A cross-sectional study on the prevalence and associated risk factors of stress among adult women in Bangladesh

By

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A thesis submitted to the Department of the School of Pharmacy in partial fulfillment of the requirements for the degree of
Bachelor of Pharmacy (Hons.)

School of Pharmacy
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Declaration

It is hereby declared that

1. The thesis submitted is my/our own original work while completing a degree at BRAC University.
2. The thesis does not contain material previously published or written by a third party, except where this is appropriately cited through full and accurate referencing.
3. The thesis does not contain material that has been accepted, or submitted, for any other degree or diploma at a university or other institution.
4. I have acknowledged all main sources of help.

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Approval

The thesis titled "A study on the prevalence of stress among adult women associated with demographic characteristics, lifestyle, and dietary history in Bangladesh", submitted by Asif Hassan Talha (213460960) of Summer 2024, has been accepted as satisfactory in partial fulfillment of the requirements for the degree of Bachelor of Pharmacy.

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Ethics Statement

The research received ethical approval from the Committee of Ethical Compliance at Southeast University (SEU/Pharm/CECR/022/2024). All participants were informed about the study's objectives, and their participation was entirely voluntary. As the survey was completely anonymous, no personally identifiable information was collected, ensuring the privacy and confidentiality of the participants' data. All responses were used solely for research purposes and were stored with strict confidentiality safeguards.

Abstract/ Executive Summary

Mental stress is a major yet often overlooked health issue for women in economically backwards countries, as they are more likely to experience it for various reasons. This study investigated the prevalence of mental stress among Bangladeshi women aged 15 to 45, involving a total of 1,019 participants from various regions. The data was coded in Excel and analysed using SPSS 27. A chi-square test was employed to examine the correlation between mental stress and lifestyle factors. At the same time, a multivariable logistic regression model was employed to identify independent predictors while controlling for confounding variables. Factors such as lifestyle, dietary history, and demographic characteristics were analyzed. In the overall sample, the rates of mild, moderate, severe, and very severe stress were 11.38%, 14.23%, 15.80%, and 6.77%, respectively. The prevalence of mental stress among participants was 48.2%. Stress was significantly more prevalent among women in service (AOR = 2.31, p = .025), those who were students (AOR = 2.19, p = .036), and those performing heavy physical labour (AOR = 2.34, p < .001). Lifestyle factors that were significant predictors included tiredness (AOR = 2.49, p < .001), excessive eating (AOR = 1.72, p = .019), and loss of appetite (AOR = 1.46, p = .010). The strongest predictors were mental health comorbidities, with significant associations found for anxiety (AOR = 6.29, p < .001) and depression (AOR = 15.58, p < .001). On the other hand, anemia (AOR = 0.69, p =.042), underweight (AOR = 0.54, p =.023), and primary (AOR = 0.48, p =.010) or secondary education (AOR = 0.55, p =.010) were all substantially protective against stress.

Keywords: Demographic factor, mental stress, lifestyle, diet history

Dedication

I dedicate this paper to Allah**,** the Almighty, whose infinite mercy, wisdom, and strength have guided me through my most challenging moments. It is by His grace that I found the perseverance and resilience necessary to sustain me through difficult times in this journey.

Acknowledgement

This paper would not have been possible without the generous contributions of many individuals. First and foremost, I am deeply grateful to the volunteers whose dedication, time, and support were instrumental in the successful completion of this study. Their efforts—whether in data collection, support, or encouragement—have been invaluable at every step. I would also like to extend my heartfelt gratitude to my family. To my parents, whose unwavering love, guidance, and belief in me have always lifted my spirits. To my beloved sister, whose constant motivation, understanding, and companionship have been a source of comfort. To my dearest friend, F. Alam, your unwavering belief in my abilities, your attentive listening, and your timely encouragement have helped me overcome moments of doubt. Your support has been truly invaluable. Finally, I would like to express my deepest gratitude to my supervisor, Associate Professor Dr. Md Rabiul Islam, whose expert guidance, constructive critiques, and unwavering encouragement were instrumental in bringing this work to fruition. From the earliest stages of conceptualizing the research to the final stages of refining the manuscript, his insightful feedback and profound expertise consistently shaped the direction and quality of this study. Thank you all very much for standing by me unwaveringly throughout this journey. Your support has been the bedrock upon which this work stands.

Table of Contents

List of Tables

List of Figures

List of Acronyms

WHO	World Health Organization
APA	American Psychological Association
NMHS	National Mental Health Survey
BMI	Body Mass Index
DASS- 21	Depression, Anxiety, and Stress Scale

Chapter 1

Introduction

1.1 Background of the Study

Mental health is vital for well-being, enabling individuals to cope with challenges, realise their potential, succeed in academics, work effectively, and contribute to their communities. As an essential part of overall health, mental health improves our decision-making abilities, enhances our interactions with others, and influences our impact on the world around us. Everyone is entitled to enjoy good mental health, which is vital for personal growth, community well-being, and the advancement of socioeconomic conditions (World Health Organisation, 2022). In 2019, mental disorders were ranked seventh in terms of disability-adjusted life years, underscoring the increasing prevalence and gender disparities in the global burden of these disorders (Patel, V., et al. 2018). Data from Hologic, collected through the Global Women's Health Index in partnership with Gallup, indicated that between 2020 and 2021, levels of stress, sadness, worry, and anger among women increased by 1% overall.

Additionally, these emotional stress levels remained 4% points higher in women than in men. These findings highlight a gender gap in emotional well-being, emphasising that women carry a greater burden of negative emotions compared to men. Bangladesh has a population of approximately 175.7 million people, of which 50.84% are women. Women have made remarkable contributions to the country's development. To promote overall progress in Bangladesh, it is essential to prioritise the mental health of women. According to the Bangladesh National Mental Health Survey conducted in 2019, 18.8% of adult women are affected by mental disorders. Women frequently experience mental stress due to various factors, including socio-economic conditions, their working environment, and lifestyle choices. While there has been extensive research on women's mental health in developed countries,

there is a considerable gap in studies focused on less developed countries like Bangladesh. The mental health of women in Bangladesh is mainly ignored due to several causes, including a lack of awareness, cultural stigma, and inadequate healthcare infrastructure (Nuri et al., 2018). Accessing specialized mental health care is challenging due to limited government resources, a shortage of providers, and the concentration of services in large urban centers (Hasan et al., 2021; Koly et al., 2024). Because of this, many, especially women, are unaware of the symptoms of mental illness or whether treatment is available, and as a result, they rely on non-professional help. Lack of information and resources keeps women from receiving the proper care, even when they are aware of their mental health issues. In Bangladesh, mental stress among women is a pressing public health issue that demands immediate attention.

1.2 Problem Statement

Stress is a growing public health problem among adult women in Bangladesh, adversely affecting their mental well-being and quality of life. Rapid urbanisation, economic uncertainty, family responsibilities, and social expectations are among the factors that contribute to the increase in stress among women. In addition, their demographic characteristics (e.g., age, education, occupation, marital status), lifestyle (e.g., physical activity, sleep patterns, leisure activities), and dietary habits (e.g., nutritional intake, fast food dependence) may play an essential role in determining the level of stress. Although there is research on this relationship at the international level, such research is very limited in the context of Bangladesh, especially on adult women. Stress is not only a risk factor for mental illness, but it also increases the risk of physical illness, reduces productivity, and negatively affects family and social relationships. This study seeks to investigate the correlation between stress and lifestyle, demographic characteristics, and dietary habits among adult women in Bangladesh. The research results will provide evidence-based information, which will be helpful in developing effective policies,

awareness campaigns, and preventive measures to reduce stress and improve the general quality of life in the future.

1.3 Research Gap

Global studies indicate that women are more prone to stress and related mental health issues; however, it has a noticeable lack of local research on how these factors affect women in Bangladesh. (Kuehner, 2017). They often internalise stress due to cultural norms and stigma, rather than recognising or reporting it as a mental health issue. Existing studies on stress among adult women in Bangladesh often overlook key socio-demographic factors, such as education, age, income, marital status, residence, and health status. While previous studies have examined the effects of physical activity, there is a need for more in-depth research on how specific types of physical activity—such as various forms of exercise and household chores—affect mental health.

Furthermore, the relationship between sleep quality and duration and mental health outcomes, particularly regarding traditional gender roles and household responsibilities, warrants further investigation. Additional research is required on the impact of specific dietary factors on mental health, including deficiencies in micronutrients like iron and vitamin D. Additionally, it is essential to investigate how cultural dietary choices and access to nutritious food influence mental health. A more detailed study is needed to understand how characteristics such as age, socioeconomic background, education level, and marital status interact to impact mental health. For example, young, educated women in cities may experience dramatically different mental health difficulties than older, less educated women in rural areas. This gap leads to an incomplete understanding of how stress levels vary across various subgroups of women. The connection between mental stress in Bangladeshi women and their lifestyle, demographics, and dietary habits needs further investigation, making this research crucial for the well-being of women in Bangladesh.

1.4 Objective

The goal of this study is to evaluate the prevalence of mental stress among adult Bangladeshi women in the age range of 15 to 45 years old. Identifying lifestyle factors such as physical activity, sleep patterns, and substance use that are associated with mental stress. Investigating the relationship between dietary diversity, nutrient intake, and levels of mental stress. Additionally, exploring how various demographic characteristics—such as age, socioeconomic status, education level, marital status, and area of residence—impact mental stress in adult women. Finally, utilising the findings to inform the development of targeted mental health interventions that cater to the specific needs of adult women in Bangladesh.

1.5 Significance in the Context of Bangladesh

In Bangladesh, mental health is generally seen with stigma, and people with mental diseases, especially women, are often stigmatised. Many women don't get the help they need because they think that having mental health problems is a sign of weakness or a shame for their family. In rural areas, where traditional views are more prevalent, this shame is even more noticeable. Due to the scarcity of mental health care services, stigma, and illiteracy about mental health, women are less likely to seek professional mental health treatment compared to men and often suffer in silence. This study could make more people aware of mental health issues, diminish the stigma connected to obtaining mental health support, and promote culturally appropriate programs that normalize this practice, particularly for women.

Besides, the cultural expectation that women should maintain a balance between their personal and professional lives increases stress and emotional strain. Women experience a significant amount of stress as a result of early marriage, which often takes place before the age of 18. Marriage at a young age restricts professional and educational opportunities and frequently puts them at risk of domestic abuse. Many women in Bangladesh face physical, emotional, and sexual abuse in their families, and the trauma induced by such abuse may result in severe

mental health issues, including conditions like depression, stress, and anxiety disorders. Women's stress and mental health issues are greatly influenced by economic and financial inequality, which includes lower wages, unequal access to savings, and limited economic independence. Further, they are stuck in loops of poverty and abuse because men and women still don't have equal access to resources and power to make decisions, and the result is oppression, weakness, and mental suffering (Hasan et al., 2019). By analysing how stress levels differ across demographic and socioeconomic groups, the research may pinpoint vulnerable populations that require additional support.

Chapter 2

Literature Review

2.1 Diet History and Stress

A cross-sectional survey was conducted involving 450 students at Noakhali Science and Technology University in Bangladesh in 2024. According to the study's findings, approximately 57.3% of students had a poor level of nutrition literacy, which was found to be substantially related to greater levels of perceived stress. A statistical study utilising adjusted linear regression discovered a negative association between nutrition literacy and perceived stress. This result aligns with a survey by Contento et al. (2010), indicating that better nutrition literacy correlates with healthier eating behaviours and enhanced mental health outcomes. According to research, students often struggle to maintain good eating habits due to a lack of cooking ability, time restrictions, and budgetary limits. For example, research by Hossain et al. (2021) found that many students rely on convenience meals and fast food, which are typically low in nutrients and high in calories. This change in eating habits may result in adverse health effects, such as elevated stress levels. The study also discovered that 47.6% of students had poor healthy eating habits, which were negatively connected with perceived stress. According to this, students who maintain healthy eating habits tend to feel less stressed. Previous studies indicate that diets rich in whole grains, vegetables, and fruits are associated with reduced stress levels and enhanced mental health (Jacka et al., 2010).

2.2 The Impact of Various Lifestyle Factors on Perceived Stress

A study among 1962 U.S. undergraduate students, Badger et al. (2019), observed that healthy lifestyle factors, such as body mass index (BMI), non-smoking, physical exercise, and non-binge drinking, were linked to lower levels of PS (perceived stress). The study indicated a link between perceived stress, physical inactivity, and smoking status, with a higher impact on women than men. A cross-sectional study of 14,804 United States undergraduates, aged 18 to

24, found an inverse correlation between vigorous physical activity and mental well-being, with 63% of the participants being women. Female college students were less likely than males to meet vigorous physical activity recommendations and were prone to report higher levels of perceived stress and poor mental health (VanKim & Nelson, 2013). According to the authors, there was a decrease in the likelihood of reporting experienced stress when participants engaged in intensive physical exercise.

Additionally, according to the findings of a cohort research in China that included 2,579 college students, 42.1% of those who took part were female students. Researchers found that higher daily cigarette consumption was linked to increased levels of mental stress (Liu et al., 2007). A study on 441 students at a community college in the Midwest of the United States likewise discovered that present smoking habit was connected with greater stress levels (Pelletier et al., 2016). According to a cross-sectional study of 268 first-year college students, 168 of whom were women, in London, there was a significant correlation between the students' self-reported weight change and their stress levels. Those whose stress levels were higher for both intensity and frequency were more likely to experience both weight gain and weight loss. In this group of students, the correlation was greater among the females (Serlachius, Hamer, & Wardle, 2007). A study by Pelletier, Lytle, & Laska (2016) also showed a very significant relationship between stress levels and both meal skipping and smoking habits.

Furthermore, a much smaller research study that involved 179 undergraduate students at a public institution in the United States found a correlation between stress and the frequency of binge drinking. Students who reported high levels of perceived stress were more likely to engage in binge drinking (Chen & Feeley, 2015). The findings of this study support interventions aimed at reducing students' stress levels by promoting healthy lifestyle behaviours, specifically a nutritious diet, regular physical exercise, and low-risk substance use, which subsequently encourage a healthy weight.

2.2 Demographic Factors Associated with Mental Stress

A cross-sectional study conducted by the Korea Centre for Disease Control and Prevention (KCDC) and public health centres among 23,139 participants, with 12,908 women (approximately 55.8% of the total sample), examined the relationship between mental stress and demographic characteristics. They used levels of education and labour market engagement as indicators of socioeconomic position, and noticed a greater association between lower education levels, specifically those below a master's degree, and individuals experiencing depressive symptoms. Stress levels varied with education, as individuals with intermediate education experienced lower stress. A notable but predictable finding was that labour market participation had different effects. Individuals who participated in the labour market reported more stress but fewer depressed symptoms. This outcome indicates that promoting labour market participation can reduce the prevalence of depression; however, adjustments at the labour level are necessary to mitigate the stress intensity associated with labour market participation (Kim & Kim, 2017).

Chapter 3
Method

3.1 Study Design

This cross-sectional study aimed to explore the relationship between demographics, diet, lifestyle, and mental stress in adult women in Bangladesh. The study included 1019 individuals, who were divided into urban and rural community groups to ensure diverse geographic representation

3.2 The participants involved in the study and the procedures followed during data collection

One hundred eighty-seven women were randomly selected from both rural and urban areas of Bangladesh who were between the ages of 15 and 45, to carry out a population-based cross-sectional study. Among the total participants, 59.89% were students, 3.74% were unemployed, 21.39% were housewives, 9.96% were in service, and the remaining participants were engaged in other occupations. At the same time, 4.278% of women were illiterate, and the other 95.72% of women had achieved some level of education in their lives. Additionally, 65.56% of the total were collected from urban areas, and 37.49% were collected from rural areas. One person did not finish the questionnaire, resulting in a response rate of 99%.

Following the acquisition of consent (Appendix D) from the organisations, a comprehensive explanation of the research objectives and participant rights was provided to every female participant who was present during the data collection process. After giving them comprehensive information, we asked participants to assist us in completing the questionnaire (Appendix A). Those who were interested in taking part in the research were invited to an individual meeting. Since some women were illiterate and could not read the questionnaire, we asked them questions, helped them understand the meaning, and assisted them in filling out the questionnaire based on their answers.

3.3 Instruments and data collection

Data were collected using a structured questionnaire that included demographic information, lifestyle and dietary history, and the DASS-21 (Appendix C, Figure 7). Before data collection, the tool was translated into Bangla**.** The test is composed of 7 items for anxiety, 7 for stress, and 7 for depression subscales. The following choices are available to participants in response to each statement: Not at all, Rarely, Sometimes, Frequently. Responses are scored on a scale, with a low score of one indicating low levels of depression, anxiety, and stress among participants. A higher score reflects increased levels of these mental health issues. For clinical purposes, scores on the DASS-21 scale are categorized by severity as mild, moderate, severe, and extremely severe. Demographic data were collected regarding age, education level, profession, marital status, family income, body weight, height, area of residence, number of cohabitants, and habits related to alcohol or recreational drug consumption. Data on lifestyle and dietary habits were collected, focusing on specific diets such as vegetarian or keto. Information was also gathered about any recent changes in appetite, the use of food, nutritional, or vitamin supplements, sleep patterns, medication intake and frequency, and any experiences of dizziness or blurred vision during normal activities. Additionally, details regarding the degree of physical activity and exercise were assessed.

Table 1: DASS-21 score for stress

Stress Severity Level	Stress Score
Normal	0-7
Mild	8-9
Moderate	10-12
Severe	13-16
Extremely Severe	17+

3.4 Data Analysis

The gathered data were coded in Excel and input into IBM SPSS Statistics (version 27) for analysis. Initially, data were reviewed to ensure it was complete and consistent, and any incomplete or inconsistent responses were excluded from the study. Descriptive statistics were computed to summarize demographic characteristics, lifestyle behaviours, dietary patterns, and stress scores.

Stress was assessed using seven specific questionnaire items rated on a 4-point Likert scale (0 = Not at all, 1 = Rarely, 2 = Sometimes, 3 = Frequently). The raw stress score for each participant was calculated by summing these items and multiplying the total by 2, yielding a final stress score ranging from 0 to 42. Participants were divided into five stress intensity categories: normal, mild, moderate, severe, and extremely severe, depending on established cutoff values adapted from the DASS-21 guidelines.

To address the first objective, the prevalence of stress was determined by calculating the proportion of participants falling within each stress severity category.

For the second objective, the association between stress levels and demographic characteristics, including factors such as age, marital status, education level, socioeconomic status, and area of residence, was examined. Chi-square tests were applied to analyse categorical variables for differences in stress prevalence among demographic groups.

Regarding the third objective, logistic regression analysis was employed to estimate the odds of experiencing elevated stress levels in relation to lifestyle and dietary variables.

Statistical significance was evaluated using a threshold of $p < 0.05$, along with the corresponding 95% confidence intervals. Assumptions and model fitness tests were taken into account as required.

Chapter4

Results

4.1 Severity Level of Stress Symptoms Among the Participants

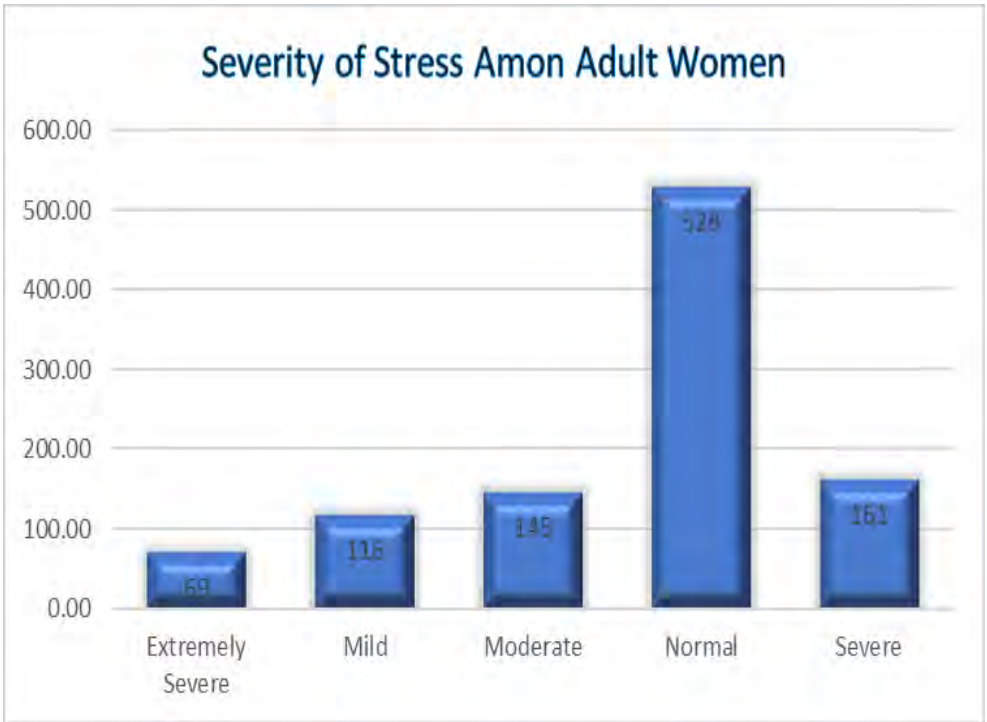


Figure 1: Severity of stress among adult women

In a study involving 1,019 adult women, the following stress levels were observed: 116 participants, or 11.38% of the total sample, reported mild stress; 145 participants, accounting for 14.23%, reported moderate stress; 161 participants, representing 15.80%, exhibited severe stress symptoms; and 69 participants, or 6.77%, displayed extremely severe stress symptoms.

4.2 Severity Level of Stress Symptoms Among the Participants

Figure 2: Prevalence of stress among the participants

Among the 1,019 adult women aged 15–45 years, the prevalence of stress was **48.2% (n = 491)**. This percentage indicates that nearly half of the participants experienced moderate-to-high stress levels, highlighting a substantial mental health burden in this population.

4.3 Association of Stress with Demographic Characteristics

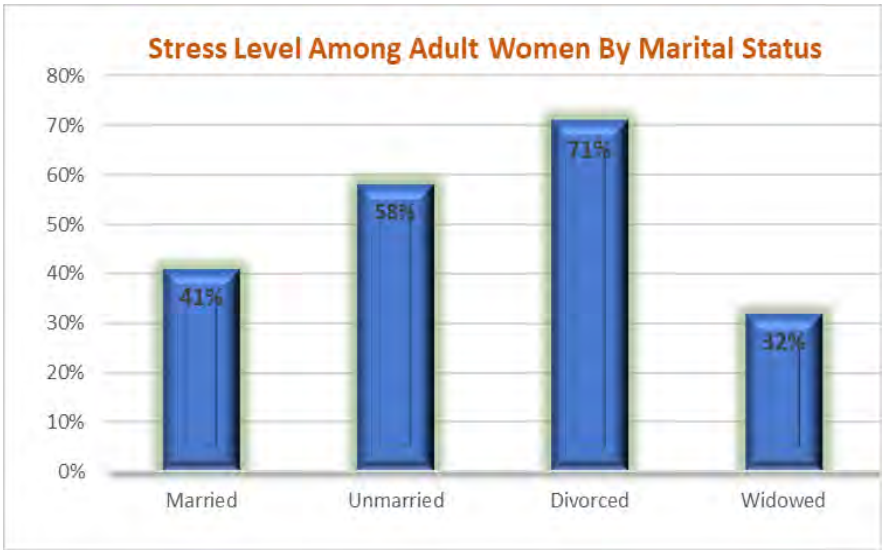


Figure 3: Stress among adult women by marital status

Bivariate analysis using chi-square tests showed that stress prevalence varied significantly across several demographic variables. Younger women (15–25 years) reported the highest

stress levels (55%), with prevalence decreasing with age (26–35 years: 46%; 36–45 years: 37%) ($\chi^2 = 22.83$, $p < .001$). Divorced (71%) and unmarried women (58%) exhibited higher stress compared to married (41%) and widowed women (32%) ($\chi^2 = 35.45$, $p < .001$).

Urban residents (64%) were more stressed than rural participants (35%) ($\chi^2 = 86.56$, $p < .001$), and women from high socioeconomic backgrounds reported higher stress (60%) compared to middle (48%) and low (39%) income groups ($\chi^2 = 25.99$, $p < .001$). Educational level and occupation were also associated with stress. Women with graduate-level education had a higher prevalence (63%) than those with primary education (31%) ($\chi^2 = 69.29$, $p < .001$).

Figure 4: Stress level in various professions

Students (59%) and service holders (59%) experienced higher stress compared to housewives (35%) and unemployed women (37%). A Chi-Square analysis demonstrates a statistically significant relationship between mental stress and marital status, with a value of ($\chi^2 = 58.85$, $p < .001$).

Nuclear family members showed slightly higher stress prevalence (51%) than those in joint families (44%) ($\chi^2 = 4.30$, $p = .038$).

4.4 Association of Stress with Lifestyle and Health Factors

Lifestyle and health variables were significantly associated with stress. Stress was more prevalent among smokers (91%) compared to non-smokers (48%) ($\chi^2 = 8.13$, $p = .004$).

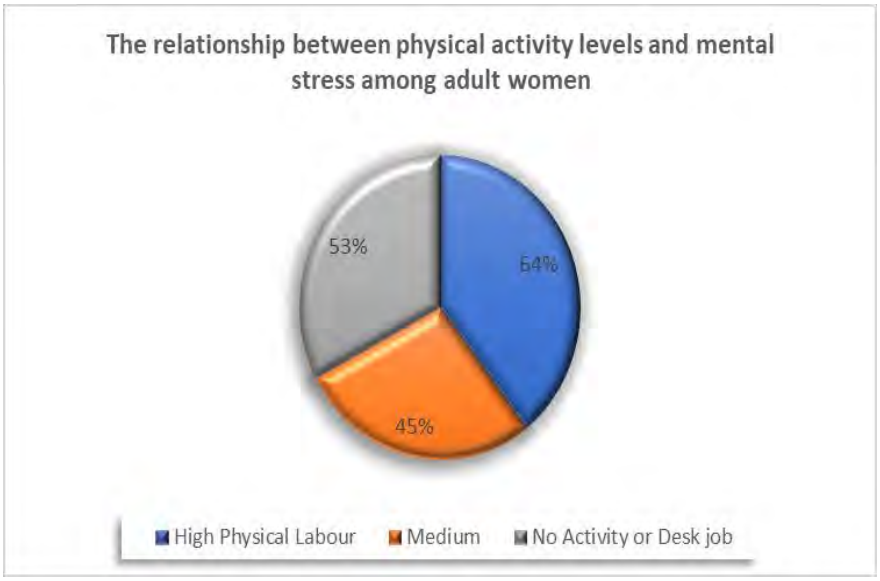


Figure 5: The relationship between physical activity levels and mental stress among adult women

Additionally, women engaged in high daily physical labour reported higher stress levels (64%) than those with medium (45%) or low/no activity (53%) ($\chi^2 = 15.18$, $p < .001$).

Participants following a specific diet (64%) or taking dietary supplements (56%) also experienced increased stress ($\chi^2 = 6.00$, $p = .014$; $\chi^2 = 4.49$, $p = .034$). The use of medication (61%) and changes in appetite—whether excessive eating (62%) or loss of appetite (52%)—were both associated with higher stress levels ($p < .001$ for both). Other factors such as tiredness (55%) and symptoms like dizziness or blurred vision (53%) were also linked to elevated stress ($p < .001$ and $p = .002$, respectively). Moreover, comorbid depression and anxiety had a strong association with stress, with prevalence rates of 73% and 62%, respectively ($p < .001$).

However, variables such as BMI category, general physical exercise, and awareness of anemia were not significantly associated with stress in bivariate analyses.

Table 2: Chi-square and regression analyses were used to identify associated factors.

Variable	Categories	Stress % (n)	χ^2 (df)	p-value	AOR (95% CI)	p-value
Age (years)	15–25	55 (273)	22.83 (2)	**<0.001**	1.28 (0.79–2.06)	0.312
	26–35	46 (126)			1.22 (0.83–1.77)	0.312
	36–45	37 (92)			1.00 (ref)	—
BMI (kg/m²)	CED <18.5	38 (30)	3.78 (2)	0.151	0.54 (0.32–0.92)	**0.023**
	Normal	50 (280)			0.88 (0.66–1.16)	0.367
	Overweight ≥25	48 (181)			1.00 (ref)	—
Marital status	Married	41 (228)	35.45 (3)	**<0.001**	1.22 (0.47–3.17)	0.688
	Unmarried	58 (246)			1.46 (0.48–4.40)	0.502
	Divorced	71 (10)			3.27 (0.71-15.09)	0.129
	Widowed	32 (7)			1.00 (ref)	—
Education	Illiterate	51 (52)	69.29 (3)	**<0.001**	1.23 (0.60–2.51)	0.578
	Primary	31 (71)			0.48 (0.28–0.84)	**0.010**
	Secondary	42 (127)			0.55 (0.35–0.87)	**0.010**
	Graduate+	63 (241)			1.00 (ref)	—
Occupation	Student	59 (241)	58.85 (4)	**<0.001**	2.19 (1.05–4.55)	**0.036**
	Housewife	35 (139)			0.99 (0.49–1.99)	0.979
	Service	59 (92)			2.31(1.11–4.81)	**0.025**

	Business	33 (2)			0.77 (0.12–4.92)	0.783
	Unemployed	37 (17)			1.00 (ref)	—
Economic status	Low	39 (135)	25.99 (2)	**<0.001**	0.98 (0.57–1.67)	0.933
	Middle	48 (199)			1.30 (0.82–2.05)	0.262
	High	60 (157)			1.00 (ref)	—
Residence	Urban	64 (295)	86.56 (1)	**<0.001**	1.29 (0.86–1.95)	0.221
	Rural	35 (196)			1.00 (ref)	—
Family type	Nuclear	51(339)	4.298(1)	**0.038**	1.30 (0.90-1.88)	.155
	Joint	44(152)			1 (ref)	—
Smoking habit	Smoker	91(10)	8.130(1)	**0.004**	2.77 (.261-29.32)	0.398
	Non smoker	48(481)			1 (ref)	0.398
Daily physical activity	None	53 (98)	15.18 (2)	**<0.001**	1.10 (0.78–1.56)	0.580
	High labor	64 (63)			2.34 (1.47–3.74)	**<0.001**
	Medium	45 (330)			1.00 (ref)	—
Specific diet	Yes	64 (37)	6.00 (1)	**0.014**	1.42 (0.66–3.06)	0.375
Dietary supplements	Yes	56 (94)	4.49 (1)	**0.034**	1.13 (0.70–1.83)	0.609
Medication use	Yes	61 (144)	20.97 (1)	**<0.001**	1.41(0.92–2.17)	0.113
Appetite changes	Loss	52 (170)	15.14 (2)	**<0.001**	1.46 (1.09–1.96)	**0.010**
	Excess	62 (64)			1.72 (1.10–2.71)	**0.019**
	No change	44 (257)			1.00 (ref)	—
Tiredness	Yes	55 (308)	25.49 (1)	**<0.001**	2.49 (1.70–3.66)	**<0.001**

Anemia	Yes	50 (261)	1.72 (1)	0.190	0.69 (0.49–0.99)	**0.042**
Depression	Yes	73 (443)	371.83(1)	**<0.001**	15.58 (10.40–23.33)	**<0.001**
Anxiety	Yes	62 (464)	214.52(1)	**<0.001**	6.29 (3.76–10.53)	**<0.001**

Note. CED = chronic energy deficiency; AOR = adjusted odds ratio; ORs adjusted for all variables in the model. Bold p-values indicate significance at ($p < 0.05$).

4. 5 Independent Predictors of Stress

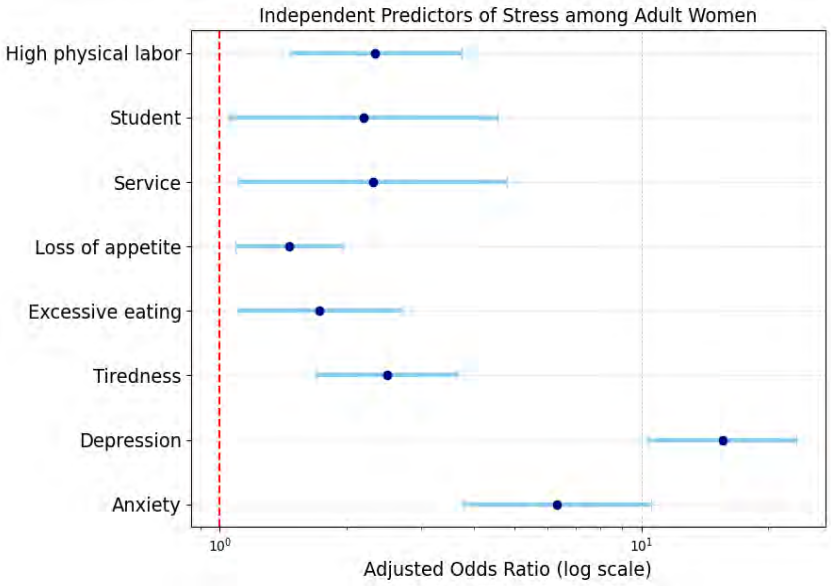


Figure 6: Forest plot of the independent predictors of stress among adult women

Multivariable logistic regression was used to identify the strongest independent predictors of stress while adjusting for potential confounders (see Table 1). The analysis revealed that several factors were significantly associated with higher odds of stress, including:

- High physical labour (Adjusted Odds Ratio [AOR] = 2.34, 95% Confidence Interval [CI] [1.47, 3.74], $p < .001$)

- Student status (AOR = 2.19, 95% CI [1.05, 4.55], $p = .036$)

- Employment in service occupations (AOR = 2.31, 95% CI [1.11, 4.81], $p = .025$)

- Loss of appetite (AOR = 1.46, 95% CI [1.09, 1.96], p = .010)

- Excessive eating (AOR = 1.72, 95% CI [1.10, 2.71], p = .019)

- Fatigue or tiredness (AOR = 2.49, 95% CI [1.70, 3.66], p < .001)

In addition, mental health comorbidities were strong predictors of stress, particularly:

- Depression (AOR = 15.58, 95% CI [10.40, 23.33], p < .001)

- Anxiety (AOR = 6.29, 95% CI [3.76, 10.53], p < .001)

Conversely, certain factors were found to be protective against stress, including:

- Underweight status (Body Mass Index [BMI] < 18.5; AOR = 0.54, 95% CI [0.32, 0.92], p = .023)

- Primary education (AOR = 0.48, 95% CI [0.28, 0.84], p = .010)

- Secondary education (AOR = 0.55, 95% CI [0.35, 0.87], p = .010)

- Anaemia (AOR = 0.69, 95% CI [0.49, 0.99], p = .042)

These findings highlight the significant relationships between various factors and stress levels. These findings suggest that nearly half of adult women in Bangladesh experience stress, with a higher risk among younger, educated, urban, and occupationally active women. Lifestyle factors, appetite changes, tiredness, and mental health comorbidities further increase the likelihood of stress. Protective factors include lower education, underweight status, and the presence of anemia. Overall, the results highlight multiple demographic, lifestyle, and health determinants of stress, emphasising the need for targeted interventions among high-risk groups.

Chapter 5

Discussion

This study examined the stress experiences of adult women concerning selected demographic, lifestyle, and dietary variables. One thousand twenty participants were assessed for stress, anxiety, and depression using the DASS-21 Scale. The results indicated that 48.2% of the participants experienced moderate to severe stress levels, which is nearly half. This figure is higher than the stress levels reported among adult women in Yazid, where a study found that 40.9% experienced stress (Mirzaei et al., 2019). According to the findings, a woman's age, place of residence, marital status, socioeconomic status, employment, educational background, and family structure all influence her level of stress. The analysis results showed that women who engage in high levels of physical labour are more than twice as likely to experience stress compared to those who are involved in medium levels of labour or none at all. This finding is supported by an Adjusted Odds Ratio (AOR) of 2.34 with a significance level of ($p < .001$). This may be due to the physical demands and job-related pressures of such occupations. A similar result was found among working women in Chennai. The findings indicate that excessive workload is a major factor causing mental stress. Karthikeyan, J. (2017). Students (AOR = 2.19, $p = .036$) are 49% more likely to experience stress than unemployed women, which can be attributed to various factors such as academic pressures, time management challenges, financial concerns, and the need to balance multiple responsibilities. Research by Misra and McKean (2000) indicates that female students often report higher stress levels compared to male students Additionally, another study found that female students often juggle multiple roles, including being a student, sister, daughter, classmate, and often as a wife, which significantly contributes to their overall stress levels (Imran, Imran, Sultan, & Iqbal, 2025). Again, our study found a significant link between mental stress and women engaged in various services (AOR = 2.31, $p = .025$), compared to those who are unemployed. This may result from the nature of service-oriented jobs and client interactions. Research by Chandrasekaran,

Guduru, and Loganathan (2025) found that 32.5% of women felt stressed after receiving negative feedback from their employers and being evaluated by superiors. Although the percentage is lower than our findings, we can conclude that there is a significant relationship between mental stress and women in various services. Our study found that both loss of appetite and excessive eating habits are significantly correlated with stress. Specifically, the adjusted odds ratio (AOR) for loss of appetite was 1.46 ($p = .010$), while for excessive eating it was 1.72 ($p = .019$), when compared to stable eating habits. Bremner et al. (2020) also explored the connection between food intake and stress. A peptide called ghrelin is produced in the pancreas and stomach, playing a key role in regulating appetite and digestion. Its levels increase before meals, stimulating food intake. Stress can raise ghrelin levels in the bloodstream, which in turn contributes to the increase in food intake related to chronic stress. Another study by Ans et al. (2018) Found That Stress can trigger orexigenic pathways, leading to increased food intake. Also, severe stress appears to disrupt sensory-specific satiety signalling, which normally helps to prevent individuals from eating the same food repeatedly. With an odds ratio (AOR) of 2.49 ($p < .001$), it is evident that there is a significant correlation between stress and tiredness in adult women. Women experiencing higher levels of stress are approximately 2.5 times more likely to report feelings of exhaustion compared to those who are less stressed. We found that 55% of women feel tired when mentally stressed, which is significantly higher than the 19% reported in a study from Palakkad city in India. This may be due to the different demographic characteristics. The results show that mental health issues have a significant impact on stress levels. Specifically, individuals with depression have an adjusted odds ratio (AOR) of 15.58 ($p < .001$), meaning they are over 15 times more likely to feel stressed. Similarly, those experiencing anxiety have an AOR of 6.29 ($p < .001$), indicating they are more than six times as likely to experience stress. Ardayfio and colleagues' study from 2006 demonstrated that long-term stress can lead to anxiety and depression. According to the study, depression

symptoms are exacerbated by extended interaction with the stress hormone cortisol. According to this research, stress hormones play a role in helping a person respond to immediate threats, and if stress continues to be high, it may increase anxiety levels. Both primary education (Adjusted Odds Ratio [AOR] = 0.48, p = .010) and secondary education (AOR = 0.55, p = .010) significantly reduced the risk of stress. Our findings indicate that primary female students had an adjusted odds ratio that was less than 52% compared to graduate students, while secondary female students showed a 45% reduced risk. Surprisingly, we found no significant association among illiterate women. The prevalence of stress among female undergraduate students in Bangladesh is 63%, which closely resembles the 65.9% reported in a study of female medical students in Egypt (Wahed & Hassan, 2017). Anemia is also substantially protective against stress. The findings highlight the importance of promoting lifestyle changes, mental health support, and effective stress management in academic and professional contexts to reduce stress among women in Bangladesh.

Chapter 6

Conclusion:

Stress is frequently overlooked in our daily lives, despite its potential to significantly harm our mental health. According to the current study, almost half of the Bangladeshi women in the survey, who are between the ages of 15 and 45, suffer from mental stress. Stress is significantly predicted by factors such as services, high physical labour, lifestyle, and mental health conditions like depression and anxiety. On the other hand, it seemed that certain demographic variables have a protective effect, such as lower educational attainment and being underweight. It is vital to address stress early on to prevent serious consequences later. To reduce mental stress in women, these findings highlight the importance of targeted interventions that focus on lifestyle, diet, and psychological factors. Community-based initiatives and improved access to mental health resources may be essential to help decrease stress and improve overall well-being in this population

References

- Arunrut, T., Alejandre, H., Chen, M., Cha, J., & Russo-Neustadt, A. (2006). Anxiogenic-like effect of chronic corticosterone in the light-dark emergence task in mice. *Behavioral Neuroscience, 120*(2), 249–256. https://doi.org/10.1037/0735-7044.120.2.249
- Badger, J., Quatromoni, P., & Morrell, J. (2019). Stress and healthy lifestyle factors in college students. *Health Behavior and Policy Review*. Retrieved from https://sites.bu.edu/nutritionalepilab/files/2019/03/Badger_Quatromoni_Morrell_Stress-and-Healthy-Lifestyle-Factors-in-College_HBPR_2019.pdf
- Bremner, J. D., Moazzami, K., Wittbrodt, M. T., Nye, J. A., Lima, B. B., Gillespie, C. F., Rapaport, M. H., Pearce, B. D., Shah, A. J., & Vaccarino, V. (2020). Diet, stress and mental health. *Nutrients, 12*(8), 2428. https://doi.org/10.3390/nu12082428
- Chen, Y., & Feeley, T. H. (2015). Predicting binge drinking in college students: rational beliefs, stress, or loneliness? *Journal of Drug Education, 45*(3–4), 133–155.
- Girija, C., & Siyamaladevi, S. (2021). Effect of stress among female college students. *International Journal of Creative Research Thoughts (IJCRT), 9*(4). https://ijcrt.org/papers/IJCRT2104007.pdf
- Hossain, M. M., et al. (2021). Dietary habits and lifestyle factors among university students in Bangladesh. *Journal of Health and Nutrition, 8*(2), 45–52.
- Imran, M., Imran, A., Sultan, A., & Iqbal, M. (2025). The impact of academic stress on the mental health and well-being of higher education female students. *Research Journal for Social Affairs, 3*(1), 317–326. https://doi.org/10.71317/RJSA.003.01.0088
- Jacka, F. N., et al. (2010). A prospective study of diet quality and mental health in adolescents. *Psychological Medicine, 40*(9), 1429–1437.

- Jamal, N. F., Abu Hasan, N. I. I., Baharuddin, M. S., & Suhaimi, S. (2022). Prevalence of depression, anxiety, and stress among undergraduate students during open and distance learning (ODL). *International Journal of Academic Research in Business and Social Sciences, 12*(8), 847–860. https://doi.org/10.6007/IJARBSS/v12-i8/14383
- Karthikeyan, J. (2017). Influencers of stress level among working women in Chennai city. *Sumedha Journal of Management, 6*, 103–108.
- Kim, J., & Kim, H. (2017). Demographic and environmental factors associated with mental health: A cross-sectional study. *International Journal of Environmental Research and Public Health, 14*(4), 431. https://doi.org/10.3390/ijerph14040431
- Kuehner, C. (2017). Why is depression more common among women than among men? *The Lancet Psychiatry, 4*(2), 146–158. https://doi.org/10.1016/S2215-0366(16)30263-2
- Lim, S., Tellez, M., & Ismail, A. I. (2020). Chronic stress and unhealthy dietary behaviours among low-income African-American female caregivers. *Current Developments in Nutrition, 4*(3), nzaa029. https://doi.org/10.1093/cdn/nzaa029
- Liu, C., Xie, B., Chou, C. P., et al. (2007). Perceived stress, depression and food consumption frequency in the college students of China Seven Cities. *Physiology & Behavior, 92*(4), 748–754.
- Mirzaei, M., Yasini Ardekani, S. M., Mirzaei, M., & Dehghani, A. (2019). Prevalence of depression, anxiety and stress among adult population: Results of Yazd Health Study. *Iranian Journal of Psychiatry, 14*(2), 137–146. https://doi.org/10.18502/ijps.v14i2.993
- Misra, R., & McKean, M. (2000). College students' academic stress and its relationship to their anxiety, time management, and leisure satisfaction. *American Journal of Health Studies, 16*(1), 41–48.

- Nuri, N. N., Sarker, M., Ahmed, H. U., Hossain, M. D., Beiersmann, C., & Jahn, A. (2018). Pathways to care of patients with mental health problems in Bangladesh. *International Journal of Mental Health Systems, 12*, 39. https://doi.org/10.1186/s13033-018-0218-y
- Patel, V., et al. (2018). The Lancet Commission on global mental health and sustainable development. *The Lancet, 392*(10157), 1553–1598. https://doi.org/10.1016/S0140-6736(18)31612-X
- Pelletier, J. E., Lytle, L. A., & Laska, M. N. (2016). Stress, health risk behaviors, and weight status among community college students. *Health Education & Behavior, 43*(2), 139–144. https://doi.org/10.1177/1090198115598983
- Serlachius, A., Hamer, M., & Wardle, J. (2007). Stress and weight change in university students in the United Kingdom. *Physiology & Behavior, 92*(4), 548–553.
- Sultana, A., Hasan, M. T., & Karim, A. (2020). Mental health and stigma: women's challenges in rural Bangladesh. *Asian Journal of Psychiatry, 53*, 102198. https://doi.org/10.1016/j.ajp.2020.102198
- Wahed, W. Y. A., & Hassan, S. K. (2017). Prevalence and associated factors of stress, anxiety and depression among medical Fayoum University students. *Alexandria Journal of Medicine, 53*(1), 77–84. https://doi.org/10.1016/j.ajme.2016.01.005
- World Health Organisation. (2020). WHO Special Initiative for Mental Health: Situational Assessment – Bangladesh. World Health Organisation.
- World Health Organisation. (2021). Mental health: strengthening our response. https://www.who.int/news-room/fact-sheets/detail/mental-health-strengthening-our-response

Appendix A.

A Study on Hemoglobin Levels and Mental Health Status Among Adult Females in Bangladesh

[বাংলাদেশে প্রাপ্তবয়স্ক মহিলাদের মধ্যে হিমোগ্লোবিনের মাত্রা এবং মানসিক স্বাস্থ্যের অবস্থার উপর একটি সমীক্ষা]

This survey has been designed to evaluate any correlation between hemoglobin levels and the mental health of adult females (15-45 years) in Bangladesh. The research has received ethical approval from the Committee of Ethical Compliance of Southeast University (SEU/Pharm/CECR/022/2024). This is a completely anonymous survey, ensuring your identity remains confidential and your privacy is respected. All collected information will be used solely for this study and kept confidential. Your consent to participate in this survey is crucial. Thank you for your cooperation in this important initiative.

[এই সমীক্ষাটি বাংলাদেশে প্রাপ্তবয়স্ক মহিলাদের (১৫-৪৫ বছর) হিমোগ্লোবিনের মাত্রা এবং মানসিক স্বাস্থ্যের মধ্যে কোনো সম্পর্ক মূল্যায়ন করতে ডিজাইন করা হয়েছে। গবেষণাটি সাউথইস্ট ইউনিভার্সিটির নৈতিক সম্মতি কমিটির (SEU/Pharm/CECR/022/2024) থেকে নৈতিক অনুমোদন পেয়েছে। এটি একটি সম্পূর্ণ বেনামী সমীক্ষা, যাতে আপনার পরিচয় গোপন থাকে এবং আপনার গোপনীয়তাকে সম্মান করা হয়। সমস্ত সংগৃহীত তথ্য শুধুমাত্র এই গবেষণার জন্য ব্যবহার করা হবে এবং গোপন রাখা হবে। এই সমীক্ষায় অংশগ্রহণের জন্য আপনার সম্মতি অত্যন্ত গুরুত্বপূর্ণ। এই গুরুত্বপূর্ণ উদ্যোগে আপনার সহযোগিতার জন্য ধন্যবাদ।]

Please Express Your Consent to Participate in the Research and Processing of Anonymous Data for Scientific Purposes [বৈজ্ঞানিক সমীক্ষার জন্য বেনামী ডেটা গবেষণা এবং প্রক্রিয়াকরণে অংশগ্রহণের জন্য আপনার সম্মতি প্রকাশ করুন]

~I am an adult female from Bangladesh and have no objection to the privacy policy of this survey and the information collected. I voluntarily agree to take part in this study.

[আমি একজন বাংলাদেশী প্রাপ্তবয়স্ক মহিলা এবং এই সমীক্ষার গোপনীয়তা নীতি এবং সংগৃহীত তথ্য নিয়ে আমার কোন আপত্তি নেই। আমি স্বেচ্ছায় এই গবেষণায় অংশ নিতে সম্মত।]

- আমি একমত (I do agree)
- আমি একমত নই (I do not agree)

স্বাক্ষর: তারিখ:

Please tick one box for each statement [প্রতিটি উক্তির জন্য যে উত্তরটি আপনার মতামতকে সবচেয়ে ভালোভাবে বর্ণনা করে তা চিহ্নিত করুন]

Section 1: Demographic questions

1.1 বয়স বছরে (Age in years)

- ১৫-২৫ (15-25)
- ২৬-৩৫ (26-35)
- ৩৬- ৪৫ (36-45)

1.2 শিক্ষার স্তর (Level of education)

- পড়ালেখা করি নাই (Illiterate)
- প্রাথমিক (Primary)
- মাধ্যমিক (Secondary)

- স্নাতকোত্তর/উর্ধ্বে (Graduate/above)

1.3 পেশা (Profession)

- চাকরি (Service)
- ব্যবসা (Business)
- গৃহিণী (Housewife)
- ছাত্র (Student)
- বর্তমানে কাজ করছেন না (Unemployed)
- অন্যান্য (Others) (Please specify) _____

1.4 বৈবাহিক অবস্থা (Marital Status):

- অবিবাহিত (Unmarried)
- বিবাহিত (Married)
- তালাকপ্রাপ্ত (Divorced)
- বিধবা (Widowed)

1.5 ওজন-কেজিতে (Body weight in Kg):

1.6 উচ্চতা- ফুট ও ইঞ্চিতে (Height in Feet and Inches):

1.7 পরিবারের মাসিক আয়- হাজারে (টাকা) (Monthly family income) (BDT in thousand):

1.8 বসবাসের এলাকা (Area of residence)

- শহর (Urban)

- গ্রাম (Rural)

1.9 আপনার সাথে বসবাসরত মানুষের সংখ্যা (Number of people living with you):

1.10 ধূমপানের অভ্যাস? (Smoking status?)

- ধূমপায়ী (Smoker)
- অধূমপায়ী (Non-smoker)
- প্রাক্তন ধূমপায়ী (Ex-smoker)

1.11 অ্যালকোহল বা কোনো বিনোদনমূলক ওষুধ সেবনের অভ্যাস (Alcohol or any recreational drugs consumption habit?)

- হ্যাঁ (Yes)
- না (No)

Section 2: Lifestyle and diet history (জীবনধারা এবং খাদ্য সম্পর্কিত তথ্য)

2.1. আপনি কি কোনো নির্দিষ্ট ডায়েট অনুসরণ করেন? (Do you follow a specific diet e.g., vegetarian, keto)?

- হ্যাঁ (Yes)
- না (No)

2.2 আপনি আপনার ক্ষুধায় কোন সাম্প্রতিক পরিবর্তন অনুভব করেছেন? (Did you experience any recent change in your appetite?)

- হ্যাঁ, অতিরিক্ত খাওয়ার অভ্যাস (Yes, overeating habit)

- ক্ষুধা কমে যাওয়া (Loss of appetite)
- কোন পরিবর্তন নেই (No change)

2.3 আপনি কি কোনো পুষ্টি বা ভিটামিন সম্পূরক গ্রহণ করে থাকেন? (Do you take any Food/Nutritional/vitamin supplements):

- হ্যাঁ (Yes)
- না (No)

2.4. আপনি কি ঘুমাতে অসুবিধা অনুভব করেন বা ঘুমের ব্যাধির কোন অভিজ্ঞতা আছে? (Do you experience difficulty sleeping or have any experience of sleeping disorders?)

- হ্যাঁ (Yes)
- না (No)

2.5. আপনি কি প্রায়শই কোনো ধরনের ওষুধ নেন? (Do you take any sort of medications frequently?)

- হ্যাঁ (Yes)
- না (No)

যদি হ্যাঁ হয়, অনুগ্রহ করে বলুন [If yes, name of medicine(s)] _____

2.6. আপনি কি দৈনন্দিন কাজে স্বাভাবিকের চেয়ে বেশি ক্লান্ত বা তন্দ্রাচ্ছন্ন হয়ে পড়েন? (Do you feel tired or drowsy doing daily chores more than usual?)

- হ্যাঁ (Yes)
- না (No)

2.7. আপনি কি প্রায়ই স্বাভাবিক কাজ করতে মাথা ঘোরা অনুভব করেন বা ঝাপসা দেখতে পান? (Do you often feel dizzy or have blurred vision while doing normal work?)

- হ্যাঁ (Yes)
- না (No)

2.9. আপনার দৈনন্দিন শারীরিক কার্যকলাপের মাত্রা কি? (Are you involved in daily physical activity?)

- উচ্চ শারীরিক শ্রম (High physical labor)
- মাঝারি স্তর (Medium level)
- কোন কার্যকলাপ নেই (ডেস্ক কাজ) (No activity at all (desk job))

2.10. আপনি কি সপ্তাহে অন্তত পাঁচবার নিয়মিত ব্যায়াম করেন? (Do you perform regular exercise at least five times a week?)

- নিয়মিত (Regular)
- অনিয়মিত (Irregular)
- একদমই নয় (Not at all)

Section 3: Mental health related information (মানসিক স্বাস্থ্য বিষয়ক তথ্য)

1 (s). আমার স্থির হতে কষ্ট হয় (I found it hard to wind down)

- একেবারেই না (Not at all)
- কদাচিৎ (Rarely)

- মাঝে মধ্যে (Sometimes)
- প্রায়ই (Frequently)

2 (a). আমার গলা শুকানোর মতো অবস্থা হয় (I was aware of dryness of my mouth)

- একেবারেই না (Not at all)
- কদাচিৎ (Rarely)
- মাঝে মধ্যে (Sometimes)
- প্রায়ই (Frequently)

3 (d). আমি কোন ইতিবাচক অনুভুতি পাই না (I couldn’t seem to experience any positive feeling at all)

- একেবারেই না (Not at all)
- কদাচিৎ (Rarely)
- মাঝে মধ্যে (Sometimes)
- প্রায়ই (Frequently)

4 (a). আমার দমবন্ধ হয়ে যাওয়ার মতো অবস্থা হয় (I experienced breathing difficulty (e.g., excessively rapid breathing, breathlessness in the absence of physical exertion))

- একেবারেই না (Not at all)
- কদাচিৎ (Rarely)
- মাঝে মধ্যে (Sometimes)

- প্রায়ই (Frequently)

5 (d). কোনো নতুন কাজ শুরু করার মতো ইচ্ছাশক্তি পাই না (I found it difficult to work up the initiative to do things)

- একেবারেই না (Not at all)
- কদাচিৎ (Rarely)
- মাঝে মধ্যে (Sometimes)
- প্রায়ই (Frequently)

6 (s). যেকোনো পরিস্থিতিতে আমি অতিরিক্ত প্রতিক্রিয়া দেখাই (I tended to over-react to situations)

- একেবারেই না (Not at all)
- কদাচিৎ (Rarely)
- মাঝে মধ্যে (Sometimes)
- প্রায়ই (Frequently)

7 (a). বিরূপ পরিস্থিতিতে কাপুনি অনুভব হয়। যেমন, হাতে (I experienced trembling (e.g., in the hands)

- একেবারেই না (Not at all)
- কদাচিৎ (Rarely)
- মাঝে মধ্যে (Sometimes)
- প্রায়ই (Frequently)

8 (s). আমার মনে হয় আমি অনেক নেতিবাচক মনোভাব পোষণ করি (I felt that I was using a lot of nervous energy)

- একেবারেই না (Not at all)
- কদাচিৎ (Rarely)
- মাঝে মধ্যে (Sometimes)
- প্রায়ই (Frequently)

9(a). আমি অতিরিক্ত দুশ্চিন্তা করি এবং আতঙ্কিত হয়ে যাই (I was worried about situations in which I might panic and make a fool of myself)

- একেবারেই না (Not at all)
- কদাচিৎ (Rarely)
- মাঝে মধ্যে (Sometimes)
- প্রায়ই (Frequently)

10 (d). আমার মনে হয় আমার জীবনের সামনে ভালো কিছু নেই (I felt that I had nothing to look forward to)

- একেবারেই না (Not at all)
- কদাচিৎ (Rarely)
- মাঝে মধ্যে (Sometimes)
- প্রায়ই (Frequently)

11 (s). আমি নিজে নিজে রাগান্বিত হয়ে যাই (I found myself getting agitated).

- একেবারেই না (Not at all)
- কদাচিৎ (Rarely)
- মাঝে মধ্যে (Sometimes)
- প্রায়ই (Frequently)

12 (s). নিজেকে শান্ত করতে পারি না (I found it difficult to relax)

- একেবারেই না (Not at all)
- কদাচিৎ (Rarely)
- মাঝে মধ্যে (Sometimes)
- প্রায়ই (Frequently)

13 (d). আমি কষ্ট এবং হতাশায় ডুবে যাই (I felt down-hearted and blue)

- একেবারেই না (Not at all)
- কদাচিৎ (Rarely)
- মাঝে মধ্যে (Sometimes)
- প্রায়ই (Frequently)

14 (s). কোনো কিছু আমার প্রতিকুলে গেলে আমি সহ্য করতে পারি না (I was intolerant of anything that kept me from getting on with what I was doing)

- একেবারেই না (Not at all)
- কদাচিৎ (Rarely)

- মাঝে মধ্যে (Sometimes)
- প্রায়ই (Frequently)

15 (a). আমার মনে হয় আমি আতঙ্কে আছি (I felt I was close to panic)

- একেবারেই না (Not at all)
- কদাচিৎ (Rarely)
- মাঝে মধ্যে (Sometimes)
- প্রায়ই (Frequently)

16 (d). আজকাল জীবনের কোনো কিছু আমাকে উৎসাহিত করতে পারে না (I was unable to become enthusiastic about anything)

- একেবারেই না (Not at all)
- কদাচিৎ (Rarely)
- মাঝে মধ্যে (Sometimes)
- প্রায়ই (Frequently)

17 (d). আমার জীবন মুল্যহীন মনে হয় (I felt I wasn't worth much as a person)

- একেবারেই না (Not at all)
- কদাচিৎ (Rarely)
- মাঝে মধ্যে (Sometimes)
- প্রায়ই (Frequently)

18 (s). আমার মনে হয় আমি একজন স্পর্শকাতর মানুষ (I felt that I was rather touchy)

- একেবারেই না (Not at all)
- কদাচিৎ (Rarely)
- মাঝে মধ্যে (Sometimes)
- প্রায়ই (Frequently)

19 (a). আমি স্থির থাকা অবস্থায়ও আমার বুক ধড়ফড় অনুভব করি (I was aware of the action of my heart in the absence of physical exertion (e.g., sense of heart rate increase, heart missing a beat))

- একেবারেই না (Not at all)
- কদাচিৎ (Rarely)
- মাঝে মধ্যে (Sometimes)
- প্রায়ই (Frequently)

20 (a). আমি কোনও কারণ ছাড়াই ভয় পেয়ে যাই (I felt scared without any good reason)

- একেবারেই না (Not at all)
- কদাচিৎ (Rarely)
- মাঝে মধ্যে (Sometimes)
- প্রায়ই (Frequently)

21 (d). আমার মনে হয় জীবন অর্থহীন (I felt that life was meaningless)

- একেবারেই না (Not at all)
- কদাচিৎ (Rarely)
- মাঝে মধ্যে (Sometimes)
- প্রায়ই (Frequently)

** Blood Hb level:_____g/dL

** Are you aware about your Hb level? Yes No

Any comments

……

Thank you for completing this survey

গবেষকের নাম: স্বাক্ষর:

তারিখ:

Appendix. B

QUESTIONNAIRE FOR THE INFORM-CONSENT

১. এই গবেষণা কর্মের ধরণ, উদ্দেশ্য এবং পদ্ধতি সম্পর্কে কি পুরো : হ্যাঁ/ না
জানতে পেরেছেন?

২. এই গবেষণায় যে আপনাকে শারীরিক, মানসিক এবং সামাজিক কোন : হ্যাঁ/ না
ঝুঁকির সম্মুখিন হতে হবে না, এ বিষয়ে কি যথেষ্ট অবহিত হয়েছেন?

৩. এই গবেষণায় আপনার শরীর অথবা কোন অঙ্গ-প্রত্যঙ্গে যে ক্ষত বা : হ্যাঁ/ না
আঘাত তৈরী করা হবে না, এ সম্পর্কে কি অবহিত হয়েছেন?

৪. এই গবেষণার ফলাফল এবং সম্ভাব্য কল্যাণের বিষয়ে আপনার : হ্যাঁ/ না
ধারণাটি স্পষ্ট হয়েছে কি?

৫. এই গবেষণা কর্মে অংশগ্রহণ, সহযোগিতাদান, অথবা বিরত থাকার : হ্যাঁ/ না
সিদ্ধাল্ড্গাপনি কি স্বাধীন ভাবে গ্রহণ করতে পারছেন?

৬. গবেষনা কর্মে অংশগ্রহণের ফলে আপনার মৌলিক মানবাধিকার কি : হ্যাঁ/ না
ক্ষুন্ন হচ্ছে?

৭. আপনি কি, পরিপূর্ণ ভাবে জ্ঞাত যে, আপনার তথ্যাবলীর গোপনীয়তা : হ্যাঁ/ না
বজায় রাখা হবে?

৮. গবেষণা কর্মে অংশগ্রহণের জন্য আপনাকে কোন পারিশ্রমিক অথবা : হ্যাঁ/ না
ভ্রমণভাতা দেয়া হবে না, এ বিষয়টি কি যথেষ্ট অবগত আছেন?

অনুমতি পত্র

এই গবেষণা কর্মের উদ্দেশ্য, পদ্ধতি ও উপযোগিতা সম্পর্কে পূর্ণ ধারণা পেয়ে, এর নীতিগত বৈশিষ্ট্য সমূহের প্রতি আমার সম্মতি প্রকাশ করছি। গবেষণা কর্মে অংশগ্রহণের জন্য আমি কোন ব্যক্তি বা গোষ্ঠি দ্বারা প্রভাবান্বিত হইনি অথবা আমার মৌলিক মানবাধিকার ক্ষুন্ন হয়নি। অতএব, যথাযথ পর্যালোচনা সাপেক্ষে আমি স্ব-প্রণোদিত হয়ে এই অনুমতি পত্রে স্বাক্ষর করছি□

Appendix. C

A Guide to the Depression, Anxiety, and Stress Scale

(DASS 21)

By Fernando Gomez- Consultant Clinical Psychologist

Introduction

The DASS-21 is a 21-item self-report questionnaire designed to measure the severity of a range of symptoms common to both Depression and Anxiety. In completing the DASS, the individual is required to indicate the presence of a symptom over the previous week. Each item is scored from 0 (did not apply to me at all over the last week) to 3 (applied to me very much or most of the time over the past week).

The essential function of the DASS is to assess the severity of the core symptoms of Depression, Anxiety, and Stress. Accordingly, the DASS allows not only a way to measure the severity of a **patient's symptoms but a means by which a patient's response to treatment can also be measured.**

The DASS and Diagnosis

Although the DASS may contribute to the diagnosis of Anxiety or Depression, it is not designed as a diagnostic tool. Indeed, several symptoms typical of Depression, such as sleep, appetite, and sexual disturbances, are not covered by the DASS and will need to be assessed independently. The DASS is not meant to replace a comprehensive clinical interview.

Suicide

Suicidality is not assessed by the DASS. Accordingly, the clinician will need to address directly this important symptom of Depression in their clinical interview.

How often to use the DASS?

Although the DASS can provide a comparison of symptoms from week to week, it is best given on first presentation and again after a period of time has lapsed long enough for the chosen treatment to have an effect. In the case of antidepressant medication, the second administration should be between the 2-4 week period after the individual has commenced taking the medication. This period is long enough for most antidepressants to be expected to show some change in the patient.

Scoring the DASS

The scale to which each item belongs is indicated by the letters D (Depression), A (Anxiety) and S (Stress). For each scale (D, A & S) sum the scores for identified items. Because the DASS 21 is a short form version of the DASS (the Long Form has 42 items), the final score of each item groups (Depression, Anxiety and Stress) needs to be multiplied by two (x2).

Interpreting the DASS

Once multiplied by 2, each score can now be transferred to the DASS profile sheet, enabling comparisons to be made between the three scales and also giving percentile rankings and severity labels.

Table 3: DASS severity ratings

(Don't forget to multiply summed scores by x 2~

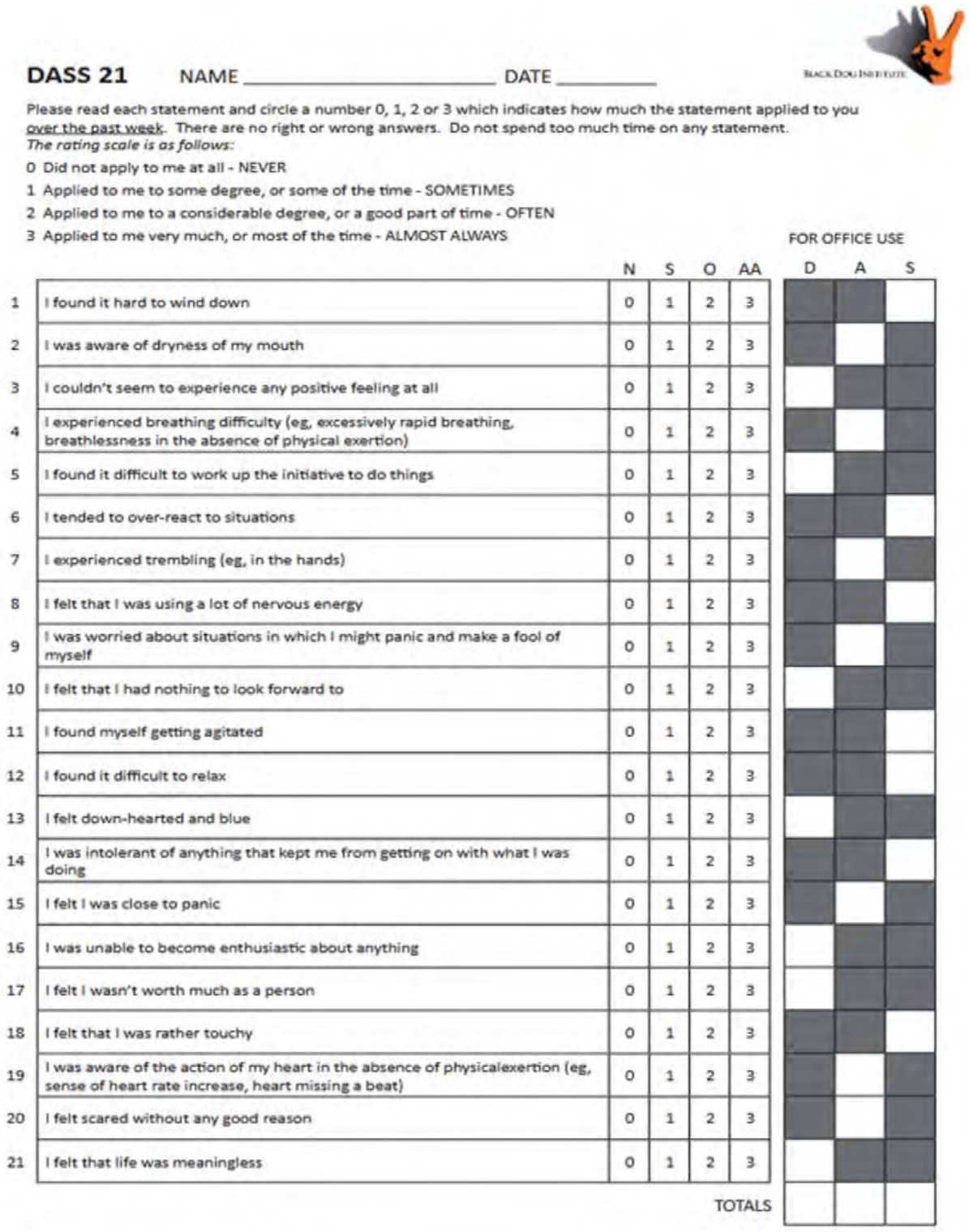
Severity	Depression	Anxiety	Stress
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extremely Severe	28+	20+	34+

As previously mentioned, the DASS should not be used on its own to assess the presence or absence of Depression or Anxiety. High scores on the DASS would certainly alert the clinician to a high level of distress in the patient and this would need to be explored further within the interview process. Similarly, low scores on the DASS should not be a substitute for a comprehensive clinical interview.

High DASS scores that are not changing may prompt the clinician to look for explanations and perhaps augment dosages or change medication. Here again, the DASS should be interpreted alongside the clinical interview.

Changes in scores in one scale (EG, Depression), with consistently high and unchanging scores in another scale (Anxiety), may alert the clinician to pay particular attention to the presence of a coexisting anxiety disorder, which may need specific treatment in its own right. Similarly, decreasing Depression scores alongside unchanging Stress scores may

alert the clinician to the presence of some life event or problem, which may need to be addressed directly.



DASS 21 NAME _____ DATE _____

Please read each statement and circle a number 0, 1, 2 or 3 which indicates how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement.
The rating scale is as follows:

0 Did not apply to me at all - NEVER
1 Applied to me to some degree, or some of the time - SOMETIMES
2 Applied to me to a considerable degree, or a good part of time - OFTEN
3 Applied to me very much, or most of the time - ALMOST ALWAYS

		N	S	O	AA	FOR OFFICE USE D	A	S
1	I found it hard to wind down	0	1	2	3			
2	I was aware of dryness of my mouth	0	1	2	3			
3	I couldn't seem to experience any positive feeling at all	0	1	2	3			
4	I experienced breathing difficulty (eg, excessively rapid breathing, breathlessness in the absence of physical exertion)	0	1	2	3			
5	I found it difficult to work up the initiative to do things	0	1	2	3			
6	I tended to over-react to situations	0	1	2	3			
7	I experienced trembling (eg, in the hands)	0	1	2	3			
8	I felt that I was using a lot of nervous energy	0	1	2	3			
9	I was worried about situations in which I might panic and make a fool of myself	0	1	2	3			
10	I felt that I had nothing to look forward to	0	1	2	3			
11	I found myself getting agitated	0	1	2	3			
12	I found it difficult to relax	0	1	2	3			
13	I felt down-hearted and blue	0	1	2	3			
14	I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3			
15	I felt I was close to panic	0	1	2	3			
16	I was unable to become enthusiastic about anything	0	1	2	3			
17	I felt I wasn't worth much as a person	0	1	2	3			
18	I felt that I was rather touchy	0	1	2	3			
19	I was aware of the action of my heart in the absence of physicalexertion (eg, sense of heart rate increase, heart missing a beat)	0	1	2	3			
20	I felt scared without any good reason	0	1	2	3			
21	I felt that life was meaningless	0	1	2	3			
					TOTALS			

Figure 7: DASS-21 (Depression Anxiety Stress Scales - 21 items) questionnaire form

DASS Severity Ratings

The DASS is a quantitative measure of distress along the 3 axes of depression, anxiety[1] and stress[2]. It is not a categorical measure of clinical diagnoses. Emotional syndromes like depression and anxiety are intrinsically dimensional - they vary along a continuum of severity (independent of the specific diagnosis). Hence, the selection of a single cut-off score to represent clinical severity is necessarily arbitrary. A scale such as the DASS can lead to a useful assessment of disturbance, for example, individuals who may fall short of a clinical cut-off for a specific diagnosis can be correctly recognised as experiencing considerable symptoms and as being at high risk of further problems.

However, for clinical purposes, it can be helpful to have 'labels' to characterise the degree of severity relative to the population. Thus, the following cut-off scores have been developed for defining mild/moderate/severe/ extremely severe scores for each DASS scale.

Note: the severity labels are used to describe the full range of scores in the population, so 'mild', for example, means that the person is above the population mean but probably sill way below the typical severity of someone seeking help (ie, it does not mean a mild level of disorder.

The individual DASS scores do not define appropriate interventions. They should be used in conjunction with all clinical information available to you in determining appropriate treatment for any individual.

[1]Symptoms of psychological arousal

[2]The more cognitive, subjective symptoms of anxiety

DASS 21 SCORE

	Depression	Anxiety	Stress
Normal	0 - 4	0 - 3	0 - 7
Mild	5 - 6	4 - 5	8 - 9
Moderate	7 - 10	6 - 7	10 - 12
Severe	11 - 13	8 - 9	13 - 16
Extremely Severe	14 +	10 +	17 +

Appendix. D

"শিক্ষা নিয়ে গড়ব দেশ
শেখ হাসিনার বাংলাদেশ"

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Ref : SEU/Pharm/CECR/022/2024 Date: 19.11.2024

Project Title: A study on the hemoglobin levels and mental health heath status among the adult females in Bangladesh

Name of the Investigators: Dr. Md. Rabiul Islam, School of Pharmacy, BRAC University and Dr. Md. Siddiqul Islam, Department of Pharmacy, Southeast University

CECR Reference No.: SEU/Pharm/CECR/022/2024

Ethical Approval

This is to certify that the research project entitled **"A study on the hemoglobin levels and mental health heath status among the adult females in Bangladesh"** presented by Dr. Md. Rabiul Islam, School of Pharmacy, BRAC University and Dr. Md. Siddiqul Islam, Department of Pharmacy, Southeast University was reviewed by Committee for Ethical Compliance in Research and was found to be compliant with Ethical Standards of Department of Pharmacy, SEU.

Dr. Israt Jahan Bulbul
Convener (Acting)
Committee for Ethical Compliance in Research