between family income status and the prevalence of anxiety revealed that participants with a family income less than 60000 YR/month had a normal anxiety status of 28.9% (n=103) and an anxious status of 71.1% (n=254). Participants with a family income more than 60000 YR/month but less than 120000 YR/month had a normal anxiety status of 30.9% (n=263) and an anxious status of 69.1% (n=587), while participants with a family income more than 120000 YR/month had a normal anxiety status of 34.6% (n=486) and an anxious status of 65.4% (n=919). The chi-square value is 5.879, with a p-value of 0.053.

Regarding health insurance coverage and the prevalence of anxiety, participants with health insurance coverage had a normal anxiety status of 33.5% (n=180) and an anxious

status of 66.5% (n=358), while participants without health insurance coverage had a normal anxiety status of 32.4% (n=672) and an anxious status of 67.6% (n=1402). The chi-square value is 0.217, with a p-value of 0.642.

The relationship between smoking habits and the prevalence of anxiety shows that smoking participants had a normal anxiety status of 26.9% (n=94) and an anxious status of 73.1% (n=255), while non-smokers or those with history of smoking had a normal anxiety status of 33.5% (n=758) and an anxious status of 66.5% (n=1505). The chi-square value is 5.923, with a p-value of 0.015.

Regarding khat chewing habits, participants who chewed khat had a normal anxiety status of 33.7% (n=296) and an anxious status of 66.3% (n=582), while non-khat chewers or those with history of khat chewing had a normal anxiety status of 32.1% (n=556) and an anxious status of 67.9% (n=1178). The chi-square value is 0.721, with a p-value of 0.396.

The relationship between different categories of insomnia and the prevalence of anxiety revealed that participants without insomnia had a normal status of 55.6% (n=268) and 44.4% (n=214) had anxiety. Participants with sub-threshold insomnia had a normal status of 35.5% (n=389) and 64.5% (n=708) had anxiety. Those with moderate insomnia had a normal status of 20.0% (n=161) and 80.0% (n=645) had anxiety, while participants with severe insomnia had a normal status of 15.0% (n=34) and 85.0% (n=193) had anxiety. The Chi-square value was 210.632 with a p-value less than 0.001.

In terms of the association between self-esteem and anxiety, participants with low self-esteem were 16.2% (n=61) normal and 83.8% (n=315) anxious, those with medium self-esteem were 28.8% (n=207) without anxiety and 71.2% (n=512) with anxiety, and participants with high self-esteem were 38.5% (n=584) normal and 61.5% (n=934) anxious. The Chi-square value was 74.335 and the p-value was less than 0.001.

Regarding the relationship between exercise practice and the prevalence of anxiety, participants who practiced exercise were 34.0% (n=621) normal and 66.0% (n=1207) anxious, while participants who did not practice exercise were 29.5% (n=231) without anxiety and 70.5% (n=553) with anxiety. The Chi-square value was 5.072 with a p-value of 0.024.

For internet use, participants who used the internet less had a normal status of 35.7% (n=521) and were anxious at 64.3% (n=937), while participants who used the internet more had a normal status of 28.7% (n=331) and were anxious at 71.3% (n=823). The chi-square value was 14.571 and the p-value was less than 0.001.

4.5 Table 5: Association Between Participant Characteristics and Anxiety Status

		Anxiety status				Chi-square	P value
		Normal		Anxious			
		Count	(%)	Count	(%)		
Age	≤ 21 years	462	(30.7)	1045	(69.3)	6.237	0.013*
	>21 years	390	(35.3)	715	(64.7)		
Gender	Male	574	(38.1)	931	(61.9)	49.246	<0.001*
	Female	278	(25.1)	829	(74.9)		
Sector	Public university	270	(38.4)	433	(61.6)	14.662	<0.001*
	Private university	582	(30.5)	1327	(69.5)		
Study field	Medical	497	(35.8)	890	(64.2)	13.900	<0.001*
	Non-medical	355	(29.0)	870	(71.0)		
Residency	Lives alone	56	(24.6)	172	(75.4)	11.646	0.003*
	lives with friends	113	(38.7)	179	(61.3)		
	lives with family	683	(32.6)	1409	(67.4)		
Marital status	Single	753	(32.5)	1564	(67.5)	1.647	0.439
	Married	74	(35.7)	133	(64.3)		
	Others	25	(28.4)	63	(71.6)		
BMI	Low BMI	207	(31.0)	460	(69.0)	1.258	0.533
	Normal BMI	539	(33.4)	1075	(66.6)		
	Overweight/obese	106	(32.0)	225	(68.0)		
Family income	< 60000 YR/Month	103	(28.9)	254	(71.1)	5.879	0.053
	< 60000-120000 YR/Month	263	(30.9)	587	(69.1)		
	>120000 YR/Month	486	(34.6)	919	(65.4)		
Health insurance	Yes	180	(33.5)	358	(66.5)	0.217	0.642
	No	672	(32.4)	1402	(67.6)		
Smoking	Yes	94	(26.9)	255	(73.1)	5.923	0.015*
	No/Ex-smoker	758	(33.5)	1505	(66.5)		
Khat chewing	Yes	296	(33.7)	582	(66.3)	0.721	0.396
	No/Ex-Khat chewer	556	(32.1)	1178	(67.9)		
Insomnia categories	Absence of insomnia	268	(55.6)	214	(44.4)	210.632	<0.001*
	Sub-threshold insomnia	389	(35.5)	708	(64.5)		
	Moderate insomnia	161	(20.0)	645	(80.0)		
	Severe insomnia	34	(15.0)	193	(85.0)		
Rosenberg Self-Esteem Scale score	Low self-esteem	61	(16.2)	315	(83.8)	74.335	<0.001*
	Medium self-esteem	207	(28.8)	511	(71.2)		
	High self-esteem	584	(38.5)	934	(61.5)		
Practice exercise	Yes	621	(34.0)	1207	(66.0)	5.072	0.024*
	No	231	(29.5)	553	(70.5)		
Internet use	Less internet use	521	(35.7)	937	(64.3)	14.571	<0.001*
	More internet use	331	(28.7)	823	(71.3)		

4.6 Association between participants characteristics and stress status:

Table 6 illustrates the correlation between participants' characteristics and stress status among 2612 participants. Regarding age and stress among participants, those aged 21 years and younger had 36.9% (n=556) in a normal state and 63.1% (n=951) stressed, while those above 21 years had 42.2% (n=466) in a normal state and 57.8% (n=639) stressed. The Chi-square value is 7.455 with a p-value of 0.006. In terms of gender and stress status association, males with a normal status were at 48.2% (n=726) and stressed at 51.8% (n=779), compared to females with a normal status at 26.7% (n=296) and stressed at 73.3% (n=811). The Chi-square value is 123.793 with a p-value less than 0.001. Regarding sector type and prevalence of stress, participants studying in a public university were at 42.4% (n=298) in a normal state and 57.6% (n=405) were stressed, whereas participants studying in a private university were at 37.9% (n=724) in a normal status, and 62.1% (n=1185) were in a stress status. The Chi-square value is 4.299 with a p-value of 0.038. The relationship between field of study and stress shows that medical students had a normal status of 39.5% (n=548) and were stressed at 60.5% (n=839), while non-medical students had a normal status of 38.7% (n=474) and depression of 61.3% (n=751). The Chi-square value is 0.182 with a p-value of 0.670.

The correlation between residency status and the prevalence of stress shows that participants living alone had 38.2% (n=87) in a normal state and 61.8% (n=141) stressed, while those living with friends had 46.6% (n=136) in a normal state and 53.4% (n=156) stressed. Participants living with family were at 38.2% (n=799) in a normal status and 61.8% (n=1293) in a stress status. The Chi-square value is 7.657 with a p-value of 0.022.

Regarding marital status and the prevalence of stress among participants, single individuals had a normal status of 39.1% (n=907) and were stressed at 60.9% (n=1410),

while married participants had a normal status of 40.1% (n=83) and were stressed at 59.9% (n=124). Others had a normal status of 36.4% (n=32) and were stressed at 63.6% (n=56). The Chi-square value is 0.364 with a p-value of 0.834.

The relationship between BMI and the prevalence of stress indicates that participants with low BMI had a normal status of 36.6% (n=244) and were stressed at 63.4% (n=423), participants with normal BMI had a normal status of 39.5% (n=637) and were stressed at 60.5% (n=977), while participants with overweight or obesity had a normal status of 42.6% (n=141) and were stressed at 57.4% (n=190). The Chi-square value is 3.567 with a p-value of 0.168.

In terms of family income and the association with the prevalence of stress, participants earning less than 60,000YR/month had a normal status of 37.0% (n=132) and were stressed at 63.0% (n=225). For participants earning between 60,000YR/month and 120,000YR/month, the normal status was 41.5% (n=353) and stressed at 58.5% (n=497). Participants earning more than 120,000YR/month had a normal status of 38.2% (n=537) and were stressed at 61.8% (n=868). The Chi-square value was 3.239 with a p-value of 0.198.

In terms of health insurance coverage, participants with health insurance had a normal status of 36.8% (n=198) and a stressed status of 63.2% (n=340), while those without insurance coverage had a normal status of 39.7% (n=824) and were stressed at 60.3% (n=1250). The Chi-square value was 1.537 with a p-value of 0.215.

The association between smoking habits and the prevalence of stress showed that smokers had a normal status of 35.2% (n=123) and a stressed status of 64.8% (n=226), whereas non-smokers or individuals with a history of smoking had a normal status of 39.7%

(n=899) and a stressed status of 60.3% (n=1364). The Chi-square value was 2.551 with a p-value of 0.110.

Regarding khat chewing habits, participants who engaged in khat chewing had a normal status of 44.1% (n=387) and a stressed status of 55.9% (n=491), while non-khat chewers or those with a history of khat chewing exhibited a normal status of 36.6% (n=635) and a stressed status of 63.4% (n=1099). The Chi-square value was 13.608 with a p-value less than 0.001.

The correlation between different categories of insomnia and the prevalence of stress indicated that individuals without insomnia had a normal status of 66.0% (n=318) and 34.0% (n=164) experienced stress. Participants with sub-threshold insomnia showed a normal status of 45.1% (n=495) and 54.9% (n=502) were stressed. Those with moderate insomnia had a normal status of 21.7% (n=175) and 78.3% (n=631) experienced stress, while individuals with severe insomnia displayed a normal status of 15.0% (n=34) and 85.0% (n=193) were stressed. The Chi-square value was 320.642 with a p-value less than 0.001.

Regarding the relationship between self-esteem and stress, participants with low self-esteem had a normal status of 25.5% (n=96) and 74.5% (n=280) experienced stress, those with medium self-esteem had a normal status of 35.4% (n=254) and 64.6% (n=464) were stressed, while participants with high self-esteem displayed a normal status of 44.3% (n=672) and 55.7% (n=846) were stressed. The Chi-square value was 50.269 with a p-value less than 0.001.

In terms of the relationship between exercise habits and the prevalence of stress, participants who engaged in exercise had a normal status of 41.1% (n=751) and 58.9% (n=1077) were stressed, while those who did not exercise showed a normal status of

34.6% (n=271) and 65.4% (n=513) experienced stress. The Chi-square value was 9.783 with a p-value of 0.002.

Regarding internet usage, individuals who used the internet less had a normal status of 44.8% (n=653) and were stressed at 55.2% (n=805), whereas those who used the internet more displayed a normal status of 32.0% (n=369) and were stressed at 68.0% (n=785). The chi-square value was 44.391 and the p-value was less than 0.001.

4.6 Table 6: Association Between Participant Characteristics and Stress Status

		Stress status				Chi-square	P value
		Normal		Stressed			
		Count	(%)	Count	(%)		
Age	≤ 21 years	556	(36.9)	951	(63.1)	7.455	0.006*
	>21 years	466	(42.2)	639	(57.8)		
Gender	Male	726	(48.2)	779	(51.8)	123.793	<0.001*
	Female	296	(26.7)	811	(73.3)		
Sector	Public university	298	(42.4)	405	(57.6)	4.299	0.038*
	Private university	724	(37.9)	1185	(62.1)		
Study field	Medical	548	(39.5)	839	(60.5)	0.182	0.670
	Non-medical	474	(38.7)	751	(61.3)		
Residency	Lives alone	87	(38.2)	141	(61.8)	7.657	0.022*
	lives with friends	136	(46.6)	156	(53.4)		
	lives with family	799	(38.2)	1293	(61.8)		
Marital status	Single	907	(39.1)	1410	(60.9)	0.364	0.834
	Married	83	(40.1)	124	(59.9)		
	Others	32	(36.4)	56	(63.6)		
BMI	Low BMI	244	(36.6)	423	(63.4)	3.567	0.168
	Normal BMI	637	(39.5)	977	(60.5)		
	Overweight/obese	141	(42.6)	190	(57.4)		
Family income	< 60000 YR/Month	132	(37.0)	225	(63.0)	3.239	0.198
	< 60000-120000 YR/Month	353	(41.5)	497	(58.5)		
	>120000 YR/Month	537	(38.2)	868	(61.8)		
Health insurance	Yes	198	(36.8)	340	(63.2)	1.537	0.215
	No	824	(39.7)	1250	(60.3)		
Smoking	Yes	123	(35.2)	226	(64.8)	2.551	0.110
	No/Ex-smoker	899	(39.7)	1364	(60.3)		
Khat chewing	Yes	387	(44.1)	491	(55.9)	13.608	<0.001*
	No/Ex-Khat chewer	635	(36.6)	1099	(63.4)		
Insomnia categories	Absence of insomnia	318	(66.0)	164	(34.0)	320.642	<0.001*
	Sub-threshold insomnia	495	(45.1)	602	(54.9)		
	Moderate insomnia	175	(21.7)	631	(78.3)		
	Severe insomnia	34	(15.0)	193	(85.0)		
Rosenberg Self-Esteem Scale score	Low self-esteem	96	(25.5)	280	(74.5)	50.269	<0.001*
	Medium self-esteem	254	(35.4)	464	(64.6)		
	High self-esteem	672	(44.3)	846	(55.7)		
Practice exercise	Yes	751	(41.1)	1077	(58.9)	9.783	0.002*
	No	271	(34.6)	513	(65.4)		
Internet use	Less internet use	653	(44.8)	805	(55.2)	44.391	<0.001*
	More internet use	369	(32.0)	785	(68.0)		

Chapter V: Discussion

Discussion

5.1 Discussion

In our study, the total number of participants was 2,612. The investigation revealed that 60.9% of university students experience stress, 67.4% encounter anxiety, and 71.5% grapple with mild to extremely severe levels of depression. In comparison to other studies, Herrmann et al. (52) reported that the prevalence rates of depression, anxiety, and stress among students in France were 16.4%, 26.4%, and 16.0%, respectively. Cheung et al. (53) noted that among subgroups of university students in China, community college transfer students exhibited the highest levels of anxiety, stress, and depression. In Malaysia, the prevalence rates for moderate to extremely severe depression, anxiety, and stress were found to be 30.7%, 55.5%, and 16.6%, respectively (54). Furthermore, among students at Fayoum University in Egypt, the incidence rates of anxiety, stress, and depression were reported as 62.4%, 64.3%, and 60.8%, respectively (55). Additionally, Islam et al. (56) assessed the levels of depression and anxiety among first-year students, finding prevalence rates of moderate to extremely severe levels of depression and anxiety at 69.5% and 61%, respectively.

Participants aged 21 years and younger ($n = 1,507$) exhibited higher prevalence rates of stress (63.1%), anxiety (69.3%), and depression (73.7%) compared to those older than 21 years. The p -value was 0.005, indicating statistical significance. This may be attributed to the fact that younger students are more likely to experience uncertainty related to their studies than their older counterparts. This observation aligns with findings from studies conducted in Spain by Enrique et al. (2020) [57]. Female students ($n = 1,107$) exhibited higher prevalence rates of depression (79.2%), anxiety (74.9%), and stress (73.3%) compared to male students, with a p -value of <0.001 . Numerous studies have indicated that females tend to experience mental health issues more frequently than males, which

can be attributed to physiological differences such as genetic vulnerability, hormonal fluctuations, and cortisol levels that influence emotions and behavior. Additionally, females may respond differently to stress due to their heightened sensitivity to various events as demonstrated in a study conducted in Singapore by Afifi (2007) [58]. For instance, female students may be more vulnerable under stressful life circumstances, and academic pressures may exacerbate their concern, as indicated by research conducted in China by Wenjuan et al. (2019) [59]. This finding is consistent with the work of Kessler et al. (2015), who reported a higher prevalence of anxiety, stress, and depression among women across multiple countries [60].

Participants studying in private universities ($n = 1,909$) demonstrated higher prevalence rates of anxiety (69.5%) and stress (62.1%) compared to those in public universities, with a p-value of <0.001 for anxiety and 0.035 for stress. This disparity may be attributed to the high academic standards and tuition fees associated with private institutions, which can create a sense of pressure and competition that leads to increased anxiety and stress. This observation is corroborated by a study conducted in Saudi Arabia by Thamir et al. (2023) [61]. Non-medical students ($n = 1,225$) exhibited higher prevalence rates of depression (74.4%) and anxiety (71.0%) compared to medical students. The p-value for depression was 0.002, and for anxiety, it was <0.001 . These findings are intriguing, as they suggest that being a medical student does not necessarily increase the risk of mental illness, which is contrary to previous studies [30-37]. This may be due to differences in population characteristics, geographical area and current situation. Further research is needed to explore the underlying causes of this psychological impact.

Additionally, participants living alone reported higher rates of anxiety (75.4%) compared to those living with friends or family, with a p-value of 0.003. Stress was also more prevalent among participants living alone or with family (61.8%), with a p-value of 0.022.

Regarding family income status, participants with a low income (less than 60,000 YR/month) (n = 357) were more likely to experience depression, with a prevalence rate of 77.0%, compared to those with higher incomes P value was 0.025, This finding aligns with systematic review studies conducted by Scarlett Mac-Ginty et al. (2024), which consistently demonstrated a correlation between socio-economic status and higher prevalence rates of depression [62]. A study in Turkey by Bostancı et al. (2005) identified an association between depression and low income among students [63]. Additionally, research in Australia by Butterworth et al. (2012) established a connection between socio-economic status, depression, and financial hardship, further supporting the results of our study [64]. We observed associations between specific behaviors and mental health outcomes. Smokers (n = 349) exhibited higher levels of anxiety (73.1%) compared to non-smokers or individuals with a history of smoking. The p-value was 0.015, indicating a significant association between our findings and those of other studies. Toghianifar et al. [65] found that, compared to non-smokers, smokers generally scored lower in various aspects of general health, social functioning, role-emotional status, and mental health in a study conducted in Iran. Similarly, a study in Bangladesh by Md. Ahsan et al. [66] observed that smoking significantly affects mood and anxiety levels, indicating that smokers experience greater fluctuations in mood and anxiety compared to non-smokers. These findings are consistent with the results of our study. Participants who did not chew khat or had a history of khat chewing (n = 1,734) exhibited higher rates of depression (74.4%) and stress (63.4%), with a p-value of <0.001. This finding contradicts other studies that indicate khat use is linked to psychological issues. Yeshaw and Mossie (2017)

[67] identified khat consumption as a predictor of depression and stress. Additionally, a study conducted in Ethiopia demonstrated a significant association between khat use and both depression and anxiety [68]. Additionally, we found that severe insomnia was linked to increased rates of depression (92.1%), anxiety, and stress (85.0%) when compared to participants with no insomnia or mild to moderate insomnia, with a p-value of <0.001 . This aligns with findings from a study in Saudi Arabia, which reported that insomnia is prevalent among students at Jazan University. Symptoms of depression, anxiety, and stress, along with environmental noise around the sleeping area, were identified as significant correlates [69].

Using the Rosenberg Self-Esteem Scale, individuals with low self-esteem ($n = 332$) reported elevated levels of depression (88.3%), anxiety (83.8%), and stress (74.5%), with a p-value of <0.001 . These findings align with numerous studies, such as one conducted in Vietnam, which indicate that low self-esteem is associated with increased anxiety, depression, and academic stress. These factors significantly impact students' quality of life and are linked to suicidal ideation [70]. Researchers have identified negative self-esteem as a risk factor for adolescent depression (Garber et al.) [71]. Furthermore, Hermann and Betz (2006) reported a direct relationship between self-esteem and depressive symptoms among college students, supporting the findings of our study. Physical activity has been associated with enhanced psychological well-being. Participants who engaged in regular exercise reported lower incidences of depression (77.0%), anxiety (70.5%), and stress (65.4%) compared to non-exercisers, with p-values of <0.001 for depression, 0.024 for anxiety, and 0.002 for stress. The relationship between physical activity and mental well-being is mediated by several mechanisms, including the release of endogenous substances such as endorphins, modulation of the stress response via the hypothalamic-pituitary-adrenal (HPA) axis, improvements in sleep quality, and the

development of self-regulation and coping strategies. A study conducted in Spain by Gabriel et al. (2022) [72] identified significant relationships between students' levels of physical activity and their mental health status, noting that high levels of commuting and leisure-time physical activity are associated with improved mental health outcomes, which aligns with our findings.

Internet use was significantly associated with psychological distress among college students. Those who engaged in more frequent internet usage reported higher rates of depression (78.2%), anxiety (71.3%), and stress (68.0%) compared to their peers who used the internet less frequently, who experienced fewer psychological issues ($p < 0.001$). These findings align with previous research, including the correlational study conducted in India by Krishna and Swathi (2017) [73], which investigated the relationship between internet addiction and emotional disturbances such as depression, stress, and anxiety among medical students. Their study revealed a positive correlation between these variables.

Finally, we did not find a strong relationship between the prevalence of mental disorders and factors such as marital status, body mass index (BMI), or health insurance coverage.

Chapter VI: Conclusion and Recommendation

Conclusion and Recommendation

6.1 Conclusion

The study revealed a high prevalence of depression, anxiety, and stress among university students in Sana'a, Yemen. Additionally, several factors associated with these symptoms were identified, including age, female gender, sector type, field of study, internet use, smoking, low family income, khat chewing, insomnia, and low self-esteem. These factors seem to be strongly linked to psychological distress in the college student population.

6.2 Strengths

This study has several significant strengths:

First, the large sample size enhances the reliability of the results, providing greater statistical power and increasing the generalizability of the finding

We employed standardized instruments, including the depression, anxiety, and stress scale (DASS-21), the insomnia severity index (ISI), and the Rosenberg self-esteem scale.

The use of these validated scales enhances the study's validity and allows for comparability on a global scale. Another important strength of this study is its location in Sana'a, the capital city of Yemen, which encompasses various universities and a diverse student population from different regions of the country. Additionally, we conducted a pilot study that helped identify potential issues within our research design

6.3 Limitations

There are several limitations in our study:

1- The most significant limitation is that this research is based on cross-sectional data which means that the findings are correlational rather than indicative of causal relationships.

2- Another limitation, the study was conducted exclusively in the city of Sana'a and did not encompass entire country of Yemen

3- Additionally, data collection occurred over period of three months, which implied that the academic conditions varied among students.

For instance, students preparing for exam may experience heightened levels of stress and anxiety, potentially influencing their responses.

6.4 Recommendations

This study recommends:

1. **Development of mental health programs** for students, focusing on high-risk groups such as females, younger students, and those in non-medical fields.
2. **Raising awareness** about the mental health impacts of khat chewing, insomnia, and low self-esteem to encourage healthier lifestyles.
3. **Improving access** to mental health services, particularly for students with lower incomes and without health insurance.
4. **Integrating routine mental health screenings** in universities for early detection and intervention.
5. **Encouraging peer support networks** and stress management workshops to build resilience and reduce stigma.

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Appendix

1. Appendix A: Data Collection Sheet

الجدول 1: البيانات الاجتماعية والديموغرافية للمشاركين

1	العمر	
2	الجنس	☐ ذكر ☐ انثى
3	الجامعة	
4	مؤهلات دراسية	☐ تخصص طبي ☐ تخصص غير طبي
5	الإقامة	☐ العيش وحيداً ☐ العيش مع الأصدقاء ☐ الحياة مع العائلة
6	المستوى	☐ المستوى الأول ☐ المستوى الثاني ☐ المستوى الثالث ☐ المستوى الرابع ☐ المستوى الخامس ☐ مستوى السادس ☐ امتياز
7	الحالة الاجتماعية	☐ أعزب ☐ متزوج ☐ غير ذلك
8	الطول	
9	الوزن	
10	متوسط الدخل للأمرأة	☐ أقل من 60000 ريال يمني شهرياً ☐ 60000-120000 ريال يمني شهرياً ☐ أكثر من 120000 ريال يمني شهرياً
11	التأمين الصحي	☐ يوجد تأمين صحي ☐ لا يوجد تأمين صحي
12	هل تدخن / تدخين؟	☐ نعم، المدة (سنوات) عدد السجائر/اليوم..... ☐ لا ☐ مدخن سابق
13	هل تمضغ القات؟	☐ نعم، المدة (سنوات) ☐ لا ☐ مخزن سابق

الجدول 2: مقياس القلق والاكتئاب 21 (DASS-21)

يرجى قراءة كل فقرة تشير إلى مدى انطباقها عليك/ي خلال الأسبوع الماضي.				
الفقرة	أبداً	أحياناً	غالباً	دائماً
1(s) خلال الأسبوع الماضي كان لدي صعوبة في الشعور بالراحة				
2(a) خلال الأسبوع الماضي كنت اشعر بجفاف فمي				
3(d) خلال الأسبوع الماضي لم يكن بإمكانني الإحساس بمشاعر إيجابية				
4(a) خلال الأسبوع الماضي شعرت بصعوبة في التنفس أو التنفس السريع على الرغم من عدم قيامي بمجهود جسدي				
5(d) خلال الأسبوع الماضي وجدت صعوبة في المبادرة على القيام بالأعمال				
6(s) خلال الأسبوع الماضي قمت بردة فعل مبالغ بها تجاه المواقف المختلفة				
7(a) خلال الأسبوع الماضي شعرت بالارتعاش (في اليدين مثلاً)				
8(s) خلال الأسبوع الماضي شعرت بتوتر عصبي شديد				
9(a) خلال الأسبوع الماضي كنت أخاف من التعرض لموقف قد اشعر فيه بالخوف مما يسبب لي إحراجاً				
10(d) خلال الأسبوع الماضي شعرت بأنني فقدت طموحي				
11(s) خلال الأسبوع الماضي شعرت بأنني مضطرب ومزعج (ضابح)				
12(s) خلال الأسبوع الماضي وجدت صعوبة في الاسترخاء				
13(d) خلال الأسبوع الماضي شعرت بالإحباط والضيق				
14(s) خلال الأسبوع الماضي لم أستطع تحمل أي شيء يمنعي بالقيام بما أريد				
15(a) خلال الأسبوع الماضي شعرت بالخوف والدعر				
16(d) خلال الأسبوع الماضي شعرت بأنني فقدت حماسي لعمل أي شيء				
17(d) خلال الأسبوع الماضي شعرت بأنني شخص لا أستحق الكثير				
18(s) خلال الأسبوع الماضي شعرت أنني كنت حساساً إلى حد ما				
19(a) خلال الأسبوع الماضي كنت اشعر بتبعض قلبي على الرغم من أنني لم أقم بمجهود جسدي مثلاً (زيادة معدل ضربات القلب، افتقاد القلب للنضض)				
20(a) خلال الأسبوع الماضي شعرت بالخوف بدون سبب				
21(d) خلال الأسبوع الماضي شعرت أن الحياة لا معنى لها				

الجدول 3: مؤشر شدة الأرق

1- يرجى تقييم مدى خطورة مشكلة (مشاكل الأرق الحالية (آخر أسبوعين).

لا شيء	خفيف	متوسط	شديد	شديد جدا
☐	☐	☐	☐	☐
☐	☐	☐	☐	☐
☐	☐	☐	☐	☐

في آخر أسبوعين كان لدي صعوبة في النوم

في آخر أسبوعين كان نومي بشكل متقطع

في آخر أسبوعين كان عندي صعوبة في الاستيقاظ مبكرا

2- ما مدى رضاك / عدم رضاك عن نمط نومك الحالي؟

راضي جدا	راضي	راضي إلى حد ما	غير راضي	غير راضي جدا
☐	☐	☐	☐	☐

3- إلى أي مدى تعتبر أن مشكلة نومك تتعارض مع أداء عملك اليومي؟

، (على سبيل المثال: التعب أثناء النهار، عدم القدرة على أداء المهام اليومية، أو عدم القدرة على التركيز).

لا تتدخل على الإطلاق	تتدخل قليلاً	تتدخل قليلاً إلى حد ما	تتدخل كثيراً	تتدخل كثيراً جداً
☐	☐	☐	☐	☐

4- إلى أي مدى تعتقد أن قلة نومك تكون ملحوظة على نمط حياتك؟

غير ملحوظ على الإطلاق	ملحوظ قليلاً	ملحوظ قليلاً إلى حد ما	ملحوظ كثيراً	ملحوظ كثيراً جداً
☐	☐	☐	☐	☐

5- ما مدى قلقك/انزعاجك بشأن مشكلة نومك الحالية؟

لست قلقاً على الإطلاق	قلق قليلاً	قلق قليلاً إلى حد ما	قلق كثيراً	قلق كثيراً جداً
☐	☐	☐	☐	☐

الجدول 4: مقياس (برونزبرغ) لتقدير الذات

يرجى الإشارة إلى مدى موافقتك أو عدم موافقتك على كل عبارة.				
	لا أوافق بشدة	لا أوافق	موافق	موافق بشدة
1.				بشكل عام، أنا راضٍ عن نفسي.
2.				في بعض الأحيان أعتقد أنني لست جيدًا على الإطلاق.
3.				أشعر أن لدي عدد من الصفات الجيدة.
4.				أنا قادر على القيام بالأشياء مثل معظم الأشخاص الآخرين.
5.				أشعر أنه ليس لدي الكثير لأفتخر به.
6.				بالتأكيد أشعر بأنني عديم الفائدة في بعض الأحيان.
7.				أشعر بأنني شخص ذو قيمة.
8.				أتمنى أن أحظى باحترام أكبر لنفسي.
9.				بشكل عام، أنا أميل إلى الاعتقاد بأنني فاشل.
10.				أأخذ موقفًا إيجابيًا تجاه نفسي.

الجدول 5: استبيان النشاط البدني الدولي

- 1- هل تمارس الرياضة بما في ذلك رياضة المشي؟ ☐ نعم ☐ لا
- 2- نوع الرياضة؟
.....
- 3- كم مرة، في الأسبوع
- 4- مدة الرياضة باليوم (بالساعات)

الجدول 6: اختبار مدى استخدام الإنترنت

	أبدا	أحيانا	غالباً	دائماً
1				الإنترنت يمثل المتعة الكبيرة لي
2				أعتبر أن استخدام الإنترنت له تأثير إيجابي على مهاراتي في الواجبات والأعمال
3				أجد الإنترنت أساساً لاستخدامي اليومي
4				أقضي وقتاً طويلاً على استخدام الإنترنت للبحث والتصفح (مثل التعلم أو الترفيه)
5				أستخدم المواقع الاجتماعية فيسبوك بشكل يومي
6				أعتقد أن تصرفاتي وفكاري يمكن أن تؤثر على كفاءة تفاعلي مع الإنترنت
7				أستخدم الإنترنت يؤثر على نظام حياتي وروتيني اليومي
8				أعتمد بشكل كبير على الإنترنت للبحث عن المعلومات والموارد.

2. Appendix B: letter of support for research and ethics approval

<i>Republic Of Yemen</i> UNIVERSITY OF SCIENCE & TECHNOLOGY Faculty of Medicine & Health Sciences Research Ethics Committee		الجمهورية اليمنية جامعة العلوم والتكنولوجيا كلية الطب والعلوم الصحية لجنة أخلاقيات البحث العلمي
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Research Ethics Committee approval form
استمارة للحصول على موافقة لجنة أخلاقيات البحث العلمي

University Research Ethics Committee Decision
قرار لجنة أخلاقيات البحث العلمي بالجامعة

In accordance with URECD good clinical practice, the Declaration of Helsinki, and World Health Organization guidelines, the Research Ethics Committee of the University of Science and Technology (UST) met at the Faculty of Medicine, reviewed the proposal, and made the following decision:

Decision: Accepted

Study ID: 1446/0018/UREC/UST

Date: 28-7-2024

العنوان الكامل للدراسة باللغة العربية :
انتشار الاكتئاب والقلق والتوتر والعوامل المرتبطة بها بين طلاب الجامعات في مدينة صنعاء: دراسة مقطعية

Title of study:
The Prevalence of Depression, Anxiety and Stress and Their Associated Factors among Universities Students in Sana'a city: A cross-sectional study

Investigators:
Abdulsalam Halboup, Abdulrazzaq Yahya Al-Khazzan

The required documents are submitted according to the committee guidelines

- All unexpected side effects and complications should be submitted to the committee within 24 hours.
- Follow-up reports should be submitted at the end of study and any other changes in the study protocol.

UREC Chairperson



UREC- stamp



الى من يهمه الامر

الموضوع : تسهيل تجميع بيانات بحث تخرج

بالإشارة الى الموضوع أعلاه نرجو منكم التكرم بالسماح للطلاب لتجميع بيانات بحث التخرج الذي بضوان مدى انتشار
الاكتئاب والقلق والتوتر والعوامل المرتبطة بها بين طلاب الجامعات في اليمن للمستوى السادس صيدلة السريرية
(Pharm-D) للطلاب التالية أسمائهم :

1. محمد نجيب النعم
2. محمد سليمان الصلوي
3. احمد محسن القحم
4. علي عبدالله العمري
5. يحيى إبراهيم زياره
6. حمد احمد العريفي
7. وليد محمد البردة
8. أسامة الحبيشني
9. احمد عبدالحميد القدسي
10. محمد الغيثي
11. شيماء فاروق الصوفي
12. سماح محمد الظاهري
13. كوثر لطفي الحمادي
14. ولاية نبيل الزبيري
15. علياء عبدالمعطي الجنيد
16. شيماء محمد السبني

ولكم جزيل الشكر

رئيس قسم الصيدلة السريرية (Pharm-D)

ا.د/ مختار الغرافي



الخلاصة

الخلفية: تنتشر اضطرابات الصحة العقلية، بما في ذلك الاكتئاب والقلق والتوتر، بشكل متزايد بين طلاب الجامعات، وخاصة في المناطق المتضررة من الصراع مثل اليمن. إن فهم العوامل الاجتماعية والسكانية وسلوكيات نمط الحياة المرتبطة بهذه الحالات أمر بالغ الأهمية لتطوير تدخلات فعالة.

الأهداف: هدفت هذه الدراسة إلى تقييم انتشار العوامل المرتبطة بالاكتئاب والقلق والتوتر والأرق وتقدير الذات بين طلاب الجامعات في اليمن.

طرق البحث: أجريت دراسة مقطعية بين 2612 طالبًا من الجامعات الحكومية والخاصة في اليمن. تم جمع البيانات حول الخصائص الاجتماعية والسكانية والسلوكيات الصحية والحالة الصحية العقلية باستخدام استبيان منظم، بما في ذلك مقياس الاكتئاب والقلق والإجهاد (21-DASS)، ومقياس روزنبرغ لتقدير الذات، وأداة تقييم الأرق. تم إجراء تحليلات إحصائية لتحديد الارتباطات بين نتائج الصحة العقلية وخصائص المشاركين المختلفة.

النتائج: ومن بين المشاركين، كان 57.6% من الذكور، وكان متوسط العمر 21 عامًا. وكان معدل انتشار الاكتئاب المتوسط إلى الشديد للغاية 71.5%، والقلق 67.4%، والتوتر 60.9%. وأثر الأرق على 81.5% من الطلاب، حيث شكلت الحالات المتوسطة إلى الشديدة 39.6%. وأفاد 58.1% من المشاركين بارتفاع احترام الذات. وُجدت ارتباطات مهمة بين الجنس وجميع نتائج الصحة العقلية، حيث أظهرت الإناث مستويات أعلى من الاكتئاب والقلق والتوتر (قيمة $P < 0.001$). كما ارتبطت عوامل أخرى مثل العمر ومجال الدراسة ودخل الأسرة ومضغ القات والأرق بشكل كبير بالاكتئاب (قيمة $P < 0.05$).

الخاتمة: تكشف الدراسة عن ارتفاع معدلات انتشار الاكتئاب والقلق والتوتر والأرق بين طلاب الجامعات في اليمن، مع وجود فوارق ملحوظة بين الجنسين وارتباطات بعوامل اجتماعية وسكانية ونمط حياة مختلف. وتؤكد هذه النتائج على الحاجة إلى تدخلات الصحة العقلية المستهدفة وخدمات الدعم المصممة خصيصًا لتلبية الاحتياجات المحددة لهذه الفئة من السكان.

الكلمات المفتاحية: الاكتئاب، القلق، التوتر، الأرق، طلاب الجامعات، اليمن، الصحة النفسية.



الجمهورية اليمنية
وزارة التربية والتعليم والبحث العلمي
الجامعة الإماراتية الدولية
كلية الطب والعلوم الصحية
قسم الصيدلة السريرية (فارم-د)

مدى انتشار الاكتئاب والقلق والتوتر والعوامل المرتبطة بها بين طلاب الجامعات في صنعاء-اليمن

بحث تخرج مقدم كمتهم جزئي للحصول على درجة البكالوريوس في الصيدلة السريرية

فريق البحث:

علياء عبدالمعطي محمد الجنيد
كوثر لطفي شرف الحمادي
محمد حسين عبدالله الغيثي
محمد سليمان عبده الصلوي
محمد نجيب سعيد أنعم
ولايه نبيل سعيد الزبييري
وليد محمد عبدالله البرده
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أحمد عبدالحميد عبده القدسي
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مشرف البحث:

أ.د. مختار عبدالحافظ الغرافي

رئيس قسم الصيدلة السريرية - الجامعة الإماراتية

د. عبدالسلام حلوب
أخصائي صيدلة سريرية
سبتمبر، (2024) م