



Factors Associated with Anxiety and Depression Among Caregivers of Children with Non-Communicable Diseases in Bangladesh: A Cross-Sectional study at Bangladesh Medical University

Submitted by:

Nil Mayuri Chowdhury

Student ID: 25167006

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Master of Public Health

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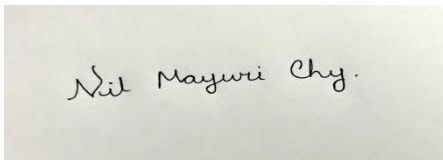
Declaration

I, Nil Mayuri Chowdhury, hereby declare that this thesis entitled "**Factors Associated with Anxiety and Depression Among Caregivers of Children with Non-Communicable Diseases in Bangladesh: A Cross-Sectional study at Bangladesh Medical University**" is an original work submitted in partial fulfilment of the requirements for the degree of Master of Public Health (MPH) at the James P. Grant School of Public Health (JPGSPH), BRAC University, Dhaka, Bangladesh.

I further declare that this work has not been submitted previously, in whole or in part, for any other degree or examination at this or any other university or institution.

All sources used in this thesis have been duly acknowledged and cited. Any assistance received has been mentioned in the acknowledgements section.

I have also added a separate declaration on GenAI use at the end of this work.



Nil Mayuri Chowdhury

Date: _____ 01/06/2026 _____



Approval

The thesis/project titled “**Factors Associated with Anxiety and Depression Among Caregivers of Children with Non-Communicable Diseases in Bangladesh: A Cross-Sectional study at Bangladesh Medical University**” submitted by

Nil Mayuri Chowdhury (Student ID: 25167006)

Of 2025-26 has been accepted as satisfactory in partial fulfilment of the requirements for the degree of Master of Public Health.

Supervisor:

Dr. Syed Masud Ahmed

Professor and Director,

Centre of Excellence for Health Systems and Universal Health

Coverage (COE-HS&UHC)

BRAC James P Grant School of Public Health, BRAC University

Departmental Head:

Santhia Ireen

Deputy Director, Education and Research

BRAC James P Grant School of Public Health, BRAC University



Ethics Statement

Ethical approval for this study was obtained from the Institutional Review Board of BRAC James P Grant School of Public Health, BRAC University (IRB reference no MPH-2025-006). Institutional approval was taken from the Faculty of Paediatrics, Bangladesh Medical University. Written informed consent was obtained from all the participants prior to data collection. All procedures conducted in this study involving human participants were in accordance with the ethical standards of the Institutional Review Board.



Abstract

Background: Non-communicable diseases (NCDs) in children require long-term care that causes physical, emotional and financial burdens on families. The mental health of caregiver is still underexplored in the Bangladeshi context even though their psychological well being directly affects the quality of care a child receives as well as overall functioning of the family..

Objectives: To assess the mental health status of caregivers of children with NCDs and identify the socio-demographic and disease-related factors associated with anxiety and depression.

Methods: A hospital-based cross-sectional study was conducted at the Department of Paediatrics, Bangladesh Medical University, between January to June 2026. A total of 310 primary caregivers of children under 18 years diagnosed with thalassemia, congenital heart disease, nephrotic syndrome, bronchial asthma, type 1 diabetes mellitus and epilepsy were recruited through convenience sampling. Anxiety and depression were assessed using the GAD-7 and PHQ-9, with a cut-off of ≥ 10 indicating clinically significant symptoms. Data were analyzed in STATA 17.0 using chi-square tests and multivariable logistic regression ($p < 0.05$).

Results: Most respondents were female (77%), mothers (76%), housewives (67%), and aged over 30 years (53%); 65% earned less than BDT 25,000 per month and 44% cared for children aged five years or younger. Overall, 61% of caregivers screened positive for anxiety and 60% for depression. In the multivariable analysis, financial stress was the strongest independent predictor of both anxiety (AOR = 4.94, 95% CI: 2.37–10.33) and depression (AOR = 4.67, 95% CI: 2.31–9.45). Caregivers of children aged five years or younger had over seven times higher odds of anxiety (AOR = 7.33) and over three times higher odds of depression (AOR = 3.40). Mothers had twice the odds of depression compared to fathers (AOR = 2.14), and caregivers in the lowest income group had five times higher odds of anxiety (AOR = 5.01).

Conclusions: Three out of five caregivers of children with NCDs in experience clinically significant anxiety or depression. Financial stress, young child age and being the mother are key independent predictors. Routine caregiver mental health screening and combined clinical and financial support should be integrated into paediatric NCD services.

Keywords: Caregivers, Anxiety, Depression, Non-communicable diseases, Children, Bangladesh



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List of Acronyms

Acronyms	Full Form
AOR	Adjusted Odds Ratio
BMU	Bangladesh Medical University
BDT	Bangladeshi Taka
CI	Confidence Interval
CHD	Congenital Heart Disease
COR	Crude Odds Ratio
GAD-7	Generalised Anxiety Disorder-7 item scale
IHME	Institute for Health Metrics and Evaluation
IRB	Institutional Review Board
JPGSPH	James P. Grant School of Public Health
LMIC	Low and Middle-Income Countries
NCD	Non-Communicable Disease
OR	Odds Ratio
PHQ-9	Patient Health Questionnaire-9 item scale
SD	Standard Deviation
UNICEF	United Nations Children's Fund
WHO	World Health Organization



Chapter 1: Introduction

1.1 Background and Rationale

Non-communicable diseases (NCDs) are now increasing worldwide and account for approximately 74% of all deaths with cardiovascular diseases, cancers, chronic respiratory diseases and diabetes being the leading causes (IHME, 2024, WHO, 2023). Nearly three-quarters of all NCD deaths happen in low and middle-income countries (LMICs) where the burden of NCDs is inequitably high (WHO, 2022). Although traditionally NCDs are considered as adult conditions, it substantially affect children, adolescents, and young adults and an estimated 2.1 billion individuals under 20 years are living with at least one NCD globally (UNICEF, 2023). In South Asia, childhood NCDs contribute to over 1.2 million deaths annually among children under 15 years with respiratory diseases and congenital anomalies (Kyu et al., 2016).

Caregivers play a crucial role in the management and overall care of persons living with NCDs (Aman et al., 2019). They can be the parents of the children or the siblings as well as other members of their family or professionally hired individuals (Namkung et al., 2016). In many societies, caregiving is seen as a normative social and familial responsibility but we often forget that providing care takes a large amount of time and effort daily (Cham et al., 2024; Namkung et al., 2016). Children with chronic NCD's need long term care and continuous monitoring which includes treatment adherence, frequent hospital visits and checking carefully for progression and complications (Cham et al., 2024). This overburden and responsibilities lead to social isolation and deteriorate their mental health condition (Soh et al., 2025).

Despite the growing burden of childhood NCDs in Bangladesh, research on caregiver mental health remains limited and fragmented. Comprehensive data on caregiver mental health across other major childhood NCDs such as congenital heart disease, type 1 diabetes, nephrotic syndrome, epilepsy and asthma remain virtually absent in the Bangladeshi context. A critical data gap exists regarding the relationship between sociodemographic factors particularly parental education, household income and psychological distress among caregivers of children with NCDs in Bangladesh.

International studies have found link between low socioeconomic status and higher caregiver burden (Entsua-Mensah et al., 2024); however there is a lack of context specific evidence in bangladesh. Similarly, factors related to diseases (such as duration of illness, frequency of hospitalizations, treatment complexity) have not been systematically studied as predictors of caregiver mental health in the Bangladesh context. Studies from neighboring countries like India and Pakistan have shown



that severity of disease and economic burden are major determinants of anxiety and depression among caregivers (Mangla et al., 2023; Rajput et al., 2015), but these findings may not be directly applicable to Bangladesh due to differences in healthcare systems, culture and social support. To develop and design equitable and family-focused NCD interventions, it is crucial to understand how parental education and household income affects psychological stress and health-seeking behaviour.

This study aims to fill this gap by assessing the psychological state such as anxiety and depression among caregivers of children with NCDs in Bangladesh and examining the sociodemographic and disease related factors that shape their mental health state. Beside care givers, the findings of this study will be significant for multiple stakeholders, including policymakers, health system planners, and healthcare providers. The data will provide evidence to integrate mental health screening policy of the relevant caregivers, and this approach will improve their overall quality of life. Evidence from this study can inform the integration of caregiver mental health screening into routine pediatric NCD care. It will also provide crucial evidence to advocate for policy reforms and resource allocation toward family-centered NCD care that includes caregiver mental health support as an integral component.

1.2 Problem Statement

A critical evidence gap exists regarding the mental health status of caregivers of children with NCDs in Bangladesh. Most of the published studies address a single disease type (primarily thalassemia) and it does not systematically analyze the sociodemographic and disease related factors as determinants of psychological stress. Without the evidence it is not possible to identify the caregivers who are at risk of anxiety and depression nor to advocate effectively for the integration of mental health screening into Paediatric NCD care services.

1.3 Research Questions

What is the mental health (generalized anxiety disorder and depression) status of caregivers of children with non-communicable diseases, and which socio-demographic, and disease-related factors are associated with their mental health in Bangladesh?

1.4 Study Objectives

1.4.1 Overall Objective

To assess the mental health status of caregivers of children with non-communicable diseases and to identify the socio demographic and disease related factors associated with their mental health status.



1.4.2 Specific Objectives

- To assess the state of mental health (generalized anxiety disorder and depression), among caregiver's s of children with non-communicable diseases.
- To explore the association between the socio-demographic factors and the mental health status of caregivers.
- To explore the association between disease-related factors (type of non-communicable disease, duration of illness and number of affected children in the family etc.) associated with caregivers' mental health.

1.5 Structure of the Thesis

This thesis is organized into six chapters. Chapter 1 provides the introduction, background, and study objectives. Chapter 2 presents a comprehensive review of existing literature. Chapter 3 outlines the methodology used in this study. Chapter 4 presents the findings. Chapter 5 provides a discussion and interpretation of the results in light of existing evidence. Chapter 6 concludes the thesis with key conclusions, recommendations, and limitations.

Chapter 2: Literature Review

2.1 Global Evidence

Looking after a child with a chronic NCD is one of the strongest predictors of poor mental health in adults. Cohn et al. (2020), in a large systematic review and meta-analysis of 41 studies, showed that parents of children with chronic illness have worse physical and mental health than parents of healthy children and that depression, anxiety and chronic stress are the most common problems. Soh et al. (2025), stated in their meta-analyses on informal caregivers, reported prevalence of around 33.35% for depression and 35.25% for anxiety across diverse caregiving populations. Franck et al. (2025), in a prospective multi-country cohort survey of 3,350 parents of hospitalised children across 14 countries, reported clinically concerning depression symptoms in 49.7% and anxiety symptoms in 69.0%, with poorer ratings of the child's health, housing insecurity and lack of social support all associated with worse outcomes.

The picture differs a little by disease, but the pattern is consistent. For congenital heart disease, Woolf-King et al. (2017) reviewed 30 studies and reported that 25% to 50% of parents had clinically significant depression or anxiety, while Biber et al. (2019) put the figure for severe psychological



distress as high as 30% to 80% in some settings. In the context of type 1 diabetes, Bassi et al. (2021) reviewed the evidence and found that parental stress, anxiety and depression are common and closely related to the daily demands of glycaemic management and Bazus et al. (2024) showed that higher the number of the procedures, dietary restrictions and night-time checks a parent has to manage, the worse their emotional state tends to be. For epilepsy, Ernest et al. (2025) found depression prevalence of 31% and an anxiety prevalence around 48% among caregivers attending a paediatric neurology clinic in Tanzania. For paediatric cancer, recent meta-analytic work has pooled depression at around 42% and anxiety at around 47% (Soh et al., 2025). Esezobor et al. (2020) reported high level of caregiver burden and psychological distress in Nigeria in case of nephrotic syndrome.

Two things stand out from the global evidence. First, no matter which chronic NCD is studied, around 30% to 60% of caregivers report clinically significant mental health problems. Second, mothers consistently report worse outcomes than fathers.

2.2 Evidence from low and middle-income countries

In LMIC settings the same patterns appear, but there are other issues also. Out-of-pocket spending on medicines, hospital visits and travel pushes families into financial crisis at the same time as they are dealing with the emotional weight of a child's chronic illness. Jaspers et al. (2015), in a systematic review across LMICs, showed that NCDs are one of the leading causes of catastrophic and impoverishing health spending at the household level. Bukhman et al. (2020), writing for The Lancet NCDI Poverty Commission, argued that poor families face a double burden where the diseases that affect their children are exactly the ones with the highest out-of-pocket cost.

In the study conducted by Entsua-Mensah et al. (2024) in Ghana, 42.9% of parents of children with CHD had clinically significant psychological distress and household income and treatment cost were to be found as predictors. Abuosi et al. (2015) also from Ghana demonstrated that the cost of having a child with an NCD was significant and that there was a correlation between the costs and parental distress. In Mexico, Toledano-Toledano and Luna (2020) studied family caregivers of children with chronic disease and reported that the psychosocial profile was mostly affected by financial worry, social isolation and emotional exhaustion, with mothers being more burdened than fathers.

Ahun et al. (2024), in a study from northern Ghana showed that mental health of the caregiver impacts not only the caregiver but also the child and poor caregiver mental health is associated with worse academic and socio-emotional outcomes in school going children. This is important because it shows caregiver mental health is not a separate issue but as a part of the child's health outcomes as well.



2.3 Evidence from South Asia

Within South Asia, evidence is different across diseases and countries. Most studies focus on a single condition, usually thalassaemia and most are based at a single tertiary hospital. There is no published South Asian study that compares caregiver mental health across multiple priority paediatric NCDs in the same sample, which is one of the gaps this thesis tries to address.

For thalassaemia, Mangla et al. (2023) examined 100 caregivers of children with beta-thalassaemia major in Vadodara, India and found high rates of depression and anxiety which were strongly related to caregiver burden scores measured on the Zarit Burden Interview. Rajput et al. (2015) had similar findings from Hyderabad, Pakistan, where socio-economic status and duration of disease were significant predictors. Anum and Dasti (2015), in a study of parents of children with beta-thalassaemia in Pakistan and found that spirituality and social support also protected the caregivers against psychological distress which highlights the importance of cultural context while designing interventions. In Pakistan, Sikandar et al. (2024) referenced the load of the thalassaemia caregiver as physical, emotional and financial burden. Mahani et al. (2023), studying caregivers of children with thalassaemia in Iran found associations between caregiver burden, depression and diminished quality of life.

2.4 Evidence from Bangladesh

In Bangladesh, NCD is responsible for 61% of total disease burden according to Ieder (2025). In this overall burden, childhood NCDs are neglected and their caregivers are receiving less attention in the policies. The published evidence on caregiver mental health for children with NCDs is thin and almost entirely confined to thalassaemia. The most recent and most relevant study is Islam et al. (2025), who studied 156 mothers of children with thalassaemia at the Bangladesh Thalassaemia Samity Hospital using the DASS-21. They reported clinically significant depression in around 63% of mothers, anxiety in around 58%, and stress in around 62%, with socio-economic status, child's age at diagnosis and disease duration as significant predictors. Their findings closely match the South Asian and LMIC evidence like the studies conducted in Pakistan and Ghana and suggest that Bangladesh is not an exception to the broader pattern (Abuosi et al., 2015).

Beyond thalassaemia, the evidence is essentially missing. There are no published Bangladeshi studies that look at caregiver mental health in paediatric congenital heart disease, type 1 diabetes, nephrotic syndrome, asthma or epilepsy. There are also no published studies that compare caregiver mental health across multiple priority paediatric NCDs in a single sample, which means it is not yet possible



to say whether the mother of a child with epilepsy in Bangladesh faces a similar or different burden to the mother of a child with thalassaemia.

2.3 Conceptual Framework

This conceptual framework adapted from Ernest et al. (2025), Thomas et al. (2023), and Adib-Hajbaghery and Ahmadi (2019), shows the main factors that influence parental mental health among caregivers of children with NCDs. In this study, parental mental health refers to generalized anxiety disorder and depression. Among the NCDs in children we have included thalassemia, congenital heart disease, nephrotic syndrome, bronchial asthma, type 1 diabetes mellitus, or epilepsy as these diseases were declared as priority NCD diseases by ICDDR,B (ICDDR,B; 2025).

The framework highlights two major groups of influencing factors: sociodemographic factors and disease-related factors. The grouping of these two domains was informed by Ernest et al. (2025), whose cross-sectional study among caregivers of children with epilepsy in Tanzania used a similar structure to examine factors associated with depression and anxiety using the PHQ-9 and GAD-7. It shows that both sociodemographic and disease-related factors directly influence parental mental health. Together these factors explain why some caregivers experience higher psychological distress than others. This framework guides the selection of study variables and supports the analysis of factors affecting parental mental health in the study population.

Sociodemographic factors include caregivers' income, education level, age, gender, relationship to the child, and number of children in the family. These variables were retained from Ernest et al. (2025) and Adib-Hajbaghery and Ahmadi (2019), both of whom reported these characteristics as significant correlates of caregiver mental health and burden. These factors affect caregivers' access to resources, understanding of the child's illness and other factors. For example, lower income and education may increase financial stress and limit access to healthcare which can negatively affect parents' mental well-being.

Disease-related factors include the severity of the child's disease, frequency of hospitalization, duration of illness and the child's age and gender. These variables were adapted from Ernest et al. (2025) and Thomas et al. (2023), who linked illness-related characteristics to higher levels of parental distress. Children with severe or long-term illness often require more intensive care, which increases physical and emotional stress for caregivers.

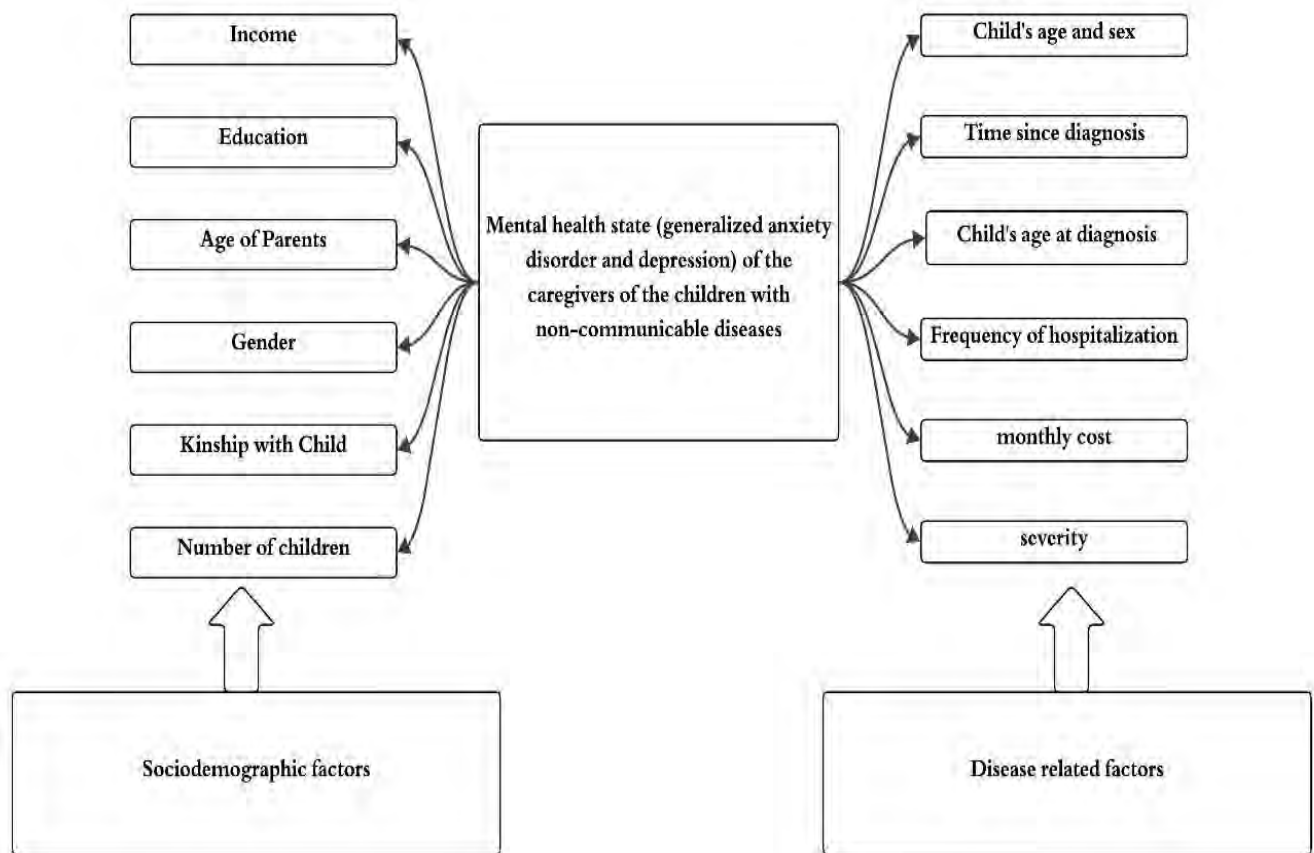


Figure 1 Conceptual Framework (Ernest et al., 2025, Thomas et al., 2023 Adib-Hajbaghery et al: 2019)

Chapter 3: Methods

3.1 Study Design

A hospital-based cross-sectional, quantitative study was conducted. It was chosen as it is appropriate for estimating the prevalence of mental health outcomes and examining their associations with sociodemographic and disease related factors at a single point in time which aligned with the study objectives and was feasible within the available study period (Ernest et al. 2025, Islam et al., 2025).

3.2 Study Area and Setting

The study was conducted in both the inpatient and outpatient services of the Faculty of Paediatrics at Bangladesh Medical University (BMU) across different departments (general paediatrics, paediatrics hematology and oncology, paediatric neurology, paediatric endocrinology, paediatric pulmonology,



paediatric cardiology, paediatric nephrology) located at Shahbagh, Dhaka. It is the only super-specialised, tertiary level government hospital in Bangladesh that serves patients referred from across the country for advanced and specialised paediatric care. This setting was selected as it provides access to caregivers of children with diverse NCD diagnoses, including those from across all divisions of Bangladesh, which ensures diverse socioeconomic and geographic backgrounds within the study. The implications of conducting the study at a single national tertiary centre are important and are addressed explicitly in the limitations: caregivers presenting at BMU have, on average, children with more advanced or complex disease, longer travel distances, and higher out-of-pocket costs than those managed at district or upazila level (Bangladesh Medical University <https://www.bmu.ac.bd/>).

3.3 Study Period

The study was conducted between January and June 2026. Data collection was carried out from March 2026 to April 2026, spanning approximately eight weeks.

3.4 Study Population

3.4.1 Study Population

Primary caregivers of children <18 years of age with non-communicable disease (thalassemia, congenital heart disease, nephrotic syndrome, bronchial asthma, type 1 diabetes mellitus, and epilepsy) who were admitted under the department of paediatrics BMU during the study period.

3.4.2 Inclusion and Exclusion Criteria

Inclusion criteria:

- Primary caregivers of children <18 years of age admitted at BMU or visiting at outdoor in BMU due to NCDs.
- Children diagnosed with one of the following non-communicable diseases: thalassemia, congenital heart disease, nephrotic syndrome, bronchial asthma, type 1 diabetes mellitus, and epilepsy. (ICDDR,B; 2025).
- Primary caregivers who provide informed written consent to participate in the study.

Exclusion criteria:



- Parents or caregivers of children admitted for conditions other than the specified non communicable diseases.
- Parents or caregivers who are unwilling to participate in the study.
- Caregivers who are professionally hired by their family as their role is more contractual and they do not share same financial or emotional burden as the caregivers who are related.

3.5 Sample Size Calculation

The sample size for this study was calculated using the single population proportion formula based on different prevalence estimates of mental health problems among caregivers reported in previous studies. For each prevalence reported in earlier studies, a corresponding sample size was estimated; the prevalence of 42.9% (depression among parents of children with congenital heart disease in Ghana) was selected because it yielded the largest sample size, closest to 50% ensuring a conservative estimate and is also a LMIC country context similar to Bangladesh health system (Entsua-Mensah et al., 2024).

The following standard formula is widely used in determining sample size:

$$n = \frac{z^2 p(1 - p)}{d^2}$$

Here,

n = the desired sample size

Z = 1.96, which corresponds to 95% confidence interval (value for error)

*p = 42.9% = 0.429 (Entsua-Mensah et al., 2024)

q = 1 - p (q is the portion of the population not having the characteristics)

= (1 - 0.429) = 0.571



d= Degree of accuracy which is considered as 5% or 0.05

$n \approx 376.8 \rightarrow$ Rounded to 377

Adjusting for an anticipated 10% non-response rate, the target sample size for the interview was 418.

Owing to a single study site and the eight-week data collection window, the achieved sample size was 310, representing 74.2% of the target. The achieved sample provides 80% power to detect an odds ratio of approximately 1.9 or greater at $\alpha = 0.05$ for an exposure with 50% prevalence in the unexposed group, which is consistent with the magnitudes reported in comparable studies.

3.6 Sampling Technique

A convenience sampling approach was used due to its practicality and suitability for the study setting (Elfil & Negida, 2017). This method was feasible for efficient data collection within limited time and resources while reducing selection bias compared to simple convenience sampling. The accompanying adult caregiver was screened for eligibility and if eligible he/she was invited to participate. Each day during data collection, eligible caregivers were interviewed from both inpatient and outpatient department.

3.7 Variables

3.7.1 Dependent Variable(s)

The primary outcome variables for this study were:

- I. Generalized anxiety disorder, measured by GAD-7 score and categorized as present (score ≥ 10) or absent (score < 10).
- II. Depression, measured by PHQ-9 score and categorized as present (score ≥ 10) or absent score < 10 .

3.7.2 Independent Variables

Sociodemographic variables: Caregiver age (≤ 30 ; > 30 years), sex (female; male), kinship to child (mother; father; other), place of residence (urban; rural), religion, marital status, educational attainment (no formal/primary; secondary or higher), occupation, household size (≤ 4 ; > 4), family decision-making role, and monthly household income in BDT ($< 15,000$; 15,000–24,999; 25,000–49,999; $\geq 50,000$).



Disease-related variables: child's sex; child's current age (≤ 5 ; 6–10; 11–18 years); child's age at diagnosis (≤ 5 ; 6–10; 11–18 years); type of NCD (thalassaemia, CHD, nephrotic syndrome, asthma, type 1 diabetes, epilepsy); time since diagnosis (< 1 year; 1–2 years; ≥ 3 years); number of hospitalisations in the past six months (0–1; 2–3; ≥ 4); monthly treatment cost in BDT; distance to nearest health facility (< 5 km; 5–10; 11–20; 21–50; > 50 km); requirement for daily medication; requirement for special diet; experience of life-threatening complications; requirement for assistance with daily activities.

3.7.3 Operational definitions:

To make the main study concepts clear and consistent throughout the thesis, the following operational definitions are used:

Non-communicable disease (NCD): A disease of long duration that is not transmitted directly from one person to another and that results from a combination of genetic, physiological, environmental and behavioural factors (World Health Organization [WHO], 2023). In this study, the term refers specifically to six priority paediatric NCDs identified by icddr,b (2025): thalassaemia, congenital heart disease, nephrotic syndrome, bronchial asthma, type 1 diabetes mellitus, and epilepsy. Children diagnosed with at least one of these conditions by a treating clinician at BMU were eligible for inclusion.

Mental health: A state of mind characterized by emotional well-being, good behavioral adjustment, relative freedom from anxiety and disabling symptoms, and a capacity to establish constructive relationships and cope with the ordinary demands and stresses of life. (American Psychiatric Association [APA], 2013).

Caregiver: A person who provides ongoing assistance to someone who cannot fully care for themselves because of age, illness or disability (Family Caregiver Alliance, 2014). In this study, the term refers to an informal primary caregiver, defined as a relative (most commonly a parent) who provides unpaid, day-to-day care for a child aged below 18 years with one of the six priority NCDs listed above. Professionally hired carers were excluded. Where more than one adult accompanied the child, the primary caregiver was the adult most involved in the child's daily care; ties were resolved by lottery.

Anxiety: In clinical terms, anxiety refers to excessive worry and apprehensive expectation about a number of events or activities, occurring more days than not, that the person finds difficult to control



and that is associated with restlessness, fatigue, difficulty concentrating, irritability, muscle tension or sleep disturbance (American Psychiatric Association [APA], 2013). In this study, anxiety was screened by a total score of ≥ 10 on the GAD-7 (Spitzer et al., 2006), which is a common screening cut-off that corresponds to moderate or higher symptom severity.

Depression: In clinical terms, depression refers to a persistent state of low mood or loss of interest or pleasure, accompanied by symptoms such as changes in sleep or appetite, fatigue, feelings of worthlessness or guilt, difficulty concentrating, and thoughts of self-harm, that cause distress or impair functioning (APA, 2013). In this study, depression was screened by a total score of ≥ 10 on the PHQ-9 (Kroenke et al., 2001), a widely used screening cut-off that corresponds to moderate or higher symptom severity.

3.8 Data Collection

3.8.1 Data Collection Tools

A structured questionnaire was developed based on a review of existing literature on caregiver mental health in the context of childhood NCDs (Ernest et al., 2025; Thomas et al., 2023; Entsua-Mensah et al., 2024; Islam et al., 2025).

Sociodemographic components: Age of the caregiver, sex, educational status, household income, family size, kinship with child, number of children and number of children with NCDs

Disease related components: child's age, sex, disease the child is suffering from, year of diagnosis, frequency of hospitalization.

Identification of mental health state: The mental health status of parents or primary caregivers was measured using two standard tools: the Patient Health Questionnaire 9 (PHQ 9) for depression and the Generalized anxiety disorder 7 (GAD 7) for generalized anxiety disorder. (Yaqoob et al., 2018)

Psychological distress among caregivers is multidimensional and cannot be adequately captured using a single screening instrument. Anxiety and depression are related but distinct mental health conditions and caregivers of children with chronic non-communicable diseases may experience one or both simultaneously. Using both the GAD-7 and PHQ-9 allowed us for a more comprehensive assessment of caregivers' mental health by identifying symptoms of anxiety and depression separately (Chakravartty et al., 2025). This dual assessment improved the accuracy of mental health



screening and helped to avoid underestimation of psychological burden that may occur if only one condition is measured.

Generalized Anxiety Disorder 7-item scale (GAD-7)

The GAD-7 is a validated screening tool used to assess the severity of anxiety symptoms over the past two weeks. It consists of seven items that measure key anxiety-related symptoms such as excessive worry, nervousness, restlessness, difficulty relaxing, irritability, fear of something awful happening, and inability to control worrying. Each item is scored on a four-point Likert scale ranging from 0 to 3, with higher scores indicating greater severity of anxiety symptoms. (Spitzer et al., 2006)

Patient Health Questionnaire 9-item scale (PHQ-9)

The PHQ-9 is a widely used screening instrument for assessing depressive symptoms based on diagnostic criteria for depression. It includes nine items that assess core components of depression such as low mood, loss of interest or pleasure, sleep disturbances, fatigue, appetite changes, feelings of worthlessness or guilt, difficulty concentrating, psychomotor changes, and thoughts of self-harm. Similar to the GAD-7, each item is scored on a four-point Likert scale, and higher total scores reflect greater severity of depressive symptoms. (Kroenke et al., 2001).

The GAD-7 and PHQ-9 were administered in Bangla. For each scale, a previously validated Bangla version was used rather than translating the instruments from scratch. For the GAD-7, the Bangla version validated by Redwan et al. (2020) in the general Bangladeshi population was used. For the PHQ-9, the Bangla version validated by Mia et al. (2025) among Bangladeshi adults was used. Both versions have been shown to perform well in Bangla speakers, with good internal consistency and structure comparable to the original English instruments (Chakravartty et al., 2025). A small number of wording adjustments were made to make the items easier to follow in everyday spoken Bangla, but the structure, response options and scoring of both scales were kept exactly as in the validated versions.

3.8.2 Pretesting

The questionnaire was pretested with 15 caregivers at BMU who were not later added to main study. Minor changes were made in the questionnaire based on the feedback and interview response to improve the clarity of the study such as in previous questionnaire, multiple response was not included in the questions regarding disease. After the interview we found that a child can suffer from multiple NCDs and it was added later in questionnaire..



3.8.3 Data Collection Procedure

Each day, interviewer approached the primary caregivers of pediatric patients diagnosed with non-communicable diseases (NCDs) admitted at BMU as well as patients from outpatient department. The accompanying adult, identified as the parent or primary caregiver was screened for eligibility according to the inclusion and exclusion criteria. Eligible caregivers were approached, informed about the purpose and procedures of the study and invited to participate.

Written informed consent was obtained before starting the interview. The interview was conducted in bedside ensuring proper confidentiality and comfort of the respondents. The interview duration was on average 30 minutes. In cases where more than one caregiver accompanied the same child, only one participant was selected, preferably the primary caregiver who was most involved in the child's daily care.

Data were collected using the KoboToolbox digital platform. The interviews were carried out in Bangla, the local language to ensure better understanding and accurate responses (Islam et al., 2025).

3.9 Data Management and Quality Assurance

Data collected through KoboToolbox were downloaded daily and stored in a password protected computer accessible only to the research team. Data were checked regularly for completeness and consistency. Initially, it was planned that in cases of missing values for continuous variables, the mean of nearby data points would be used and for categorical variables, responses would be cross-checked with respondents. If multiple missing values were found for a single respondent, that response would have been dropped before analysis. However, data was collected with a structured questionnaire digitally by KoboToolbox and most data fields were configured as required so there were no missing values in the final dataset.

3.10 Data Analysis

All quantitative data analyses were performed using STATA version 17.0. Data exported from KoboToolbox were first imported into STATA, where preliminary cleaning, recoding, and consistency checks were carried out. Both categorical and continuous variables were assigned appropriate value labels before analysis. The level of statistical significance was set at $p < 0.05$ and all confidence intervals are reported at 95%. The analysis proceeded in three steps:

- I. Descriptive analysis of sociodemographic, disease-related, and mental-health variables
- II. Bivariate analysis to identify factors associated with anxiety and depression and



- III. Multivariable binary logistic regression to estimate adjusted odds ratios for factors independently associated with each outcome.

3.10.1 Construction of outcome variables

The two primary outcome variables, generalized anxiety disorder and depression, were constructed from GAD-7 and PHQ-9 scales, respectively. In accordance with the validated scoring guidelines and the cut-offs adopted from other studies of caregivers of children with chronic non-communicable diseases (Ernest et al., 2025; Yaqoob et al., 2018), a total score of ≥ 10 was used as the threshold for clinically significant anxiety (GAD-7) and depression (PHQ-9). For each outcome, a binary variable was generated where 1 indicated the presence of the condition (score ≥ 10) and 0 indicated its absence (score < 10).

3.10.2 Descriptive analysis

Descriptive statistics were used to summarize the characteristics of the study participants and the prevalence of mental-health outcomes. Categorical variables (including sex, kinship with the child, place of residence, religion, marital status, education, occupation, household size, family decision-making role, income group, awareness of NCDs prior to diagnosis, presence of caregiver's own chronic illness, child's sex, child's age group, type of disease, time since diagnosis, hospitalizations in the last six months, treatment cost, financial stress, adequate information from providers, distance to facility, daily medication requirement, special diet, life-threatening complications, daily assistance needs, and stigma) were summarized as frequencies and percentages. The prevalence of anxiety, depression, and their co-occurrence was reported as percentages with 95% confidence intervals.

3.10.3 Bivariate analysis

Bivariate associations between each explanatory variable and the two outcomes (anxiety and depression, separately) were examined using Pearson's chi-square test of independence for categorical predictors. Where expected cell counts were below five, Fisher's exact test was used instead, or sparse categories were collapsed before running the test, so that the assumptions of the chi-square test were not violated.

3.10.4 Multivariable logistic regression (adjusted odds ratios)

Two separate binary logistic regression models were fitted to identify factors independently associated with anxiety and depression. Adjusted odds ratios (AORs) with 95% confidence intervals were obtained from the multivariable model. A p-value of less than 0.05 in the final multivariable model was considered indicative of a statistically significant independent association. Collinearity



between each correlated pair was checked using pairwise correlation coefficients and variance inflation factors. Where two variables overlapped, one was retained on a priori grounds and the other was dropped. First, caregiver sex and kinship to the child were strongly correlated (mothers were almost all female and fathers all male); kinship was retained because it carries more substantive meaning in the South Asian caregiving context, and caregiver sex was dropped. Second, the child's current age and the child's age at diagnosis were strongly correlated (84% of children were diagnosed at or before five years of age); the child's current age was retained because it captures the present caregiving demand, while age at diagnosis was dropped. Third, perceived financial stress, household income and monthly treatment cost all relate to the family's economic situation; perceived financial stress was retained as the most direct measure of the caregiver's experience and household income was retained as an objective marker of socio-economic status, while monthly treatment cost was dropped because of its high correlation with perceived financial stress (Spearman $\rho = 0.62$). After these exclusions, all retained predictors showed variance inflation factors below 2.5, indicating no remaining multicollinearity problem. Model fit was assessed using the Hosmer–Lemeshow goodness-of-fit test, with $p > 0.05$ indicating acceptable fit; both final models met this threshold (anxiety model: $p = 0.42$; depression model: $p = 0.31$).

3.11 Ethical Considerations

- Ethical approval was obtained from the Institutional Review Board (IRB) of BRAC James P Grant School of Public Health prior to data collection. For data collection, a written permission was also be taken from the DEAN of Paediatrics, Bangladesh Medical University (BMU), Dhaka.
- Participation in the study was entirely voluntary. All eligible participants were informed about the purpose of the study and their rights as participants.
- Written informed consent was obtained from all respondents before conducting interviews. Participants were clearly informed about their right to refuse participation or to withdraw from the study at any point of time.
- Confidentiality and privacy of participants were strictly maintained throughout the study. All collected data is stored securely in password-protected electronic files and locked storage for any hard copies, accessible only to the research team.
- The ninth item of PHQ9 assesses the thoughts of self-harm. Out of 310 participants, 9 participants expressed thoughts of self-harm, the interviewer provided immediate supportive communication with the family members and referred them to the Department of Psychiatry



at Bangladesh Medical University. This procedure was also conducted at respectful manner while maintaining confidentiality.

Chapter 4: Results

This chapter presents the findings of the cross-sectional study conducted among primary caregivers of children with NCDs attending the Department of Paediatrics, Bangladesh Medical University (BMU). A total of 310 caregivers were interviewed during the span of two months of data collection. Mental health status was assessed using the tools GAD-7 for anxiety and the PHQ-9 for depression, with a cut-off score of ≥ 10 used to define both outcomes. Results are presented in four sections:

- i. Sociodemographic and disease related characteristics
- ii. Prevalence and severity of anxiety and depression
- iii. Bivariate associations
- iv. Multivariate logistic regression findings

4.1 Characteristics of caregivers and children with NCDs

A total of 310 primary caregivers participated in the study and among them most of the respondents were female (77%). Mothers were almost three-quarters of all the caregivers (76%) and fathers were 23%. Other relatives (grandparents and maternal aunt) were 1%. Most of the respondents were married (93%). 64.5% (n=200) had completed secondary or higher levels of education, whereas 35.5% had no formal or only primary education. Two-thirds of the respondents were housewives (67%), 23% were engaged in informal or self-employment. Nearly all caregivers were identified as Muslim (94%).

More than half of the participants reported their household had more than four members (n = 187, 60%) and 29% identified themselves as the head of the household. Regarding monthly family income, 44% reported their income is between BDT 15,000 and 24,999, 31% between BDT 25,000 and 49,999, 21% earned less than BDT 15,000 and only 4% reported income of BDT 50,000 or more (n=14). Almost half of the caregivers had two children under the age of 18 years (54%) and 97% reported having only one child with an NCD. Place of residence was approximately even distributed and among them, 51% living in urban areas and 49% in rural areas. 76.5% respondents reported that they had not hear of childhood NCDs before their child was diagnosed and 15.5% of caregivers reported having a chronic medical condition themselves. Detailed socio-demographic characteristics are presented in Table 1.



Table 1: Socio-demographic characteristics of caregivers (N = 310)

Characteristic	n	%
Sex of respondent		
Female	238	77
Male	72	23
Age of respondent		
≤30 years	147	47
>30 years	163	53
Kinship with child		
Mother	234	76
Father	72	23
Others (grandparent/relative)	4	1
Marital status		
Married	289	93
Widow/Widower	8	3
Separated/Divorced	13	4
Highest educational qualification		
No formal/primary	110	35.5
Secondary or higher	200	64.5
Occupation		
Housewife	208	67
Formal employment	30	10
Informal/self-employed	72	23
Religion		
Islam	292	94
Hinduism	18	6
Household size		
4 or less	123	40
More than 4	187	60
Family head (decision-maker)		
No	220	71
Yes	90	29
Monthly family income (BDT)		
< 15,000	65	21
15,000–24,999	135	44
25,000–49,999	96	31
≥ 50,000	14	4
Number of children under 18 year		
1 child	87	28
2	166	54
3 or more	57	18
Number of Children with NCDs		
1	301	97



2	7	2
3	2	1
Place of residence		
Rural	152	49
Urban	158	51
Heard about childhood NCDs before diagnosis		
No	237	76.5
Yes	73	23.5
Caregiver has a chronic medical condition		
No	262	84.5
Yes	48	15.5

4.2 Children and their disease-related factors

Regarding the children and their disease-related characteristics, more than half of the children were male (55%) and 45% were female. 44% were aged five years or less, 36% were between 6 and 10 years and 20.0% were between 11 and 18 years. The majority of children were diagnosed before the age of five years (84%) and 13% diagnosed between 6 and 10 years.

Regarding the type of disease, thalassemia was the most commonly found (30%), then epilepsy (24%), and congenital heart disease (23%).

In last 6 months, 44% of children had been hospitalised two to three times, 30% four or more times, and 26% (n = 81) had been hospitalised once or not at all. Most families reported a monthly treatment cost between BDT 5,001 and 10,000 (56%) and 32% spent BDT 5,000 or less. Over half of the caregivers (54%) lived more than 50 km from the nearest health facility.

Three-quarters of the caregivers (75.5%) reported facing financial stress related to their child's illness, while 14% reported feeling ashamed of their child's condition.

Table 2: Child- and disease-related characteristics (N = 310)

Characteristic	Frequency (n)	Percentage (%)
Sex of child		
Female	140	45
Male	170	55
Current age of child		
≤5 years	137	44
6–10 years	111	36



Characteristic	Frequency (n)	Percentage (%)
11–18 years	62	20.0
Age of child at diagnosis		
≤5 years	261	84
6–10 years	39	13
11–18 years	10	3
Disease of child (multiple response)		
Thalassemia	92	30
Epilepsy	73	24
Congenital heart disease	71	23
Nephrotic Syndrome	53	17
Bronchial asthma	21	7
Type 1 diabetes	3	1.0
Time since diagnosis		
Within 1 year	79	26
Within 2 years	72	23
≥ 3 years	159	51
Number of hospitalisations (last 6 months)		
0–1	81	26
2–3	135	44
4 or more	94	30
Monthly treatment cost (BDT)		
≤ 5,000	99	32
5,001–10,000	174	56
10,001–20,000	33	11
> 20,000	4	1
Distance to nearest health facility		
< 5 km	5	1
5–10 km	28	9
11–20 km	55	18
21–50 km	55	18
> 50 km	167	54
Child requires daily medication		
Yes	285	92
No	25	8
Child requires special diet		



Characteristic	Frequency (n)	Percentage (%)
Yes	184	59
No	126	41
Child experienced life-threatening complication		
Yes	146	47
No	164	53
Child requires assistance with daily activities		
Yes	137	44
No	173	56
Caregiver facing financial stress		
Yes	234	75.5
No	76	24.5
Caregiver felt ashamed of child's illness		
Yes	44	14
No	266	86

4.3 Prevalence of anxiety and depression

After using GAD-7 and PHQ-9 on the 310 caregivers, 61% screened positive for anxiety (GAD-7 ≥ 10) and 60% screened positive for depression (PHQ-9 ≥ 10).

Table 3: Prevalence of anxiety (GAD-7 ≥ 10) and depression (PHQ-9 ≥ 10) among caregivers (N = 310)

Characteristics	Frequency (n)	Percentage (%)
Presence of anxiety (GAD-7 ≥ 10)		
Present	188	61
Absent	122	39.4
Presence of depression (PHQ-9 ≥ 10)		
Present	185	60
Absent	125	40.3

GAD-7 ≥ 10 = presence of anxiety (Ernest et al., 2025). n = frequency. PHQ-9 ≥ 10 = presence of depression (Ernest et al., 2025). n = frequency



4.4 Association between socio-demographic and disease factors and presence of anxiety among caregivers

Bivariate analysis using the chi-square test was done to examine the association between socio-demographic and disease-related factors and the presence of anxiety among caregivers. The results are presented in Table 4.

Female caregivers were more likely to suffer from anxiety than male caregivers (84.0% vs. 16.0%). In relation with that, mothers reported anxiety about 84% of caregivers compared to 15% fathers and 1% other relatives ($p < .001$). Rural residence was significantly associated with anxiety, with 57% of caregivers compared to 43% of those without anxiety ($p = .001$). Caregivers aged 30 years or younger were more likely to have anxiety than other caregivers (56% vs. 44%, $p < .001$).

Monthly household income was significantly associated with anxiety ($p < .001$). Among caregivers with anxiety, 27% had a household income below BDT 15,000 compared with 11% among those without anxiety.

Disease-related factors were also significantly associated with anxiety. Anxiety was more common when the child had been diagnosed at five years of age or younger and when the child's current age was five years or below (57% vs. 24%, $p < .001$). The number of hospitalizations in the past year was also significantly associated with anxiety ($p < .001$); 54% of caregivers with anxiety reported two to three hospitalizations compared with 28% of those without anxiety. Financial stress showed the strongest association with anxiety: 90% of caregivers with anxiety reported facing financial stress, compared with 52% of those without anxiety.

Table 4: Chi-square analysis of factors associated with anxiety among caregivers of children with NCDs at BMU (n = 310)

Variables	Category	Anxiety n = 188 (%)	No Anxiety n = 122 (%)	p-value
Sex of caregiver	Female	158 (84%)	78 (64%)	< 0.001



	Male	30 (16%)	44 (36%)	
Relationship to child	Mother	157 (84%)	77 (63%)	< 0.001
	Father	29 (15%)	43 (35%)	
	Others	2 (1%)	2 (2%)	
Place of residence	Rural	107 (57%)	45 (37%)	0.001
	Urban	81 (43%)	77 (63%)	
Age of caregiver	≤ 30 years	106 (56%)	41 (34%)	< 0.001
	> 30 years	82 (44%)	81 (66%)	
Monthly household income (BDT)	< 15,000	51 (27%)	14 (11%)	< 0.001
	15,000–24,999	87 (46%)	48 (39%)	
	25,000–49,999	46 (25%)	50 (4%)	
	≥ 50,000	4 (2%)	10 (8%)	
Child's age at diagnosis	≤ 5 years	173 (92%)	88 (72%)	< 0.001
	6–10 years	13 (7%)	26 (21%)	
	11–18 years	2 (1%)	8 (7%)	
No. of hospitalisations (past year)	0–1	41 (22%)	40 (33%)	< 0.001
	2–3	101 (54%)	34 (28%)	



	4 or more	46 (24%)	48 (39%)	
Financial stress	No	18 (10%)	58 (48%)	< 0.001
	Yes	170 (90%)	64 (52%)	
Monthly treatment cost (BDT)	≤ 5,000	34 (18%)	65 (53%)	< 0.001
	5,001–10,000	130 (69%)	44 (36%)	
	10,001–20,000	21 (11%)	12 (10%)	
	20,001–30,000	1 (1%)	1 (1%)	
	> 30,000	2 (1%)	0 (0.00%)	
Current age of child	≤ 5 years	108 (57%)	29 (24%)	< 0.001
	6–10 years	62 (33%)	49 (40.%)	
	11–18 years	18 (10%)	44 (36%)	

Bold p-values indicate statistical significance ($p < 0.05$).

4.5 Association between socio-demographic and disease factors and presence of anxiety among caregivers

The association between socio-demographic and disease-related factors and the presence of depression was examined using the chi-square test.

Female caregivers were significantly more likely to report depression than male caregivers (84%, $p < .001$). Mothers represented the majority of caregivers with depression (84%), compared to fathers (15%, $p < .001$). Rural residence was significantly associated with depression. Younger caregivers (≤ 30 years) were more likely to report depression than those aged above 30 years (55% vs. 36%, $p = .001$).



Monthly household income was significantly associated with depression ($p = .001$). Among caregivers with depression, 26% reported a household income of less than BDT 15,000, compared with 13% among those without depression. Disease-related factors were also significantly associated with depression. Depression was more frequent among caregivers of children diagnosed at five years of age or younger (91% vs. 74%, $p < .001$) and among those whose child was currently aged five years or below (55% vs. 29%, $p < .001$). The number of hospitalisations in the past year was also significantly associated with depression ($p = .006$); 51% of caregivers with depression reported two to three hospitalisations, compared with 33% of those without depression.

Financial stress was strongly associated with depression: 90% of caregivers with depression reported financial stress compared with 54%. Monthly treatment cost was also associated with depression ($p < .001$).

Table 5: Chi-square analysis of factors associated with depression among caregivers of children with NCDs at BMU (n = 310)

Variables	Category	Depression n = 185 (%)	No Depression n = 125 (%)	p-value
Sex of caregiver	Female	155 (84%)	81 (65%)	< 0.001
	Male	30 (16%)	44 (35%)	
Relationship to child	Mother	155 (84%)	79 (63%)	< 0.001
	Father	28 (15%)	44 (35%)	
	Others	2 (1%)	2 (2%)	
Place of residence	Rural	104 (56%)	48 (38%)	0.002
	Urban	81 (44%)	77 (62%)	
Age of caregiver	≤30 years	102 (55%)	45 (36%)	0.001
	>30 years	83 (45%)	80 (64%)	
Monthly household income (BDT)	< 15,000	49 (26%)	16 (13%)	0.001
	15,000–24,999	83 (45%)	52 (42%)	



	25,000–49,999	49 (27%)	47 (37%)	
	≥ 50,000	4 (2%)	10 (8.00%)	
Child's age at diagnosis	≤ 5 years	168 (91%)	93 (74%)	< 0.001
	6–10 years	14 (8%)	25 (20%)	
	11–18 years	3 (1%)	7 (6%)	
No. of hospitalisations (past year)	0–1	40 (22%)	41 (33%)	0.006
	2–3	94 (51%)	41 (33%)	
	4 or more	51 (27%)	43 (34%)	
Financial stress	No	19 (10%)	57 (46%)	< 0.001
	Yes	166 (90%)	68 (54%)	
Monthly treatment cost (BDT)	≤ 5,000	34 (18%)	65 (52%)	< 0.001
	5,001–10,000	124 (67%)	50 (40%)	
	10,001–20,000	24 (13%)	9 (7%)	
	20,001–30,000	1 (1%)	1 (1%)	
	> 30,000	2 (1%)	0 (0.00%)	
Current age of child	≤ 5 years	101 (55%)	36 (29%)	< 0.001
	6–10 years	62 (33%)	49 (39%)	
	11–18 years	22 (12%)	40 (32.00%)	

Bold p-values indicate statistical significance ($p < 0.05$).

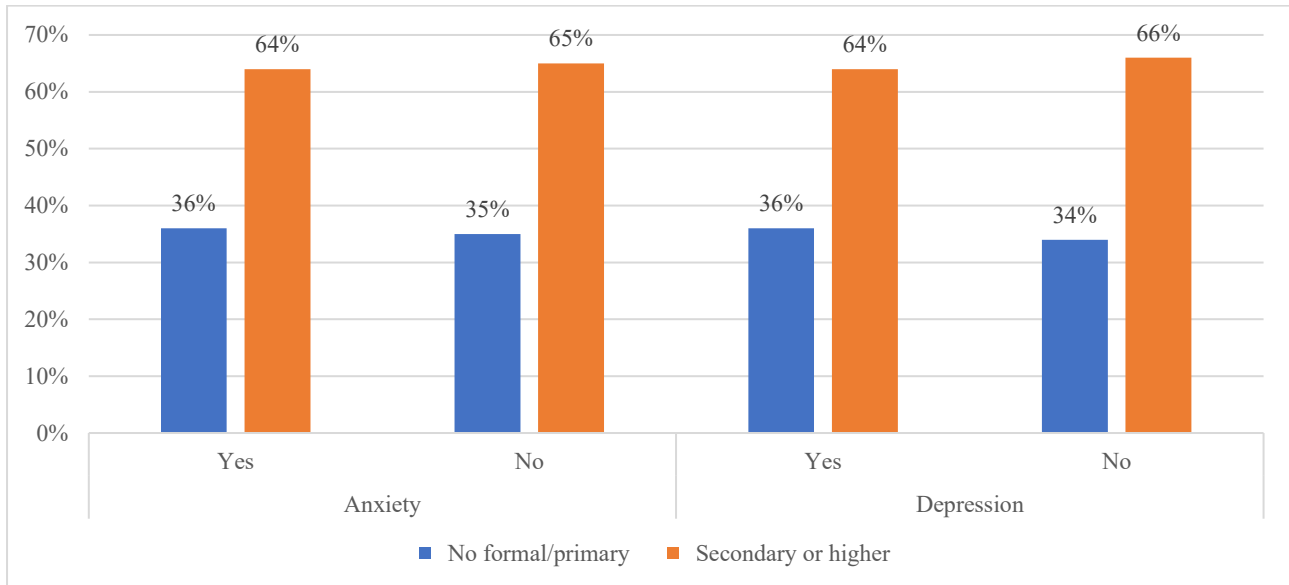


Figure:2 association of highest educational qualification with anxiety and depression

Figure 2 shows Among caregivers with anxiety, 36% had no formal/primary education and 64% had secondary or higher education, mirroring those without anxiety (35% and 65%, respectively). Among caregivers with depression, 36% had no formal/primary education and 64% had secondary or higher education, similarly close to those without depression (34% and 66%, respectively).

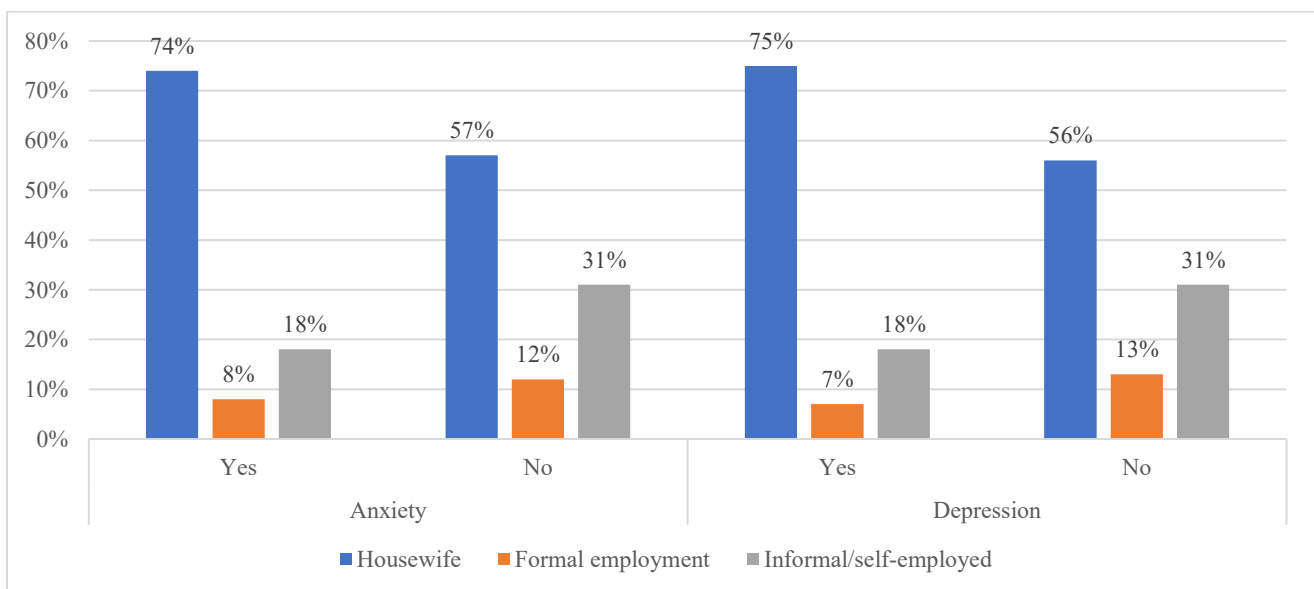


Figure 3: association of occupation of caregivers with anxiety and depression

Figure 3 shows Among caregivers with anxiety, 74% were housewives, 18% informal/self-employed, and 8% formally employed, compared to 57%, 31%, and 12% respectively among those without anxiety. Among caregivers with depression, 75% were housewives, 18% informal/self-



employed, and 7% formally employed, compared to 56%, 31%, and 13% among those without depression.

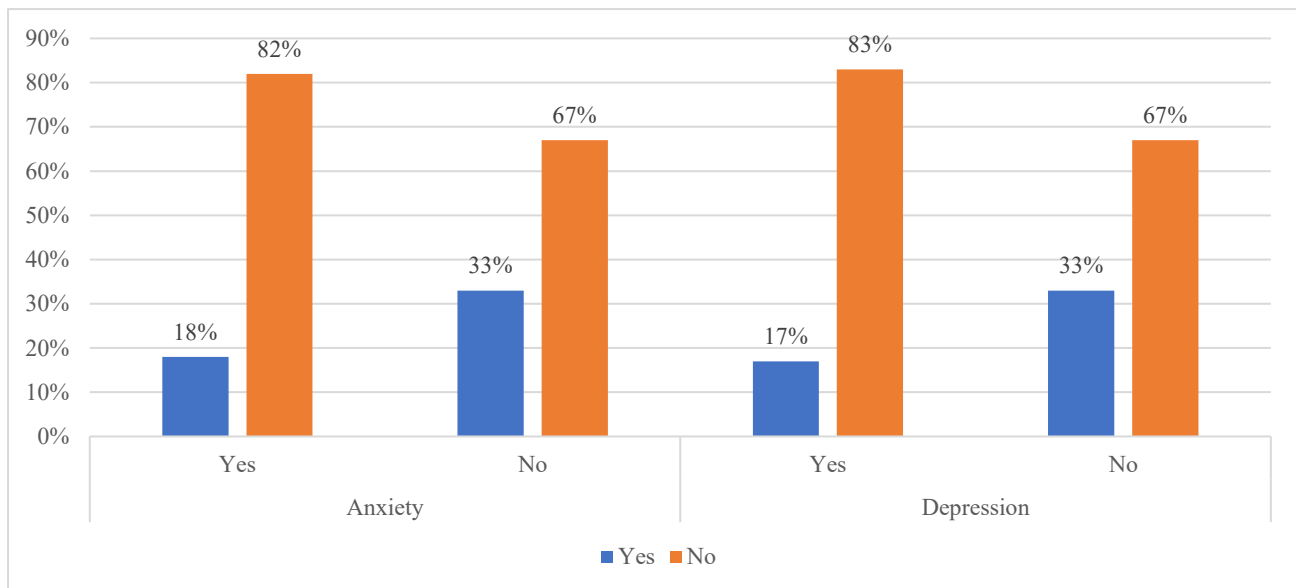


Figure 4: association of caregivers awareness of NCDs before diagnosis of their child

Figure 4 shows Among caregivers with anxiety, 18% had awareness of childhood NCDs compared to 33% without anxiety. Similarly, among those with depression, 17% had prior awareness compared to 33% without depression.

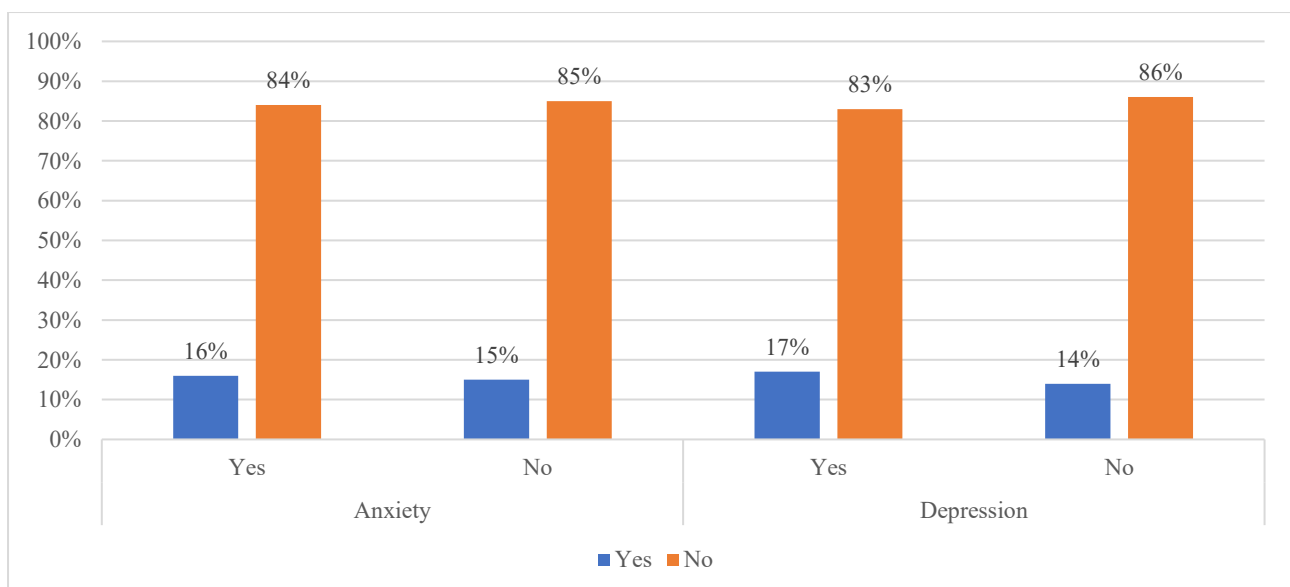


Figure 5: association of caregivers' chronic medical condition with anxiety and depression

Figure 5 shows, Among caregivers with anxiety, 16% had a chronic condition compared to 15% without anxiety. Among those with depression, 17% had a chronic condition compared to 14% without depression, suggesting minimal difference across groups.

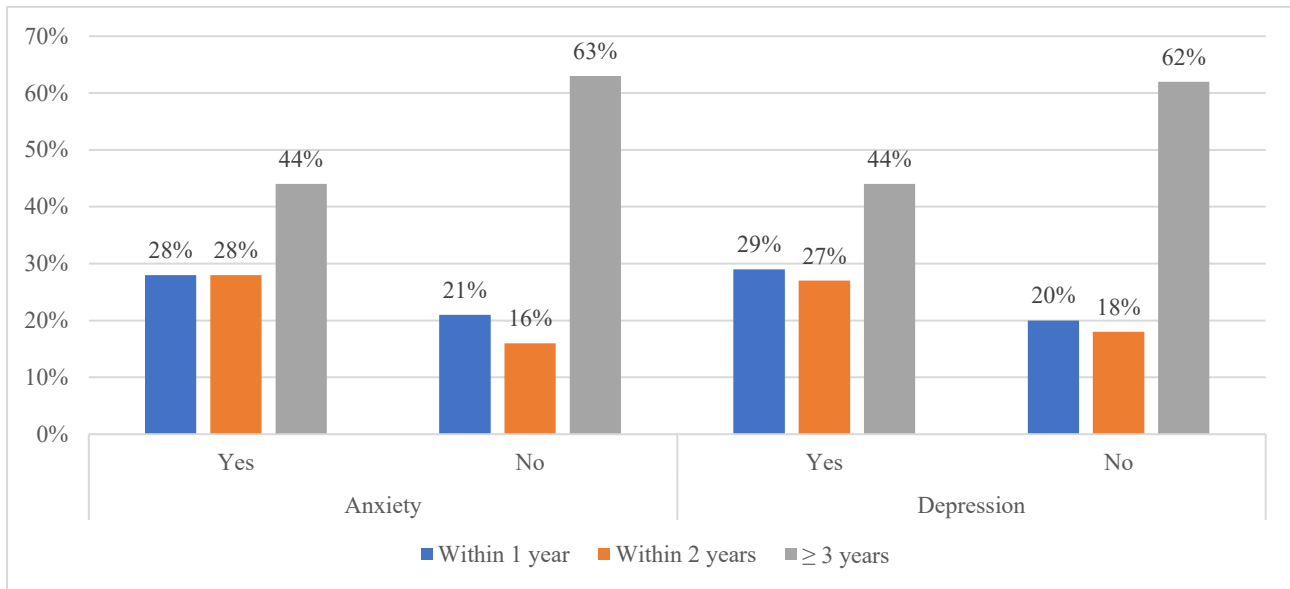


Figure 6: association of anxiety and depression with time since diagnosis

Figure 6 shows, among caregivers with anxiety, 28% were diagnosed within 1 year, 28% within 2 years, and 44% had a diagnosis of 3 or more years, compared to 21%, 16%, and 63% respectively among those without anxiety. Among caregivers with depression, 29% were diagnosed within 1 year, 27% within 2 years, and 44% at 3 or more years, compared to 20%, 18%, and 62% among those without depression.

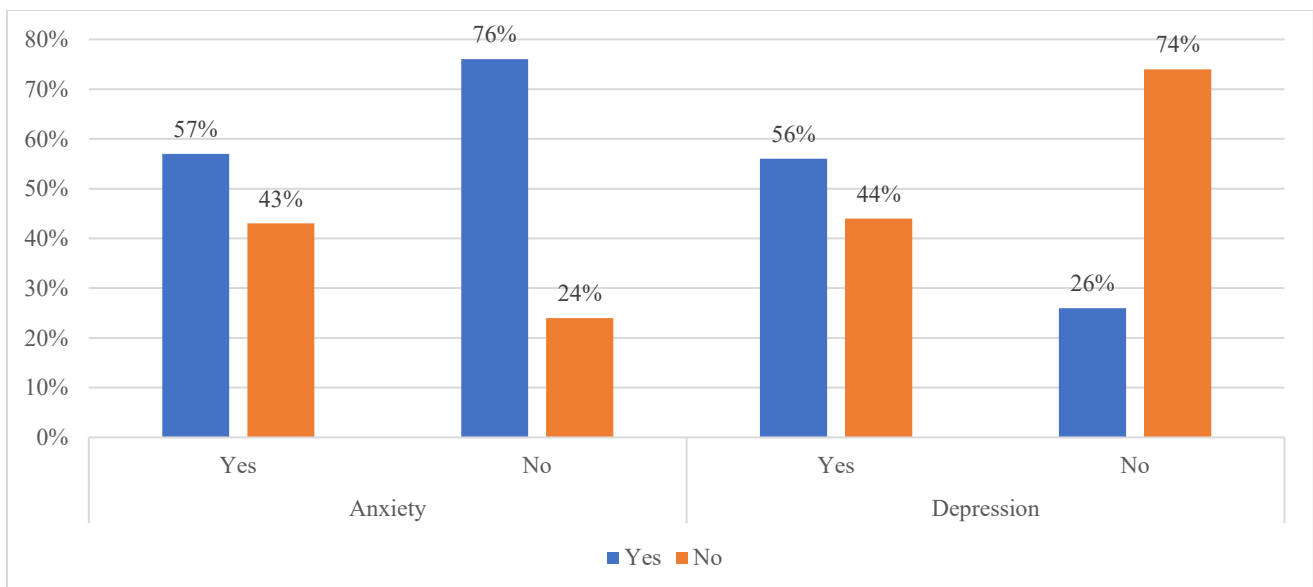


Figure 7: association of anxiety and depression with children who requires assistance with daily activities



Figure 7 shows, among caregivers with anxiety, 57% reported their child required assistance with daily activities compared to 76% without anxiety. Among caregivers with depression, 56% reported their child needed assistance compared to 26% without depression

4.6 Factors independently associated with anxiety and depression among caregivers: multivariable logistic regression analysis

In the multivariable model (which included age of caregiver, place of residence, relationship to child, household income, child's current age and financial stress), three factors were independently and significantly associated with both anxiety and depression among caregivers. Financial stress emerged as the strongest predictor as caregivers who reported financial stress had approximately five times higher odds of both anxiety (AOR = 4.94, 95% CI: 2.37–10.33, $p < 0.001$) and depression (AOR = 4.67, 95% CI: 2.31–9.45, $p < 0.001$) compared to those without financial stress. The current age of the child was also a significant predictor for both anxiety and depression. Caregivers of children aged five years or below had more than seven times higher odds of anxiety (AOR = 7.33, 95% CI: 3.12–17.26, $p < 0.001$) and more than three times higher odds of depression (AOR = 3.40, 95% CI: 1.53–7.58, $p = 0.003$) compared to the caregivers of children aged 11-18 years, while caregivers of children aged 6-10 years also had significantly higher odds of anxiety (AOR = 2.28, 95% CI: 1.04–5.02, $p = 0.040$).

Regarding kinship to the child, mothers had significantly higher odds of depression compared to fathers (AOR = 2.14, 95% CI: 1.10–4.16, $p = 0.025$) though the association with anxiety was borderline and did not reach statistical significance (AOR = 2.00, $p = 0.054$).

Income was significantly associated with anxiety only, caregivers in the lowest income group (less than 15,000 BDT) had five times higher odds of anxiety compared to those earning 50,000 BDT or more (AOR = 5.01, 95% CI: 1.02–24.64, $p = 0.047$). but this did not reach significance for depression after adjustment. Age of caregiver and place of residence were not independently significant in either model after adjustment.

Table 6: Multivariable logistic regression — factors associated with anxiety and depression among caregivers of children with NCDs at BMU (n = 310)

Variable	Category	Anxiety (GAD-7 ≥ 10)	Depression (PHQ-9 ≥ 10)
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		AOR	95% CI	p	AOR	95% CI	p
Age of caregiver	≤ 30 years (ref.)	Ref.	—	—	Ref.	—	—
	> 30 years	0.78	0.40–1.51	0.463	0.80	0.42–1.49	0.474
Place of residence	Rural (ref.)	Ref.	—	—	Ref.	—	—
	Urban	0.61	0.35–1.08	0.089	0.66	0.38–1.12	0.122
Relationship to child	Father (ref.)	Ref.	—	—	Ref.	—	—
	Mother	2.00	0.99–4.05	0.054	2.14	1.10–4.16	0.025
	Others	0.39	0.04–3.63	0.408	0.59	0.07–5.09	0.631
Monthly household income (BDT)	≥ 50,000 (ref.)	Ref.	—	—	Ref.	—	—
	< 15,000	5.01	1.02–24.64	0.047	3.26	0.70–15.13	0.131
	15,000–24,999	3.04	0.71–13.09	0.135	2.13	0.51–8.82	0.298
	25,000–49,999	2.27	0.53–9.64	0.268	2.24	0.55–9.20	0.262
Current age of child	11–18 years (ref.)	Ref.	—	—	Ref.	—	—
	6–10 years	2.28	1.04–5.02	0.040	1.52	0.71–3.25	0.276
	≤ 5 years	7.33	3.12–17.26	< 0.001	3.40	1.53–7.58	0.003
Financial stress	No (ref.)	Ref.	—	—	Ref.	—	—
	Yes	4.94	2.37–10.33	< 0.001	4.67	2.31–9.45	< 0.001

AOR = Adjusted Odds Ratio; CI = Confidence . Bold/shaded cells indicate statistical significance at $p < 0$



Chapter 5: Discussion

5.1 Summary of key findings

This study assessed the mental health status of 310 primary caregivers of children with non-communicable diseases (NCDs) attending the Department of Paediatrics at Bangladesh Medical University. Based on the GAD-7 and PHQ-9 cut-off of score of 10 or more, three out of every five caregivers had clinically significant symptoms of anxiety (61%) or depression (60%). The major caregivers were mothers (76%), housewives (67%) and belonged to lower income group (65% of the caregivers earned less than BDT 25,000 per month). Most of the children were young (44% were 5 years old or younger) and a high proportion had been diagnosed before the age of 5 (84%). The most common diagnosis had been thalassemia (30%), epilepsy (24%) and congenital heart disease (23%).

In the multivariable analysis, three factors came as the strongest independent predictors of both anxiety and depression. Caregivers who reported financial stress were almost five times more likely to experience anxiety (AOR = 4.94) and depression (AOR = 4.67) than those without financial stress. Caregivers of younger children (aged five years or below) had seven times higher odds of anxiety (AOR = 7.33) and three times higher odds of depression (AOR = 3.40) compared to caregivers of older children. Finally, the odds of depression were more than two times higher for mothers than for fathers (AOR = 2.14). After controlling for all other factors, the lowest income group (less than BDT 15,000) was independently associated with anxiety (AOR = 5.01).

5.2 Discussion of Findings:

5.2.1 High prevalence of anxiety and depression:

The prevalence of anxiety (61%) and depression (60%) found in this study is very high. It is much higher than reported for adults living with NCDs themselves in South Asia, where the prevalence of depression in adults with diabetes, cancer or heart disease ranges between 37% and 44% and anxiety is around 29% (Uphoff et al., 2019). This reflects that the care-giver may have a mental health burden, and that the caregiver is not necessarily seen by the health care system.

The findings are very similar to those reported by Islam et al. (2025), who conducted a study on 156 mothers of children with thalassemia at the Bangladesh Thalassaemia Samity Hospital and found that around 63% had depression and 58% had anxiety using the DASS-21 scale. The



findings also similar with international evidence. Cohn et al. (2020) found in their meta-analysis that across the years parents of children with chronic illness consistently fare worse than parents of healthy children with respect to the mental health of the parents. In a study of caregivers of children with epilepsy in Tanzania, Ernest et al. (2025) found that anxiety was experienced by approximately 48% of caregivers and depression by approximately 31% of caregivers. Psychological distress was found among about 43% of parents of children with CHD in Ghana (Entsua-Mensah et al., 2024).

5.2.2 Financial stress

Financial stress came out as the single strongest predictor of both anxiety and depression in the adjusted analysis. Caregivers who reported financial stress had about five times higher odds of both outcomes. This finding is logical in the Bangladeshi health system context. Bangladesh has one of the highest out-of-pocket health expenditure rates in the world, with around 73% of all health spending in 2021 coming directly from household pockets (BSS, 2024). The strong link between financial stress and poor mental health found here is consistent with what Jaspers et al. (2015) reported in their systematic review across low and middle-income countries, where NCDs were identified as a leading cause of household financial crisis and emotional distress. It is also similar to the results of Mangla et al. (2023) from India, Rajput et al. (2015) from Pakistan, and Entsua-Mensah et al. (2024) from Ghana, who also found household income and treatment cost to be strong predictors of caregiver psychological distress.

5.2.3 young child age

The strong effect of the child's current age on caregiver mental health is a notable finding. Caregivers of children aged five years or younger had markedly higher odds of both anxiety and depression compared with caregivers of adolescents. This is in line with the observation that as the children in need of care get younger, parents tend to be more protective of them and caregivers face higher levels of stress (Güven Baysal & Çorabay, 2024).

5.2.4 Mothers are most affected

Mothers had about twice the odds of depression compared to fathers even after adjusting for income, residence and other factors. The association with anxiety was similar in size, although it was borderline in statistical significance. Van Oers et al. (2014), in a study of mothers and fathers



of children with various chronic conditions, reported that mothers were about twice as likely as fathers to be in the clinical range for anxiety and depression. Islam et al. (2025), in their Bangladeshi study on mothers of children with thalassemia, explained that mothers in South Asia are almost always the default primary caregivers, often without formal support and frequently while also managing all household work. In the present study, 67% of caregivers were housewives meaning that most of the mothers had no separate income and they relied on the family for both financial and emotional support.

5.2.5 Income and other socio-demographic factors

The odds of anxiety were five times higher for the lowest income group (BDT 15,000/month) than for the highest (BDT 50,000/month) group. This aligns with the general findings in Bangladesh, where depression and anxiety have been significantly associated with lower household income, even among adults with diabetes and hypertension comorbidity in rural Bangladesh (Chakravartty et al. (2025).

Age of caregiver and place of residence were significant in the bivariate analysis but not in the adjusted model. This means that being young or being from rural itself is not enough, it is more about the financial issue which leads to poor mental health state and it needs to be explored further.

5.3 Strengths of the Study

The study has several notable strengths. It is among the first studies in Bangladesh where the mental health state of caregivers of paediatric NCD patients were examined across major six diseases (thalassemia, congenital heart disease, nephrotic syndrome, bronchial asthma, type 1 diabetes and epilepsy) rather than focusing on a single disease. By including six diseases. This study provides a broader and more context specific picture of the mental health state of the caregivers. Secondly, in this study internationally validated screening instrument PHQ-9 and GAD-7 were used to assess the mental health state which increased the reliability of the study. Finally inferential statistical analysis was done that increased the confidence in identified associations.

5.4 Limitations of the Study

Several limitations should be considered in interpreting the findings.



- **Selection bias from a single tertiary site:** Data were collected at a single national tertiary referral hospital. Caregivers attending BMU are not representative of the wider population of caregivers of children with NCDs in Bangladesh as their children have, on average, more advanced or complex disease. Generalisation beyond the tertiary referral context should be made with care.
- **Convenience sampling:** Convenience sampling compounds the selection bias above, particularly with respect to the times of day and weeks during which recruitment occurred. Caregivers who were able to participate may differ systematically from those who were in acute crisis at the moment of approach.
- **Achieved sample size below target:** The achieved sample of 310 (74.2% of the calculated target of 418) limits the precision of effect estimates, particularly for sub-groups with small cell sizes such as the highest-income reference category ($n = 14$), which produced wide confidence intervals for the income-related associations..

5.5 Implications for Public Health Policy and Practice

Childhood Non-Communicable Diseases (NCDs) policies need to move beyond just clinical care to fully supporting children and families. There is a need to incorporate mental health checks in paediatric NCD care services in Bangladesh to identify the caregiver who is experiencing anxiety or depression and to refer them for support. Although the policy has been established in the National Mental Health Strategic Plan (2020-2030) to provide a comprehensive and integrated services system to access high-quality mental health and psychosocial wellbeing services, it is currently not available for caregivers in NCD setting. Financial strain was the greatest contributor to poor mental health, so mental health support will not suffice. Some interventions are necessary to alleviate the burden on families that the government should implement, for example subsidised treatment, free medications for chronically ill children (Bukhman et al., 2020; Drown et al., 2025; Lawrence, 2025). Also, particular focus should be placed on mothers and caregivers of very young children, who are most likely to suffer.



Chapter 6: Conclusion and Recommendations

6.1 Conclusion

This cross-sectional study of caregivers of children with non-communicable diseases at Bangladesh Medical University documents an under recognized burden of mental disorders. Approximately six in ten caregivers screened positive for anxiety as well as depression using the scale GAD7 and PHQ9. The burden was seen more among mothers, low income families and caregivers of younger children. The strongest and most consistent independent predictors of poor caregiver mental health were economic : presence of financial stress and low income. Also caregivers of very young child remained significant independently.

These findings provide context specific evidence from Bangladesh, indicating the necessity to integrate caregiver mental health into the national Paediatric NCD care map. And it requires more than the addition of a mental health service as we need to work on financial and social determinants also that will ease their distress.

6.2 Recommendations

Based on the findings, the following recommendations are proposed:

- Integrate routine mental health screening for caregivers of children with NCDs into national paediatric care protocols. This should be done in standard outpatient as well as inpatient.
- Train paediatric nurses and also the health workers in the community to conduct brief psychological screening of caregivers during routine hospital visits and admissions.
- Establish referral pathways to psychiatric and psychosocial support services for caregivers who screen positive.
- Family-centred approaches should include peer support groups for mothers and clear referral pathways to mental health services. Paediatric NCD clinics could also work with community health workers and NGOs to extend support beyond the hospital.
- Government should introduce financial schemes for the families with paediatric NCDs to reduce the financial burden which will help in the long run to ease their mental health issues.



- For future research, extend the research to community and primary healthcare setting to know more about the caregivers who are not accessing health care at tertiary level hospitals and examine the effectiveness of psychological interventions for caregivers of children with NCDs in the Bangladeshi context.

Declaration of GenAI Use

I, Nil Mayuri Chowdhury, declare that in preparing this thesis, I used ChatGPT (OpenAI, version 5.5) as a support tool to assist with brainstorming ideas, organising the structure of my writing, overcoming writer's block, and improving clarity and language in the text that I drafted myself. GenAI was not used to generate original arguments, interpret results, or produce final academic content. All substantive ideas, judgments, references, and conclusions are my own and have been independently verified in line with JPGSPH academic integrity guidelines.



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Appendices

Appendix A: Data Collection Instrument

Questionnaire (English)

Factors Associated with anxiety and Depression Among Caregivers of Children with Non-Communicable Diseases in Bangladesh: A Cross-Sectional study at Bangladesh Medical University

Questionnaire

Module A: Socio-demographic information of the caregiver

This module collects basic background information of the parent or primary caregiver, including age, sex, education, occupation, household size, income, place of residence, and relationship with the child. This information helps to understand the social and economic background of the caregivers.

Module B: Child's information and disease-related factors

This module collects information about the child's non-communicable disease, including type of disease, age, age at diagnosis, duration of illness, hospitalization history, treatment cost, and access to healthcare services. These factors help to assess how disease characteristics may affect caregiver mental health.

Module C: Generalized Anxiety Disorder scale (GAD-7)

This module assesses anxiety symptoms of caregivers over the past two weeks. It includes



questions related to nervousness, excessive worry, restlessness, irritability, difficulty relaxing, and fear. Higher scores indicate higher levels of anxiety.

Module D: Patient Health Questionnaire (PHQ-9)

This module measures depressive symptoms experienced by caregivers over the past two weeks. It includes questions on low mood, loss of interest, sleep problems, fatigue, appetite changes, poor concentration, feelings of worthlessness, and thoughts of self-harm. Higher scores indicate greater severity of depression.



Module A: Socio-demographic Information of the Caregiver				
SI No.	Question	Code	Options	Instructions
A_1	Date of the interview			
A_2	Time of the Interview			
A_3	Name of the respondents (parent/primary caregiver)			
A_4	Sex of respondents	1	Male	
		2	Female	
A_5	Age of respondents (in years)			
A_6	Kinship with child	1	Mother	
		2	Father	
		3	Siblings	
		96	others	
A_7	Division code			
A_8	District code			



A_9	Upazila code			
A_9.1	City corporation/Pouroshobha	1	yes	
		2	no	
A_9.2	Address (upazilla, union, ward/village)			
A_10	Place of residence	1	urban	
		2	rural	
A_11	Religion	1	Islam	
		2	Hinduism	
		3	Buddhism	
		4	Christianity	
		96	Others (specify)	
A_12	Phone No. of the respondents		□□□□□□□□□□	
A_13	Marital Status	0	unmarried	
		1	married	
		2	Widow/widower	
		3	Separated/divorced	
A_14		1	No formal education	



	Highest educational qualification of the respondents	2	Below primary education	
		3	Completed primary education (class 5)/ Ebtedayee	
		4	Completed secondary education (SSC) /Dakhil	
		5	Completed higher secondary education (HSC)/ Alim	
		6	Completed Bachelor/Diploma/Fazil	
		7	Completed Masters or higher/Kamil	
		96	Others (Specify)	
A_15	What is the total number of people in your household?	1	Less than 4	
		2	More than 4	
A_16	Are you Family Head? (Decisionmaker of the family)	1	yes	
		2	no	
A_17	Occupation of the respondents	1	Housewife	
		2	Farming and agriculture	



		3	Labor and construction	
		4	Business and trade	
		5	Govt. Service holder	
		6	Private service holder	
		7	Informal sector (Rickshaw puller, street vendor)	
		8	Retired	
		9	Unemployed	
		96	Others (Specify)	
A_18	Monthly Family Income (in BDT)			
A_19	How many children under 18 years old are there in your household?			
A_20	What is the number of children with NCDs?	1	1	
		2	2	
		3	3	
		4	4 or more	



A_21	Did you heard about childhood NCDs before diagnosis of your child?	1	Yes	
		2	No	

Module B: Child's information and disease related factors				
SI No.	Question	Code	Options	Instructions
B_1	Sex of child	1	Male	
		2	Female	
B_2	Child current age	1	>=5	
		2	6-10	
		3	11-15	
		4	16-18	
B_3	Disease of child	1	Bronchial Asthma	
		2	Congenital Heart Disease	
		3	Epilepsy	
		4	Thalassemia	
		5	Kidney Disease	
		6	Type 1 Diabetes	



B_4	Time since diagnosis	1	Within one year	
		2	Within two year	
		3	Three or more year	
B_5	Child's age at diagnosis	1	>= 5	
		2	6-10	
		3	11-15	
		4	16-18	
B_6	Number of hospitalization in last 6 months	1	0-1	
		2	2-3	
		3	4 or more	
B_7	Monthly cost of treatment including medicine, doctor consultation fee and other expenditures related to treatment (in BDT)			
B_8	Are you getting all the necessary	1	yes	



	information regarding your child illness?	2	no	
B_9	Are you facing financial stress due to child's condition?	1	yes	
		2	no	
B_10	Distance from home to nearest health care facility (in KM)	1	<5	
		2	5-10	
		3	11-20	
		4	21-50	
		5	More than 50	
B_11	Time to reach nearest health care facility (in minutes)		□□□□□	

Module C: Generalized anxiety disorder (GAD-7)



First, ask the respondents Over the last two weeks, how often have you been bothered by the following problems?

SI No.	Question	Code	Options	Instructions
C_1	Feeling nervous, anxious, or on edge	0	Not at all	
		1	Several days	
		2	More than half the days	
		3	Nearly every day	
C_2	Not being able to stop or control worrying	0	Not at all	
		1	Several days	
		2	More than half the days	
		3	Nearly every day	
C_3	Worrying too much about different things	0	Not at all	
		1	Several days	
		2	More than half the days	
		3	Nearly every day	
C_4	Trouble relaxing	0	Not at all	
		1	Several days	



		2	More than half the days	
		3	Nearly every day	
C_5	Being so restless that it is hard to sit still	0	Not at all	
		1	Several days	
		2	More than half the days	
		3	Nearly every day	
C_6	Becoming easily annoyed or irritable	0	Not at all	
		1	Several days	
		2	More than half the days	
		3	Nearly every day	
C_7	Feeling afraid, as if something awful might happen	0	Not at all	
		1	Several days	
		2	More than half the days	
		3	Nearly every day	



Module D: PATIENT HEALTH QUESTIONNAIRE-9

(PHQ-9)

First, ask the respondents Over the last two weeks, how often have you been bothered by the following problems?

SI No.	Question	Code	Options	Instructions
D_1	Little interest or pleasure in doing things	0	Not at all	
		1	Several days	
		2	More than half the days	
		3	Nearly every day	
D_2	Feeling down, depressed, or hopeless	0	Not at all	
		1	Several days	
		2	More than half the days	
		3	Nearly every day	
D_3	Trouble falling or staying asleep, or sleeping too much	0	Not at all	
		1	Several days	
		2	More than half the days	



		3	Nearly every day	
D_4	Feeling tired or having little energy	0	Not at all	
		1	Several days	
		2	More than half the days	
		3	Nearly every day	
D_5	Poor appetite or overeating	0	Not at all	
		1	Several days	
		2	More than half the days	
		3	Nearly every day	
D_6	Feeling bad about yourself — or that you are a failure or have let yourself or your family down	0	Not at all	
		1	Several days	
		2	More than half the days	
		3	Nearly every day	
D_7	Trouble concentrating on things, such as reading the newspaper or watching television	0	Not at all	
		1	Several days	
		2	More than half the days	
		3	Nearly every day	
D_8	Moving or speaking so slowly that other people could have noticed? Or	0	Not at all	
		1	Several days	



	the opposite — being so fidgety or restless that you have been moving around a lot more than usual	2	More than half the days	
		3	Nearly every day	
D_9	Thoughts that you would be better off dead or of hurting yourself in some way	0	Not at all	
		1	Several days	
		2	More than half the days	
		3	Nearly every day	

Questionnaire (Bengali)

বাংলাদেশে অসংক্রামক রোগে আক্রান্ত শিশুদের পরিচর্যাকারীদের মধ্যে সাধারণ উদ্বেগজনিত

ব্যাধি এবং বিষণ্ণতার সাথে সম্পর্কিত কারণগুলি: বাংলাদেশ মেডিকেল বিশ্ববিদ্যালয়,

বাংলাদেশের একটি ক্রস সেকশনাল রিসার্চ

প্রশ্নাবলী

সূচি

মডিউল এ: 69

মডিউল বি: 73

মডিউল সি: 75

মডিউল ডি: 78



মডিউল A: পরিচর্যাকারীর আর্থ-সামাজিক তথ্য

এই মডিউলটি পিতামাতা বা প্রাথমিক পরিচর্যাকারীর মৌলিক তথ্য সংগ্রহ করে, যার মধ্যে রয়েছে বয়স, লিঙ্গ, শিক্ষা, পেশা, পরিবারের আকার, আয়, বসবাসের স্থান এবং শিশুর সাথে সম্পর্ক। এই তথ্য পরিচর্যাকারীর সামাজিক ও অর্থনৈতিক পটভূমি বুঝতে সাহায্য করে।

মডিউল বি: শিশুর তথ্য এবং রোগ-সম্পর্কিত কারণ

এই মডিউলটি শিশুর অসংক্রামক রোগ সম্পর্কে তথ্য সংগ্রহ করে, যার মধ্যে রয়েছে রোগের ধরণ, বয়স, রোগ নির্ণয়ের সময়কাল, অসুস্থতার সময়কাল, হাসপাতালে ভর্তির ইতিহাস, চিকিৎসার খরচ এবং স্বাস্থ্যসেবা পরিষেবার অ্যাক্সেস। এই কারণগুলি পরিচর্যাকারীদের মানসিক স্বাস্থ্যের উপর কীভাবে প্রভাব ফেলতে পারে তা মূল্যায়ন করতে সহায়তা করে।

মডিউল সি: জেনারেলাইজড অ্যাংজাইটি ডিসঅর্ডার স্কেল (GAD-7)

এই মডিউলটি গত দুই সপ্তাহ ধরে পরিচর্যাকারীদের উদ্বেগের লক্ষণগুলি মূল্যায়ন করে। এতে নার্ভাসনেস, অতিরিক্ত উদ্বেগ, অস্থিরতা, বিরক্তি, শিথিল হতে অসুবিধা এবং ভয় সম্পর্কিত প্রশ্ন অন্তর্ভুক্ত রয়েছে। উচ্চতর স্কোর উদ্বেগের উচ্চ স্তর নির্দেশ করে।

মডিউল D: রোগীর স্বাস্থ্য প্রশ্নাবলী (PHQ-9)

এই মডিউলটি গত দুই সপ্তাহ ধরে পরিচর্যাকারীদের বিষণ্ণতার লক্ষণগুলি পরিমাপ করে। এতে মেজাজ খারাপ হওয়া, আগ্রহ হ্রাস, ঘুমের সমস্যা, ক্লান্তি, ক্ষুধা পরিবর্তন, মনোযোগের অভাব, অযোগ্যতার অনুভূতি এবং নিজের ক্ষতি করার চিন্তাভাবনা সম্পর্কিত প্রশ্ন অন্তর্ভুক্ত রয়েছে। উচ্চতর স্কোর বিষণ্ণতার তীব্রতা নির্দেশ করে।



মডিউল এ: পরিচর্যাকারীদের আর্থ-সামাজিক-জনসংখ্যাগত তথ্য

সিরিয়াল নং।	প্রশ্ন	কোড	বিকল্পগুলি	নির্দেশনা
A_1	সাক্ষাৎকারের তারিখ			
A_2	সাক্ষাৎকারের সময়			
A_3	উত্তরদাতাদের নাম (পিতামাতা/প্রাথমিক পরিচর্যাকারী)			
A_4	উত্তরদাতা শনাক্তকারী নম্বর		□□□□□□	
A_5	উত্তরদাতাদের লিঙ্গ	১	পুরুষ	
		২	মহিলা	
		৯৬	অন্যান্য	
A_6	উত্তরদাতাদের বয়স (বছরে)			
A_7	সন্তানের সাথে আত্মীয়তা	১	মা	
		২	বাবা	
		৩	ভাইবোন	



		৯৬	অন্যান্য	
A_8	বিভাগ কোড			
A_9	জেলা কোড			
A_10	ইউনিয়ন কোড			
A_11	বসবাসের স্থান	১	নগর	
		২	গ্রামীণ	
A_13	ধর্ম	১	ইসলাম	
		২	হিন্দুধর্ম	
		৩	বৌদ্ধধর্ম	
		৪	খ্রিস্টধর্ম	
		৯৬	অন্যান্য (নির্দিষ্ট করুন)	
A_14	উত্তরদাতাদের ফোন নম্বর		□□□□□□□□□□□□	
A_15	বৈবাহিক অবস্থা	0	অবিবাহিত	
		১	বিবাহিত	
		২	বিধবা/বিপত্তিক	
		৩	সেপারেশন/তালাক	
A_16		১	কোন আনুষ্ঠানিক শিক্ষা নেই	



	উত্তরদাতাদের সর্বোচ্চ শিক্ষাগত যোগ্যতা	২	প্রাথমিক শিক্ষার নিচে	
		৩	প্রাথমিক শিক্ষা সম্পন্ন (৫ম শ্রেণী)/ ইবতেদায়ি	
		৪	মাধ্যমিক শিক্ষা (এসএসসি) / দাখিল সম্পন্ন	
		৫	উচ্চ মাধ্যমিক শিক্ষা (এইচএসসি)/আলিম সম্পন্ন।	
		৬	সম্পন্ন স্নাতক/ডিপ্লোমা/ফাজিল	
		৭	স্নাতকোত্তর বা উচ্চতর/কামিল সম্পন্ন।	
		৯৬	অন্যান্য (নির্দিষ্ট করুন)	
A_17	মোট কত?	১	৪ এর কম	
	আপনার পরিবারের লোক সংখ্যা?	২	৪ জনের বেশি	
A_18	আপনি কি পরিবারের প্রধান? (পরিবারের সিদ্ধান্ত গ্রহণকারী)	১	হ্যাঁ	
		২	না	
A_19	উত্তরদাতাদের পেশা	১	গৃহিণী	
		২	কৃষিকাজ এবং কৃষিকাজ	
		৩	শ্রম ও নির্মাণ	



		৪	ব্যবসা এবং বাণিজ্য	
		৫	সরকারি চাকরিজীবী	
		৬	বেসরকারি চাকরিজীবী	
		৭	অনানুষ্ঠানিক খাত (রিকশাওয়ালা, রাস্তা বিক্রেতা)	
		৮	অবসরপ্রাপ্ত	
		৯	বেকার	
		১০	অন্যান্য (নির্দিষ্ট করুন)	
A_20	মাসিক পরিবার আয় (টাকায়)			
A_21	আপনার পরিবারে ১৮ বছরের কম বয়সী কতজন শিশু আছে?			
A_22	অসংক্রামক রোগে আক্রান্ত শিশুর সংখ্যা কত?	১	১	
		২	২	
		৩	৩	



		৪	৪ বা তার বেশি	
A_23	আপনার সন্তানের রোগ নির্ণয়ের আগে কি আপনি শৈশবের অসংক্রামক রোগ সম্পর্কে শুনেছেন?	১	হ্যাঁ	
		২	না	

মডিউল বি: শিশুর তথ্য এবং রোগ সম্পর্কিত কারণগুলি				
সিরিয়াল নং।	প্রশ্ন	কোড	বিকল্পগুলি	নির্দেশনা
বি_১	শিশুর লিঙ্গ	১	পুরুষ	
		২	মহিলা	
বি_২	শিশুর বর্তমান বয়স	১	>=৫	
		২	৬-১০	
		৩	১১-১৫	
		৪	১৬-১৮	
বি_৩	শিশুর রোগ	১	শ্বাসনালী হাঁপানি	
		২	জন্মগত হৃদরোগ	
		৩	মৃগীরোগ	



		৪	থ্যালাসেমিয়া	
		৫	কিডনি রোগ	
		৬	টাইপ ১ ডায়াবেটিস	
বি_৪	রোগ নির্ণয়ের পর থেকে সময়কাল	১	এক বছরের মধ্যে	
		২	দুই বছরের মধ্যে	
		৩	তিন বা তার বেশি বছর	
বি_৫	রোগ নির্ণয়ের সময় শিশুর বয়স	১	≥ ৫	
		২	৬-১০	
		৩	১১-১৫	
		৪	১৬-১৮	
বি_৬	গত ৬ মাসে হাসপাতালে ভর্তির সংখ্যা	১	০-১	
		২	২-৩	
		৩	৪ বা তার বেশি	
বি_৭	চিকিৎসার মাসিক খরচ, যার মধ্যে রয়েছে ঔষধ, ডাক্তারের পরামর্শ ফি এবং চিকিৎসা সংক্রান্ত অন্যান্য খরচ (টাকায়)			



বি_৮	আপনার সন্তানের অসুস্থতা সম্পর্কে কি আপনি প্রয়োজনীয় সকল তথ্য পাচ্ছেন?	১	হ্যাঁ	
		২	না	
বি_৯	সন্তানের অবস্থার কারণে আপনি কি আর্থিক চাপের সম্মুখীন হচ্ছেন ?	১	হ্যাঁ	
		২	না	
বি_১০	বাড়ি থেকে নিকটতম স্বাস্থ্যসেবা কেন্দ্রের দূরত্ব (কিলোমিটারে)	১	< 5	
		২	৫-১০	
		৩	১১-২০	
		৪	২১-৫০	
		৫	৫০কিমি র বেশি	
বি_১১	নিকটতম স্বাস্থ্যসেবা কেন্দ্রে পৌঁছানোর সময় (মিনিটের মধ্যে)			

মডিউল সি: সাধারণ উদ্বেগ ব্যাধি (GAD-7)



প্রথমে, উত্তরদাতাদের জিজ্ঞাসা করুন গত দুই সপ্তাহে, আপনি কতবার নিম্নলিখিত সমস্যাগুলি অনুভব করেছেন				
সিরিয়াল নং।	প্রশ্ন	কোড	বিকল্পগুলি	নির্দেশনা
সি_১	নার্ভাস, উদ্বেগ, অথবা বিপদে পড়া	০	মোটোও না	
		১	বেশ কয়েক দিন	
		২	অধিকেকেরও বেশি দিন	
		৩	প্রায় প্রতিদিনই	
সি_২	উদ্বেগ থামাতে বা নিয়ন্ত্রণ করতে না পারা	০	মোটোও না	
		১	বেশ কয়েক দিন	
		২	অধিকেকেরও বেশি দিন	
		৩	প্রায় প্রতিদিনই	
সি_৩	বিভিন্ন বিষয় নিয়ে অতিরিক্ত চিন্তিত হওয়া	০	মোটোও না	
		১	বেশ কয়েক দিন	
		২	অধিকেকেরও বেশি দিন	
		৩	প্রায় প্রতিদিনই	
		০	মোটোও না	



সি_৪	আরাম করতে সমস্যা /নির্ভর হতে/ পারছেন না	১	বেশ কয়েক দিন	
		২	অর্ধেকেরও বেশি দিন	
		৩	প্রায় প্রতিদিনই	
সি_৫	এতটাই অস্থির যে স্থির হয়ে বসে থাকা কঠিন হয়ে পড়ে	০	মোটো না	
		১	বেশ কয়েক দিন	
		২	অর্ধেকেরও বেশি দিন	
		৩	প্রায় প্রতিদিনই	
সি_৬	সহজে বিরক্ত হচ্ছি	০	মোটো না	
		১	বেশ কয়েক দিন	
		২	অর্ধেকেরও বেশি দিন	
		৩	প্রায় প্রতিদিনই	
সি_৭	ভয় লাগছে, যেন ভয়ঙ্কর কিছু। ঘটতে পারে	০	মোটো না	
		১	বেশ কয়েক দিন	
		২	অর্ধেকেরও বেশি দিন	
		৩	প্রায় প্রতিদিনই	



মডিউল ডি: রোগীর স্বাস্থ্য প্রশ্নাবলী -9

(PHQ-9)

প্রথমে, উত্তরদাতাদের জিজ্ঞাসা করুন গত দুই সপ্তাহে, আপনি কতবার নিম্নলিখিত সমস্যাগুলি অনুভব করেছেন?

সিরিয়াল নং।	প্রশ্ন	কোড	বিকল্পগুলি	নির্দেশনা
ডি_১	কোন কাজ করার প্রতি আগ্রহ বা আনন্দ কম থাকা	0	মোটেনো না	
		১	বেশ কয়েক দিন	
		২	অধিকেকেরও বেশি দিন	
		৩	প্রায় প্রতিদিনই	
ডি_২	হতাশ, বিষণ্ণ, অথবা আশাহীন বোধ করা	0	মোটেনো না	
		১	বেশ কয়েক দিন	
		২	অধিকেকেরও বেশি দিন	
		৩	প্রায় প্রতিদিনই	
		0	মোটেনো না	



ডি_৩	ঘুমিয়ে পড়া বা ঘুমিয়ে থাকতে সমস্যা হওয়া, অথবা খুব বেশি ঘুমানো	১	বেশ কয়েক দিন	
		২	অর্ধেকেরও বেশি দিন	
		৩	প্রায় প্রতিদিনই	
ডি_৪	ক্লান্ত বোধ করা বা শক্তি কম থাকা	০	মোটেনো	
		১	বেশ কয়েক দিন	
		২	অর্ধেকেরও বেশি দিন	
		৩	প্রায় প্রতিদিনই	
ডি_৫	ক্ষুধা কম থাকা বা অতিরিক্ত খাওয়া	০	মোটেনো	
		১	বেশ কয়েক দিন	
		২	অর্ধেকেরও বেশি দিন	
		৩	প্রায় প্রতিদিনই	
ডি_৬	নিজের সম্পর্কে খারাপ লাগা — অথবা আপনি একজন ব্যর্থ ব্যক্তি অথবা নিজেকে বা আপনার পরিবারকে হতাশ করেছেন	০	মোটেনো	
		১	বেশ কয়েক দিন	
		২	অর্ধেকেরও বেশি দিন	
		৩	প্রায় প্রতিদিনই	
ডি_৭		০	মোটেনো	
		১	বেশ কয়েক দিন	



	সংবাদপত্র পড়া বা টেলিভিশন দেখার মতো বিষয়গুলিতে মনোযোগ দিতে সমস্যা হওয়া	২	অর্ধেকেরও বেশি দিন	
		৩	প্রায় প্রতিদিনই	
ডি_৮	এত দীর্ঘে চলাফেরা করা বা কথা বলা যা অন্যরা লক্ষ্য করতে পারে? অথবা বিপরীত - এত অস্থির বা অস্থির হওয়া যে আপনি স্বাভাবিকের চেয়ে অনেক বেশি ঘোরাফেরা করছেন।	০	মোটেনা	
		১	বেশ কয়েক দিন	
		২	অর্ধেকেরও বেশি দিন	
		৩	প্রায় প্রতিদিনই	
ডি_৯	মরে যাওয়া অথবা নিজেকে কোনোভাবে আঘাত করাই ভালো হবে এমন ভাবনা	০	মোটেনা	
		১	বেশ কয়েক দিন	
		২	অর্ধেকেরও বেশি দিন	
		৩	প্রায় প্রতিদিনই	

Appendix B: Informed Consent Form

Consent Form (English)

Factors Associated with anxiety and depression Among
Caregivers of Children with Non-Communicable Diseases



in Bangladesh: A Cross-Sectional study at Bangladesh Medical University

Information Sheet

Introduction: Greetings, My name is Nil Mayuri Chowdhury, and I come from Brac James P Grant School of Public Health, BRAC University. We are conducting a study on ***Mental health state of the caregivers of the children with non communicable diseases.***

Serial no.:

Aim: The aim of this study is to assess the mental health state (generalized anxiety disorder and depression) of parents or caregivers of children with non-communicable diseases and to identify the socioeconomic and disease related factors associated with caregivers' mental health state.

Justification of participation: Parents and caregivers play a central role in the long-term care of children with non-communicable diseases. Understanding their mental health condition is important to identify hidden stress, emotional challenges, and support needs. Your participation will help generate evidence that can guide future programs and policies to support caregivers like you.

Procedure: If you agree to participate, you will be asked to take part in a face-to-face interview using a structured questionnaire. The interview will take approximately 25 to 30 minutes. The questionnaire will include questions on socio-demographic information, disease related questions and psychological screening tool PHQ9 and GAD&. No audio or video recording will be done.

Benefits of participation: There is no direct personal benefit from participating in this study. However, the information you provide will help researchers, healthcare providers, and policymakers better understand caregiver stress and design interventions to improve mental health support and overall quality of life for parents and caregivers of children with chronic diseases.



Risk: There is no physical risk involved in participating in this study. Some questions related to stress or emotional well-being may feel sensitive or make you feel slightly uncomfortable. You are not required to answer any question that makes you uncomfortable, and you may skip any question or stop the interview at any time.

Confidentiality and anonymity: All information collected in this study will be kept strictly confidential. Your name or any personal identifiers will not be recorded in the dataset. Each participant will be assigned a unique identification number. Only the research team will have access to the data, which will be securely stored in password-protected files. The findings of this study may be used in academic reports, presentations, or publications, but no information that could identify you will be shared.

Nature of participation: Your participation in this study is completely voluntary. You are free to decide whether or not to participate, and your decision will not affect your access to healthcare services or create any problems for you. You may withdraw from the study at any point during the interview without providing a reason. If you wish to withdraw, any information collected from you will not be used.

Contact information: If you have any questions or concerns about this research study, you may contact:

Nil Mayuri Chowdhury

Phone: _____

For ethical concerns, you may contact the Institutional Review Board (IRB):

Phone: +801993379512

Email: irb-jpgsph@bracu.ac.bd

Consent Form

If you agree to participate in this study, please confirm by putting your signature/thumbprint.

Thank you for your cordial cooperation.



Do you give permission for the interview to be audio recorded? Yes No

Please note that at any point during the interview, you can ask the interviewer to turn off the recording device.

Do you give permission to share your findings? Yes No

Do you give permission to take photos? Yes No

Do you give permission to share the photos? Yes No

(If you need to contact the/collect data from the respondent again, need to state here and ask permission...)

Do you have any question? Yes No

State the question

Interviewer name:

Respondent's name:

Interviewer signature:

Respondent's signature/thumbprint:

Date:

Date:

Consent Form (Bengali)

বাংলাদেশে অসংক্রামক রোগে আক্রান্ত শিশুদের পরিচর্যািকারীদের মধ্যে উদ্ব্গ এবং বিষন্নতার সাথে

সম্পর্কিত কারণগুলি: বাংলাদেশ মেডিকেল বিশ্ববিদ্যালয়ের একটি আন্তঃবিভাগীয় গবেষণা



তথ্য পত্র

ভূমিকা: শুভেচ্ছা, আমার নাম নীল ময়ূরী চৌধুরী, এবং আমি ব্র্যাক বিশ্ববিদ্যালয়ের ব্র্যাক জেমস পি গ্রান্ট স্কুল অফ পাবলিক হেলথ থেকে এসেছি। আমরা *অসংক্রামক রোগে আক্রান্ত শিশুদের যত্ন নেওয়া ব্যক্তিদের মানসিক স্বাস্থ্যের অবস্থা নিয়ে একটি গবেষণা পরিচালনা করছি।*

ক্রমিক নং: MPH-2025-006

লক্ষ্য : এই গবেষণার লক্ষ্য হল অসংক্রামক রোগে আক্রান্ত শিশুদের বাবা-মা বা পরিচর্যািকারীদের মানসিক স্বাস্থ্যের অবস্থা (সাধারণ উদ্বেগ ব্যাধি এবং হতাশা) মূল্যায়ন করা এবং তাদের মানসিক স্বাস্থ্যের অবস্থার সাথে সম্পর্কিত আর্থ-সামাজিক এবং রোগ সম্পর্কিত কারণগুলি সনাক্ত করা।

অংশগ্রহণের যৌক্তিকতা: অসংক্রামক রোগে আক্রান্ত শিশুদের দীর্ঘমেয়াদী যত্নে পিতামাতা এবং পরিচর্যািকারীরা কেন্দ্রীয় ভূমিকা পালন করেন। লুকানো চাপ, মানসিক চ্যালেঞ্জ এবং সহায়তার চাহিদা সনাক্ত করার জন্য তাদের মানসিক স্বাস্থ্যের অবস্থা বোঝা গুরুত্বপূর্ণ। আপনার অংশগ্রহণ এমন প্রমাণ তৈরি করতে সাহায্য করবে যা আপনার মতো পরিচর্যািকারীদের সহায়তা করার জন্য ভবিষ্যতের প্রোগ্রাম এবং নীতিগুলিকে নির্দেশ করতে পারে।

পদ্ধতি: যদি আপনি অংশগ্রহণ করতে সম্মত হন, তাহলে আপনাকে একটি কাঠামোগত প্রশ্নাবলী ব্যবহার করে মুখোমুখি সাক্ষাৎকারে অংশগ্রহণ করতে বলা হবে। সাক্ষাৎকারটি প্রায় ২৫ থেকে ৩০ মিনিট সময় নেবে। প্রশ্নাবলীতে আর্থ-সামাজিক-জনসংখ্যা সংক্রান্ত তথ্য, রোগ সম্পর্কিত প্রশ্ন এবং মনস্তাত্ত্বিক স্ক্রিনিং টুল PHQ9 এবং GAD-7 সম্পর্কিত প্রশ্ন অন্তর্ভুক্ত থাকবে। কোনও অডিও বা ভিডিও রেকর্ডিং করা হবে না।

অংশগ্রহণের সুবিধা: এই গবেষণায় অংশগ্রহণের মাধ্যমে সরাসরি কোনও ব্যক্তিগত সুবিধা নেই। তবে, আপনার প্রদত্ত তথ্য গবেষক, স্বাস্থ্যসেবা প্রদানকারী এবং নীতিনির্ধারকদের যত্নশীলদের চাপ আরও ভালভাবে বুঝতে এবং দীর্ঘস্থায়ী রোগে আক্রান্ত শিশুদের বাবা-মা এবং যত্নশীলদের মানসিক স্বাস্থ্য সহায়তা এবং সামগ্রিক জীবনযাত্রার মান উন্নত করার জন্য হস্তক্ষেপ ডিজাইন করতে সহায়তা করবে।

ঝুঁকি: এই গবেষণায় অংশগ্রহণের ক্ষেত্রে কোনও শারীরিক ঝুঁকি নেই। মানসিক চাপ বা মানসিক সুস্থতা সম্পর্কিত কিছু প্রশ্ন আপনাকে সংবেদনশীল মনে হতে পারে অথবা কিছুটা অস্বস্তিকর বোধ করতে পারে। আপনাকে এমন কোনও প্রশ্নের উত্তর দিতে হবে না যা আপনাকে অস্বস্তিকর করে তোলে এবং আপনি যেকোনো সময় যেকোনো প্রশ্ন এড়িয়ে যেতে পারেন অথবা সাক্ষাৎকার বন্ধ করতে পারেন।



গোপনীয়তা এবং পরিচয় গোপন রাখা: এই গবেষণায় সংগৃহীত সমস্ত তথ্য কঠোরভাবে গোপন রাখা হবে। আপনার নাম বা কোনও ব্যক্তিগত শনাক্তকারী ডেটাসেটে রেকর্ড করা হবে না। প্রতিটি অংশগ্রহণকারীকে একটি অনন্য শনাক্তকরণ নম্বর দেওয়া হবে। শুধুমাত্র গবেষণা দলের ডেটা অ্যাক্সেস থাকবে, যা পাসওয়ার্ড-সুরক্ষিত ফাইলগুলিতে নিরাপদে সংরক্ষণ করা হবে। এই গবেষণার ফলাফলগুলি একাডেমিক প্রতিবেদন, উপস্থাপনা বা প্রকাশনাগুলিতে ব্যবহার করা যেতে পারে, তবে আপনাকে সনাক্ত করতে পারে এমন কোনও তথ্য ভাগ করা হবে না।

অংশগ্রহণের ধরণ : এই গবেষণায় আপনার অংশগ্রহণ সম্পূর্ণ স্বৈচ্ছাসেবী। অংশগ্রহণ করবেন কিনা তা আপনি সিদ্ধান্ত নিতে স্বাধীন, এবং আপনার সিদ্ধান্ত স্বাস্থ্যসেবা পরিষেবাগুলিতে আপনার প্রবেশাধিকারকে প্রভাবিত করবে না বা আপনার জন্য কোনও সমস্যা তৈরি করবে না। আপনি কোনও কারণ না দেখিয়ে সাক্ষাৎকারের সময় যেকোনো সময় গবেষণা থেকে সরে আসতে পারেন। আপনি যদি প্রত্যাহার করতে চান, তাহলে আপনার কাছ থেকে সংগৃহীত কোনও তথ্য ব্যবহার করা হবে না।

যোগাযোগের তথ্য: এই গবেষণা সম্পর্কে আপনার যদি কোনও প্রশ্ন বা উদ্বেগ থাকে, তাহলে আপনি যোগাযোগ করতে পারেন:

নীল ময়ূরী চৌধুরী ফোন: _____

নীতিগত উদ্বেগের জন্য, আপনি ইনস্টিটিউশনাল রিভিউ বোর্ড (IRB) এর সাথে যোগাযোগ করতে পারেন:

ফোন: +801993379512 ইমেল: irb-jpgsph@bracu.ac.bd

সম্মতিপত্র

আপনি যদি এই গবেষণায় অংশগ্রহণ করতে সম্মত হন, তাহলে অনুগ্রহ করে আপনার স্বাক্ষর/আঙুলের ছাপ দিয়ে নিশ্চিত করুন।

আপনার আন্তরিক সহযোগিতার জন্য ধন্যবাদ।

আপনি কি সাক্ষাৎকারটি অডিও রেকর্ড করার অনুমতি দেন? *অনুগ্রহ করে মনে রাখবেন যে* হ্যাঁ না

সাক্ষাৎকার চলাকালীন যেকোনো সময়, আপনি সাক্ষাৎকারগ্রহীতাকে রেকর্ডিং ডিভাইসটি বন্ধ করতে বলতে পারেন।

আপনি কি আপনার গবেষণার ফলাফল শেয়ার করার অনুমতি দেন? হ্যাঁ না



আপনি কি ছবি তোলার অনুমতি দেন?

হাঁ

না

আপনি কি তোলা ছবি শেয়ার করার অনুমতি দেন?

হাঁ

না

(প্রয়োজনে উত্তরদাতার সঙ্গে পুনরায় যোগাযোগ বা তথ্য সংগ্রহ করতে হলে এখানে উল্লেখ করে অনুমতি নিতে হবে)

আপনার কি কোন প্রশ্ন আছে?

হাঁ

না

প্রশ্নটি বলুন।

সাক্ষাৎকারগ্রহীতার নাম:

উত্তরদাতার নাম:

সাক্ষাৎকারগ্রহীতার স্বাক্ষর:

উত্তরদাতার স্বাক্ষর/আঙুলের ছাপ:

তারিখ:

তারিখ: