10-27-2023

Stress and its associated factors in mothers with preterm infants in a private tertiary care hospital of Karachi, Pakistan

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STRESS AND ITS ASSOCIATED FACTORS IN MOTHERS WITH PRETERM INFANTS IN A PRIVATE TERTIARY CARE HOSPITAL OF KARACHI, PAKISTAN

By

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A thesis submitted in partial fulfilment

of the requirements for the degree of

Masters of Science in Nursing

Karachi, Pakistan

27th October 2023

Aga Khan University

School of Nursing and Midwifery

Submitted In partial fulfillment of the requirements for the degree of

[Masters of Science in Nursing]

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Dedication

I would like to dedicate this dissertation to my beloved mother, Shehnaz Akbar, my first teacher, my backbone and my sparkling light in the race of life. Her wisdom, love, support, and motivation has always given me the strength to believe in myself, and the inspiration to choose the correct path in my personal and professional ventures. I also feel privileged in dedicating this thesis to my sister, Afshan Akbar, who always believed in me and stood beside me in the journey of my career and life. I would also like to mention my father, Akbar Ali, in giving the best possible support for my life.

Abstract

Background

Preterm births are the leading cause of death worldwide. Preterm births not only have devastating effects on the new born, but they also have psychological effects on the mothers. Identifying stress related to preterm births, and the factors associated with the stress among mothers with preterm infants is of great importance, for providing sound care to the newborns and their mothers. This study aimed to assess the level of stress and the factors associated with increased level of stress among mothers with preterm infants, in a tertiary care hospital in Karachi, Pakistan.

Purpose

The study aimed to answer the following questions:

1. What is the level of stress among mothers with preterm infants?

2. What are the factors associated with stress among mothers with preterm infants?

Methods

An analytical cross sectional study design was used to achieve the study objectives. A total of 200 mothers who had delivered preterm infants were recruited using consecutive sampling. Data was collected using a self-developed questionnaire for socio-demographic characteristics, obstetric and gynecological characteristics, marital and familial characteristics, coping related factors and newborns characteristics of mothers with preterm infants. Moreover, perceived stress scale (PSS) was also used in the study to identify level of stress among mothers with preterm infants. Data was

analyzed through descriptive and inferential analysis in the Statistical Package for Social Sciences (SPSS) version 22. Inferences were made using the chi-square test for the categorical variables, and T-test was used for two independent samples for continuous variables in the study.

Study Findings

The level of stress identified using the PSS tool among mothers who had delivered preterm infants was significantly higher as compared to other countries around the world. Based on the criteria of PSS scoring, the majority of the participants 92% (n=184) of the mothers, were categorized as having high perceived stress and 8% (n=16) of the mothers fell into the category of moderate stress.

Conclusion

The study findings suggest high levels of perceived stress among mothers with preterm infants. The factors associated with the stress among mothers with preterm infants included mothers who abuse substance, had gender preference pressure from family and were housewives. In addition, lack of social support from husband and in-laws were also found to be associated with increased level of stress among mothers with preterm infants.

List of Abbreviation

APH	Ante-partum Hemorrhage
CMO	Chief Medical Officer
CVI	Content Validity Index
ER	Emergency Room
ERC	Ethics Review Committee
GDM	Gestational Diabetes Mellitus
HIC	High Income Countries
IUD	Intrauterine Deaths
IUGR	Intrauterine Growth Restriction
LBW	Low Birth Weight
LMIC	Low Middle Income Countries
NG	Naso-gastric
NEC	Necrotizing Enterocolitis
NICU	Neonatal Intensive Care Unit
NNJ	Neonatal Jaundice
OR	Operating Room
OG	Oro-gastric
PCOS	Polycystic Ovary Syndrome
PIH	Pregnancy Induced Hypertension
PROM	Premature Rupture of Membrane
PSS	Perceived Stress Scale
RAM	Roy Adaptation Model

RDS	Respiratory Distress Syndrome
SD	Standard Deviation
SPSS	Statistical Package for Social Sciences
TTN	Transient Tachypnea of Newborn
UMIC	Upper Middle Income Countries
USA	United States of America
WHO	World Health Organization

Acknowledgements

I would like to thank the Almighty Allah, for his immense blessings, which enabled me to achieve the great goal of my life. I would like to thank His Highness Prince Karim Aga Khan for providing me the opportunity to fulfill my dreams in his prestigious university.

I am grateful to my supervisor, Ms. Yasmin Parpio, whose scholarly advice, help, and constant encouragement have contributed significantly to the completion of this study.

I am thankful to my co-supervisor, Dr. Tazeen Ali, in standing as a pillar of support and giving the best possible advice for the completion of the study.

I wish to thank my dissertation committee member, Ms. Sumia Andleeb Abbasi, for their critical input for my study.

I am appreciative of the services of Ms. Fatima Shahabuddin who assisted in the proofreading and editing of my paper.

Thank you all

Declaration

I declare that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university and to the best of my knowledge it does not contain any material previously published or written by another person, except where due reference has been made in the text.

The editorial assistance provided to me has in no way added to the substance of my thesis which is the product of my own research endeavors.

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(Signature of Candidate)

27th October 2023

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Date

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Chapter One: Introduction

This chapter provides an overview of the prevalence of stress, globally, among mothers with preterm infants. It also presents details regarding the burden of preterm births nationally and internationally. It also furnishes details about the associated factors of stress among mothers with preterm infants in a tertiary care hospital in Karachi, Pakistan. Moreover, it discusses the significance, purpose, and study questions. The chapter ends with a short summary.

Background

In the context of obstetrics, 'preterm' refers to delivery of an infant prior to the completion of 37 weeks of pregnancy (Machado et al., 2021). Compared to term newborns, preterm infants have different needs. Preterm babies are more likely to experience infections, hypothermia, poor suck reflex, difficulty feeding, effort to gain weight, and impaired lung maturation (WHO, 2022).

Preterm births are escalating, globally. Each year, approximately 15 million newborns are delivered preterm globally (Hanif et al., 2017). One of the reasons for the substantial neonatal deaths prevalence is preterm births which account for 28% of all neonatal deaths worldwide (Khan et al., 2016). Almost 45% of the children who die below the age of five are newborns; amongst these 60–80% are those born prematurely (WHO, 2022).

Pakistan is determined to work on this challenging issue, as it is fourth after China, Nigeria, and India, on the global list of high national rates of preterm births (Hanif et al., 2017). Moreover, the high burden of neonatal morbidity and mortality rates in the nation can be attributed to preterm births. The prevalence of neonatal mortality in Pakistan is that for every 1000 live births, there are 42 neonatal deaths (Kumar et al., 2022). Furthermore, to achieve

sustainable development goal 3.2, which states to reduce neonatal and below 5 mortalities, the matter of preterm births needs to be addressed. Amongst the four provinces of Pakistan, Baluchistan has the highest prevalence of neonatal mortality at, 63 deaths per 1000 live births (Kumar et al., 2022).

Stress can be described as an innate response of an individual to undesirable circumstances that disturbs body equilibrium and stability (Alves et al., 2021). Stress is at its peak when a mother gives birth to a preterm infant. This stress in mothers with preterm infants increases, to a great extent, as the newborns require immediate medical interventions to support their well-being. The person reacts in accordance with the available support network and the stressors at the time. The body's response to stress is primarily based on the external environment, interpersonal skills, and family support (Ansari et al., 2022).

A preterm neonate often has numerous health complications that require neonatal intensive care unit (NICU) admissions for vigorous treatment. Mothers must deal with early detachment from the newborn, preoccupation with the survival of the newborn, and the need for extensive hospitalization. Moreover, preterm infants may have enduring effects of prematurity, leading to the development of stress, depression, and post-traumatic stress disorders in mothers (Malliarou et al., 2021).

Stress upon the birth of preterm infants produces physical and psychological stressors for both the newborn and the mothers. The need for intensive care treatments, feeding difficulties, and low birth weight (LBW) are among the physical challenges for preterm infants. These physical problems for the newborn often lead to psychological impacts on the health of the mothers as well. The mother-child bond is at risk when a preterm infant is born because of the

early detachment of the infant from the mother, due to the aggressive treatment requisites for the newborn. A mother's stress stemming from a particular course of treatment for her preterm infant hinders the development of a stable parent-child bond (Lau et al., 2020).

The incidence of postpartum depression in Pakistan is 63.3% (Chang et al., 2022). Preterm births potentially create disturbing effects on the newborn, while simultaneously initiating distressing challenges for the mothers. These difficult challenges account for the advancement of stress resulting in high levels of depression in some mothers (S. Karbandi et al., 2018). A systematic review conducted to investigate the relationship between preterm birth and postpartum depression found that mothers of preterm infants had a higher risk of postpartum depression (de Paula Eduardo et al., 2019). This literature seems to indicate preterm births have psychological effects on mothers. Moreover, early childbirth weakens the mother’s decision and thinking capability, adding to the pressure of having a high-risk newborn (S. Karbandi et al., 2018). Furthermore, this challenging issue makes the mother of a preterm more prone to mental instabilities, in contrast to mothers of term babies. The incidence of postpartum depression in mothers with preterm infants is as elevated as 30-40% in contrast to 6-12% in mothers with infants born at the completion of the gestational period (C. Pisoni et al., 2019). In the initial postnatal period, mothers of preterm infants have been found to have more stress and depression than mothers of term babies (Chang et al., 2022). According to a longitudinal study, 63% of mothers whose infants were admitted in NICU had postpartum depression even after discharge from the hospital (C. Pisoni et al., 2019).

A multitude of factors contribute to the upsurge in stress experienced by mothers of preterm newborns. According to a research conducted in India, hospitalization of the child in the critical care setting, socio-economic status, and environmental support in the hospital setting for

the mothers and the newborn are frequently associated with stress in mothers with preterm infants (Ansari et al., 2022).

One of the ways to address this challenge is by focusing on the coping approaches of mothers with preterm babies. According to Karbandi et al (2018), maternal coping is an attempt by the mother to eliminate or diminish stress and increase tolerance. Furthermore, mothers of preterm infants use various coping strategies to minimize the stress in this demanding circumstance. Coping strategies of mothers with premature infants have a close connection with their support systems and their own emotional well-being (S. Karbandi et al., 2018).

Support systems for mothers having preterm newborns are very important. This support system includes the emotional and psychological help that is received from the husband, family members, and friends. Social support facilitates positive stress reaction that aids in elevating the mother’s self-confidence and emotional stability (Lau et al., 2020). Moreover, it also diminishes the physiological and mental afflictions triggered by stress. Social support upsurges the mother’s capability to fight mental pressure, lessens physical problems, and enhances the possibility of giving appropriate care to the newborn (Chang et al., 2022).

The growing number of preterm births highlights the need to work on the newborns' physical needs and the mothers' psychological requirements simultaneously. This dual approach can be done by identifying the level of stress and the factors that are associated with the stress among mothers with preterm infants and incorporating effective coping strategies to reduce the stress associated with preterm births.

Significance

Preterm births are mounting in greater numbers, building a massive burden of morbidity and mortality globally. Pakistan is ranked third in the world for neonatal mortality and accounts for about 7% of the universal neonatal death (Dawood & Majeed, 2022).

Preterm births themselves create a demanding environment while generating difficult circumstances for the psychological health of the mothers. Birth of preterm infants causes serious psychological stress for mothers which make them vulnerable to developing mental disorders, including depression (Mesa et al., 2021). Thus, while generating a caring environment for preterm infants, the mother's psychological health is of prime significance and needs to be critically considered. The emotional well-being of mothers needs to be addressed as the mother's overall health will directly affect the care of the newborn (Malliarou et al., 2021). Thus, the mothers of premature babies possess an augmented need to reduce the stress level associated with the birth and care of preterm. In addition, there is a need for identifying the factors that are associated with the increased level of stress among mothers with preterm infants. The areas that need to be worked on for mothers to cope with the demanding situation include recognizing the support system available for the mothers including spouses, family members, and close friends. Increasing levels of support system enhance an individual's ability to reduce stress and lessen physical issues (Chang et al., 2022).

Tertiary care hospitals work on the physical aspects of care while providing treatment to preterm infants; however, there is a propensity to sideline the psychological health of the mothers who have delivered preterm infants. Stress in mothers with preterm infants potentially causes reduced cognitive capacities, vague attention, deprived memory, insomnia, and moods of exhaustion (Chang et al., 2022). While the physical health of the preterm infant is vital, at the same time, the mental health of the mothers is also essential.

Nurses are an integral part of the collaborative care of the preterm and their mothers. Nurses can provide knowledge to mothers, which can boost their confidence in caring for their preterm infants (Im & Oh, 2021). The findings of this study can assist nurses to identify the stressors of mothers resulting from the birth of a premature baby. In addition, it allows nurses to identify the possible factors of stress among mothers with preterm newborns at the individual level while seeking strategies to overcome those factors. Moreover, nurses can also facilitate mothers in recognizing the various support systems available to them. Furthermore, nurses can work jointly for betterment in the care of preterm infants and their mothers during this challenging time.

This study is important because the identification of stressors can lead to careful planning for the interventions and prevention programs for mothers with premature babies, in the future. This study can ultimately reduce the overall mortality and morbidity associated with ineffective coping by mothers, associated with the birth of a premature newborn. This research potentially facilitates the accomplishment of the Sustainable Development Goal 3, by reducing maternal and infant mortalities and morbidities.

Study Purpose

The goal of this study was to identify the levels of stress in mothers associated with the birth of preterm infants while seeking care in the step-down units and NICU of a tertiary care hospital in Karachi, Pakistan.

Study Questions

The aim of this study was to answer the following questions:

1. What is the level of stress among mothers with preterm infants in a tertiary care hospital in Karachi, Pakistan?

2. What are the factors associated with stress among mothers with preterm infants in a tertiary care hospital in Karachi Pakistan?

Summary

Preterm births are a major burden nationally and internationally. This burden is also associated with the mental health of the mothers delivering preterm infants. Stress associated with the birth of a premature newborn is huge which may lead to a damaging effect on the general psychological wellbeing of the mothers. Factors that are associated with the stress linked to the birth of the preterm babies need to be addressed and resolved during a time of duress and fear for the mothers, which further complicates the efforts.

The nurse is an integral part of the team providing care for the preterm infants and their mothers. This study can provide a platform for nurses to enlighten their therapeutic role by delivering physical care to the newborns and rendering psychological help to the mothers at the same time in an effort to deliver holistic care.

As mothers are the primary caretakers involved in the overall care of the preterm infants, their mental wellbeing is pivotal. Although hospitals focus on the health of preterm infants, there is often a gap in addressing the psychological health of the mothers. The study findings can help detect mothers' need for psychological assistance, which helps in substantially improving their mental wellbeing.

Chapter Two: Literature Review

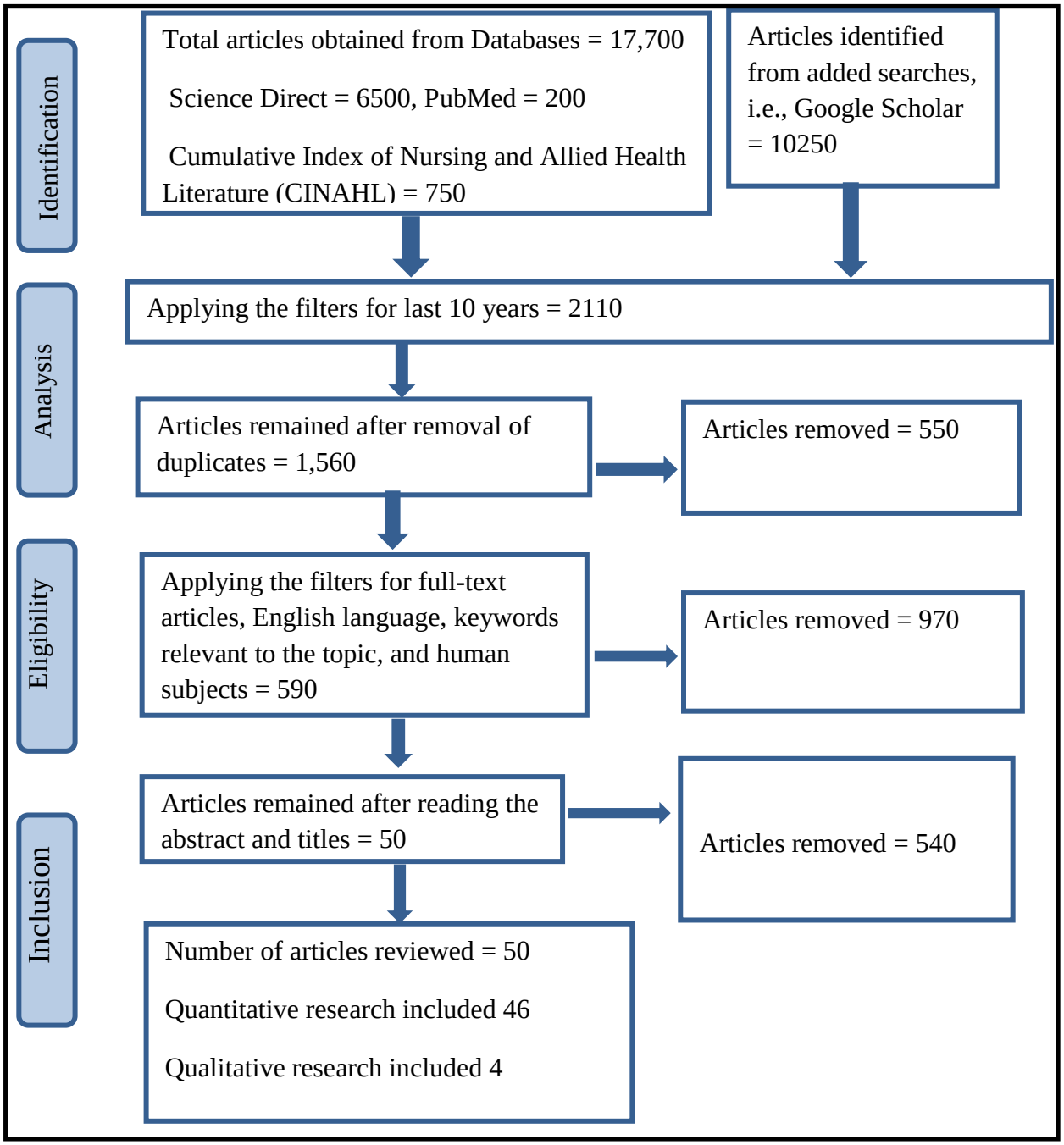
This chapter provides details about the literature review undertaken for this thesis. It commences with a consideration of issue of increasing numbers of preterm births, which is then followed by a literature review regarding the level of stress in mothers caused by the birth of premature babies. In addition, it also describes the factors that are associated with the birth of a preterm newborn. This chapter also presents details about the theoretical framework that was utilized in the study. Finally, the chapter ends with a gap analysis and a brief summary.

Search Strategy

A detailed and complete literature search was conducted using numerous electronic databases, including CINAHL, Science Direct, PubMed, and Google Scholar. The specific keywords that were used included “Premature Infants”, “Mothers AND Preterm”, “Prevalence of Neonatal Mortality in Pakistan”, “Mothers AND Preterm AND Pakistan”, “Risk factors AND Preterm” and “Factors associated with Stress among Mothers with Preterm in Pakistan”. The search showed about 17,700 articles which were further narrowed by filtering for recent studies, (i.e., within the last 10 years), which brought down the results to 2,110.

Firstly, articles with titles and abstract that appeared irrelevant to the topic were excluded. Next, duplicate articles were removed and the articles that remained were 1,560. In addition, articles that only had abstracts, had copyright issues, and had languages other than English were also excluded, bringing the number down to 590 articles. Articles were then explored by analyzing the titles and the abstracts which yield 50 articles for inclusion. These 50 articles included research articles, review articles, and commentary articles. Despite meticulous searching, very limited literature was found on the risk factors associated with preterm births in Pakistan.

Figure 1. Search Strategy



Burden of Preterm Births

Over time, there has been a significant rise in preterm births in Pakistan. According to a study conducted in Pakistan, the incidence of preterm births in the different provinces of

Pakistan, i.e., Punjab, Sindh, Khyber *Pakhtunkhwa,* and Baluchistan were 176 (18.4%), 86 (22.5%), 77 (27.9%), and 26 (32.1%), respectively (Hanif et al., 2020). This gives a clear picture of the enormous burden of preterm births in the country. Moreover, the rate of neonatal mortality shows that Pakistan is far behind in the battle of achieving the Sustainable Development Goal 3.2 by 2030, so vigorous actions and interventions are required.

Physiological Adaptation of Preterm Infants

Early transition to extra uterine life due to premature birth leads to numerous health challenges for the newborn. There are various factors that can influence normal adaptation in a preterm newborn. The factors that affect the postnatal development of preterm infants include impaired sucking reflex leading to poor feeding establishment, LBW due to intrauterine growth restriction (IUGR), and course of treatment during hospitalization (Silveira & Procianoy, 2019).

Temperature regulation in preterm newborns is also a critical challenge, as with LBW the exposed surface area tends to lose the body heat resulting in hypothermia. Since regulation of body temperature is disrupted in preterm infants, it is the leading cause of neonatal deaths worldwide (Silveira & Procianoy, 2019).

Feeding establishment is another prime concern in babies born preterm. As the sucking reflex is not fully developed, premature infants are unable to suck the breast or bottle properly. This deficit leads to poor weight gain; hence, additional help, including oro-gastric (OG) and naso-gastric (NG) tube feedings is needed for proper weight gain in preterm newborns. Preterm infants born below 34 weeks of gestation require external feedings due to the underdevelopment of the sucking and swallowing reflexes (Silveira & Procianoy, 2019).

Inadequate lung maturation, due to lack of surfactant, is also a risk factor associated with the birth of a preterm infant. The need for respiratory support, including ventilators and

administration of surfactants, to reduce the chances of respiratory distress syndrome (RDS) is in the imperative to safeguard the respiratory risk for the preterm newborn (Silveira & Procianoy, 2019).

Maternal Stress and Its Burden

Maternal stress is the pressure that is experienced by mothers during pregnancy and in post-natal period. Numerous negative pregnancy outcomes, such as preterm birth and LBW infants, are linked to maternal stress (Keane et al., 2021). Stress during pregnancy can result in devastating consequences. Preterm birth is one of the outcomes that is correlated with perceived stress during pregnancy (Lalani et al., 2023).

Maternal mortality is also closely linked with maternal factors including maternal stress and associated co-morbidities. Maternal mortality is explained as the death of the mother during the course of pregnancy or within 42 days after the completion of pregnancy (Shaeen et al., 2022). Maternal deaths are relatively high in low and middle income countries (LMIC) like Pakistan.

A high maternal mortality rate of 186 deaths per 100,000 live births was reported in 2019, which was a 32% increase since 2017, at 140 deaths per 100,000 live births (Shaeen et al., 2022). These high figures depict the burden of maternal mortality in the country. Sustainable Development Goal #3.1 also aims at combating this situation and to reduce the global maternal mortality ratio by 2030. The figures for maternal mortality rates mentioned above are far greater than what needs to be achieved by 2030. These numbers suggests an immense need to work on the overall health and well-being of mothers delivering preterm infants.

Maternal Stress and Preterm Births

The transition role of becoming a mother is crucial; at the same time, it is a moment of happiness for the mother and the family (Dua'a et al., 2020). The transition is demanding enough when delivering a term infant, but becomes traumatic if a preterm infant is born. Moreover, the birth of preterm infants possesses a risk to the overall physical and psychological health of the mothers (Sih et al., 2019). The risk of having depressive symptoms in the postnatal period has been found to be 4–18 times more in mothers with preterm infants (C Pisoni et al., 2019).

In one study, among individuals who experienced stress during pregnancy, 54 % of them gave birth to preterm infants (Lilliecreutz et al., 2016). According to a quantitative research conducted on stress among mothers of premature infants in a Malaysian NICU, 56.5% of the mothers who delivered preterm infants reported high levels of stress (Ong Swee, 2018). Moreover, the prevalence of maternal stress in LMICs is 29–60% (Waqas et al., 2020). Pakistan is also a LMIC, with a high prevalence of maternal stress. These numbers illustrate the burden that comes with maternal stress, which can result in premature births that place a burden on the nation.

Factors Associated with Maternal Stress

There are multiple factors that increase maternal stress and result in the delivery of a preterm infant. A study conducted in Ukraine, on maternal stress experienced in the NICU after preterm delivery, concluded that mothers with preterm newborns experience high levels of stress, which are associated with maternal age, length of stay in the NICU, alteration in the parental role, and the unavailability of a support system (Pavlyshyn et al., 2022). Others have reported risk factors such as age of the mother, educational status, history of preterm births and abortion, care during the antenatal period, and maternal health issues such as hypertension and anemia

(Hidayat et al., 2016). The factors associated with maternal stress and the birth of a preterm infant are discussed below.

Physiological and demographic factors. Several physiological and demographic factors have connections with stress in mothers with preterm infants. Amongst these factors, maternal age is significantly associated with the birth of a preterm infant. Advancement in the maternal age and underlying co-morbidities of the mother can also lead to the delivery of a preterm infant (Dahman, 2020). Moreover, nutritional status is also of prime importance to prevent preterm births, which is assessed by the hemoglobin level of the mothers, to identify anemia. The World Health Organization (WHO) considers anemia as a universal problem, with severe effects on mothers and infants (Samson et al., 2018).

Socio-cultural factors. Many socio-cultural factors have been found to have an association with stress in mothers with preterm infants. Studies in the Pakistani context have identified several culture-oriented factors related to pregnancy that have adverse effects. These include restricting women's access to health care and clinics to take decisions about family planning, and limited education related to sexual and reproductive health (Lalani et al., 2023). However, researchers have also suggested that the support system of husbands and in-laws are promoting factors in reducing stress in mothers with preterm infants, while lack of support groups negatively affect the mental health of mothers (Lalani et al., 2023). In addition, gender preference has also been found to increase stress in mothers. Moreover, preferring a male child over a female child also increases the number of unplanned pregnancies (Lalani et al., 2023).

Psycho-social factors. One of the psycho-social factors found to have an association with stress in mothers with preterm infants is that a good relationship with the husband is a protective factor. This partnership boosts their satisfaction level and reduces their stress to a

great level. On the other hand, domestic violence by the husband creates negative effects and increases the level of stress (Lalani et al., 2023). Moreover, substance abuse, including use of betel nuts, alcohol, and cigarette smoking has been found to lead to an increased risk of delivering a preterm infant (Lilliecreutz et al., 2016).

Socio-economic factors. Among the socio-economic factors found to have an association with stress in Pakistani mothers with preterm infants are unemployment, lack of education, and poverty (Lalani et al., 2023). One of the stresses that seem to affect a large numbers of mothers with preterm infants is knowledge gap respecting risk factors regarding prevention of preterm births (Tambunan et al., 2020). Moreover, the low level of literacy rates among females in Pakistan deprives them of taking decisions for their own benefit (Lalani et al., 2023).

Pregnancy-related factors. Pregnancy-related factors found to have an association with stress in mothers with preterm infants, shows that multiple pregnancies, Ante-partum hemorrhage (APH) during pregnancy, and the amount of fluid including polyhydramnios and oligohydramnios are associated with an increased risk of premature birth (Lilliecreutz et al., 2016). Moreover, co-morbidities arising during pregnancy, including pre-eclampsia and gestational diabetes mellitus (GDM), lead to an increased risk of preterm delivery (Lilliecreutz et al., 2016). Maternal history of hypothyroidism, asthma, and hypertension also augment the risk of preterm birth (Lilliecreutz et al., 2016). In addition, history of abortion, miscarriages, preterm birth, stillbirth, premature rupture of membrane (PROM), and pregnancy induced hypertension (PIH) were also linked with the delivery of a preterm infant (Gejo et al., 2021).

Mental Health of Mothers and Preterm Infants

The prime intervention for reducing neonatal deaths is empowering mothers to combat the situation. Survival of preterm infants depends upon the mothers' sound mental health, which

is essential to care for the preterm infant (Sih et al., 2019). Mental health of mothers with preterm infants needs to be evaluated keenly to identify increase level of stress that will help distinguish mothers with impending need of psychological help. Mothers of preterm infants often use ineffective coping strategies after preterm delivery, which have been associated with negative results (Sih et al., 2019).

Premature birth is experienced as a psychological event by the parents and it also distresses the preterm infant (Simon et al., 2021).The most pivotal aspect in decreasing neonatal mortality is the mental well-being of mothers, which is not only vital for the mother, but it is also a key component in the development and growth of the preterm infant. Stress of the mother can lead to depression, which can hinder a mother from caring for the preterm infant and affects the development of the newborn (Barber et al., 2021). This hindrance in the care of preterm infants not only affects their physical growth but also hinders their mental development. Depression in mothers has been linked with deprived cognition in children, and impact on verbal communication and social outcomes (Yaari et al., 2019).

Child birth potentially results in a difficult role for mothers; it gives stress to the mothers. However, for mothers delivering preterm infants risks of mental problems are somewhat higher, and the stress in the post-natal period has effects on the growth of the infant. A connection has been recognized between the impairment in a child's neurological development and psychological distress in mothers whose children are born preterm (Yaari et al., 2019).

Many approaches can be employed to alleviate maternal mental health and decrease the chances of mental disruption after the delivery of a preterm infant. Mothers of preterm infant experience sleep instability, stress, and financial constraints (Soheila Karbandi et al., 2018). The major areas that need attention include provision of psychological support to the mothers,

education of mothers regarding preterm infants, spousal support, and involving the mother in the care of the infant. Spousal support has been observed as having positive effects on the mental well-being of the mothers (Kestler-Peleg, 2021). These strategies will aid in boosting the mental health of mothers, and bringing a sense of empowerment in them.

Theoretical Framework

Roy's Adaptation Model (RAM) of Nursing was developed by Sister Callista Roy, in 1976. Roy visualizes the person as a set of interconnected systems that preserve equilibrium among the numerous environmental stimuli (Tefera et al., 2022). RAM suggests that adaptation is perceived when an individual constantly interconnects with environmental stimuli (Tefera et al., 2022). Many studies have been conducted to identify the effect of mothers' adaptation to the newly emerging role of motherhood, but most studies work on a single aspect of maternal roles, including self-efficacy, connection with their infants, and parenting stress; however, studies on relation with emotional well-being have not been conducted (Tefera et al., 2022).Moreover, there is less evidence regarding the application of a designed educational program for postnatal care and adaptations of the maternal role in mothers with preterm infants, in the Pakistani context (Tefera et al., 2022).

Incorporating the model for mothers with preterm infants, RAM describes a mother's experience of pregnancy and delivering a preterm infant as the outcome of the process, whether it is positive or negative, which also includes the care provided by significant others (Tefera et al., 2022).The model suggests that nurses must address the focal stimuli of the experience, which includes the mode of delivery, i.e., vaginal or caesarean section. The contextual stimuli include factors such as socio-demographic data of mothers, knowledge level, and infant's status, are suggestive factors that influence the response to the focal stimulus, directly, to adaptation.

Residual stimuli deal with the mother's perception of the experience with the birth of a preterm infant.

Learning skills, judgment, decision-making, and emotions are part of the cognator that is the coping sub-system in RAM. These include the perception of mothers about the feelings and emotions related to the experience of pregnancy and delivery and the first contact with the preterm infant. A birth experience that is perceived as negative by the mothers is interpreted as 'inadequate adaptation' within RAM (Tefera et al., 2022).

Utilizing the RAM, the mother's responses to stimuli are described in four main modes of adaptation, physiological-physical, self-concept, role and function, and interdependence. The RAM adaptation modes suggest that the adaptation behaviors of mothers differ on the basis of the characteristics such as parity, mode of delivery, and educational level.

Physiological-physical mode. Chemical changes are a part of the individual body that enables the living organisms to function. These are the actual processes put in motion by the regulator sub-system. This mode includes the need for oxygen, food, elimination, activity, and rest. Mothers, during pregnancy and delivery of a preterm infant, go through the complex processes of this mode, which are associated with the senses, fluid and electrolytes balance, neurologic function, and endocrine function (Tefera et al., 2022).The physiological mode for mothers with preterm infants includes fatigue, pain, and activity intolerance, and surgical wound in postnatal mothers.

Self-concept mode. This mode deals with the mothers' emotional aspects, which includes the perception of self and others. The loss of self-confidence and anxiety about the impact on future pregnancies are included in this mode (Tefera et al., 2022).

Role and function mode. This mode deals with social integrity by concentrating on the performance related to the various roles that individuals come across during their lifetime. For mothers with preterm infants, the role transition to motherhood requires them to perform as a mother and a wife after exposure to the stimuli. Lack of self-care and family care deficits have been identified under the role and function mode (Tefera et al., 2022).

Interdependence mode. This mode highlights the role of relationships between the mothers and significant others. The interdependence mode includes a healthy relationship with the husband and in-laws, family support, interaction with health professionals, i.e., nurses and social support, and contact with the preterm infant (Tefera et al., 2022).

Levels of Adaptation in RAM

Integrated Process. When the modes and sub-systems, mentioned in the RAM, meet the required needs of the environment, the integrated level of adaption takes place. These include stable processes (e.g., breathing, spiritual realization, and successful relationship) (Tefera et al., 2022).

Compensatory Process. This occurs when the cognator and regulator modes work to meet the requirements that are being challenged by the environment, e.g., grief, starting a new job, and the birth of a preterm infant (Tefera et al., 2022).

Compromised Process. This happens when the challenges of the environment are not adequately met by the modes and sub-systems, e.g. unresolved loss, maladaptive coping, and abusive relationships (Tefera et al., 2022).

Six-step nursing process. Roy suggests nurses as facilitators of the adaptation process, which can be achieved by manipulating the stimuli either by removing, decreasing, or increasing the specific stimuli for the individual (Tefera et al., 2022). The six steps of the nursing process

include:

1. Assess the behaviors of an individual as mentioned in the four adaptive modes of RAM.
2. Classify the identified stimuli as focal, contextual, or residual.
3. Develop the nursing diagnosis of the mother's adaptive level.
4. Establish a goal to promote adaptation.
5. Implement interventions that are expected to manage the stimuli.
6. Evaluate whether the adaptive goal has been achieved.

This framework provides different modes that are relevant to the scope of the study. In addition, the challenges that are encountered by the mothers delivering preterm infants can easily be identified by applying the RAM and timely interventions can be carried out to improve the situation. Moreover, this model not only helps work on the physical aspects of the mothers but it can be used to work on the psychological aspects of the mothers in this difficult situation. The model also suggests the nursing process related to the process of adaptation that can be utilized by the nurses while dealing with mothers delivering preterm infants.

This study's prime focus was to identify the stress and the associated factors linked with the birth of preterm infants, which include socio-demographic information, pregnancy-related variables, and cultural and economic factors of mothers. This model helped develop the questionnaire according to the mentioned factors related to the study. This framework has been of immense importance in guiding the study.

Gap Analysis

Preterm births are an immense burden nationally and internationally. Statistics have shown that there is a pressing need for interventions in this regard. The primary maternal intervention required, is for the mental well-being. The only way to overcome this difficult

situation is to work on the mothers' mental health, which requires knowledge of the risk factors linked to preterm births. Moreover, identifying support systems for mothers can aid in achieving better health outcomes for both mothers and newborns. Therefore, it is imperative to determine the level of stress among mothers with preterm infants for the overall betterment of mothers and infants.

If these risk factors are already known, teaching about the care of the anticipated preterm infant can be given in the antenatal period, to prevent the psychological effects on the mother and the infant. Moreover, risk factors leading to preterm births need to be identified to decrease the chances of preterm births. However, if infants are born preterm, then specific interventions must be carried out for the mothers and the infants.

This study provided a platform to identify the factors that are associated with stress related to preterm infants. Moreover, this study can provide a platform for future research in the field.

Summary

This chapter provided details about the search strategy and the burden of preterm births at the national and international levels. Moreover, it discussed the physiological adaptation of preterm infants, maternal stress, its burden, and the relation of maternal stress with preterm births. Furthermore, it described the factors that are associated with maternal stress and the importance of mental wellbeing of mothers with preterm infants. In addition, the chapter discussed the theoretical framework of Roy and the gap analysis.

Chapter Three: Methodology

This chapter provides an outline of the methods utilized for conducting the study. It is comprised of the study design, study population, study setting, study period, sampling strategy, and sample size. It incorporates the participants' recruitment process, through the eligibility criteria based on the inclusion and exclusion criteria. The chapter also provides details about the conceptual and operational definitions of the study variables. Moreover, it also describes the data sources and process of data collection. Furthermore, the chapter presents details about the PSS, which includes content validity, and reliability. The techniques of pre-testing, managing data entry, and statistical analysis are explained in this segment. Lastly, the chapter encompasses the ethical considerations of the study and finishes with a short summary.

Study Design

Quantitative research examines phenomena and situations that impact the population on a larger scale delivering factual data that can be conveyed via figures and numbers (Polit & Beck, 2017). The analytical cross-sectional study design was incorporated into the study to identify stress and its associated factors among mothers with preterm infants. The analytical cross-sectional study design is beneficial when the plan of the study is to identify the prevalence of a problem, its associated factors, and the association between exposure and outcome (Polit & Beck, 2017). This study is aimed at identifying the level and factors associated with stress among mothers who delivered preterm infants. To ascertain an association between the level of stress, and its associated factors, an analytical cross-sectional study design was considered relevant for this study.

Study Population

The population of the study implies the group of all the subjects on whom the results of the study are based, and that can be generalized for the whole target population (Shukla, 2020). The study population was the mothers who delivered preterm infants in a private tertiary care hospital in Karachi, Pakistan. These preterm babies were treated in the NICU and then shifted to step-down units for teaching and training the mothers in handling the preterm infant. The mothers were recruited from the NICU and the step-down units of a private tertiary care hospital in Karachi, Pakistan. The step-down units for neonates are designed to promote normal growth and development of the preterm neonates with the aim of achieving feeding targets and competencies in handling techniques. These units engage mothers as the primary caregiver for their preterm babies by involving them in the overall care of the newborn.

Study Setting

The surroundings, logistics, environment, and arrangements of the study setting are significant aspects that need consideration before commencing a research study (Majid, 2018). Data was collected from a private tertiary care hospital in Karachi Pakistan. The inpatient service for preterm infants includes NICU, neonatal step-down units, and neonatal nurseries, catering to more than 50 patients per day. Viewing a study setting prior to data collection grants the researcher the chance to plan for any challenges within the study setting (Majid, 2018).

There was a large pool of mothers from these areas who had given birth prematurely, from which the participants could be chosen. Moreover, people accessing the hospital come from different demographic regions, socio-cultural backgrounds, and educational statuses which may contribute to a comprehensive picture of the study population.

Study Period

This quantitative analytical cross-sectional research study was completed in a five-month period, from December 2022 to April 2023. The study commenced after approvals from the chief medical officer (CMO), and the ethical review committee (ERC).

Eligibility Criteria

Defining the inclusion and exclusion criteria for the study participants improves the possibility of generating reliable results and diminishes the possibility of recruiting inappropriate participants (Hornberger & Rangu, 2020). The participants for the study were selected based on the below mentioned inclusion and exclusion criteria.

Inclusion Criteria

The inclusion criteria of a study indicate the main features that the potential participants of the study must have; these criteria include demographics and the pertinent characteristics related to the study (Hornberger & Rangu, 2020).The inclusion criteria of this study included:

- Mothers of age 18 years and above
- Gestational age of preterm below 37 weeks.
- Mothers who were willing to participate and give consent.

Exclusion Criterion

The exclusion criteria of the study specifies the subjects who meet the inclusion criteria but possess other features that are not favorable for the study and that need to be excluded (Hornberger & Rangu, 2020).The exclusion criterion of the study included:

- Mothers who could not communicate in the Urdu or the English language.

Sampling Method

The non-probability sampling technique was utilized in the study. The non-probability sampling method is a non-random collection of sample, based on convenience or the subjective judgment of the researcher (Taherdoost, 2017).

A consecutive sampling method was used for selecting participants. Consecutive sampling involves enlisting a group of people from the available population that meets the eligibility criteria over a particular period. Consecutive sampling is an enhanced approach as it minimize bias in the study, as compared to the convenience sampling method (Polit & Beck, 2017). However, the efficacy of this sampling technique is contingent upon the researcher's ability to recruit potential participants, as the selection process is not random (Polit & Beck, 2017). Furthermore, the individuals in that environment need to be typical of the target population.

Sample Size

The sample size of the study must be pre-planned, systematically considered, and adequately large to depict the population (Garg, 2016). The sample size was calculated using the Open Epi software.

Sample Size for the Prevalence of Stress among Mothers with Preterm Infants

The sample size was calculated through Open Epi software. The prevalence of stress among mothers with preterm infants was reported to be 75% as per Fróes et al. (2019). The reported prevalence of stress among mothers with preterm infants was used to calculate the sample size, with a 95% confidence interval, 10% room for error, and a non-response rate of 10% was also adjusted. To achieve the study objective, the final sample size was determined as 73+7 i.e. 80.

Sample Size for Determining the Associated Factors of Stress among Mothers with Preterm Infants

The sample size was also calculated for associated factors by considering the prevalence of co-morbidities in mothers with preterm infants. The prevalence of co-morbidities among mothers with preterm infants was 38.41% and for mothers with term infants were 20.76% (Al-Hindi et al., 2021). Considering the proportions, taking power of the study as 80, the confidence level of 95%, two-sided hypotheses, taking 1:1 ratio for unexposed and exposed for the sample, and the estimated prevalence ratio of 1.8; the approximate sample size came out to be 213. Adding the non-response rate of 10% i.e. 21 the final sample size was 234.

Since the sample size is higher for associated factors of stress among mothers with preterm infants (i.e., 234), the sample size of 234 was required for the study. However, during the process of data collection, due to the non-availability of mothers in the NICU, a sample size of 200 was achieved.

Recruitment Process of Participants

The selection of relevant participants is fundamental for the correct interpretation of the population in a study (Manohar et al., 2018). Firstly, permission for the research was taken from the CMO of the hospital. Moreover, approval from the ERC of the Aga Khan University Hospital was taken.

After getting the required permissions, the recruitment process of participants was started. The researcher approached the participants in the NICU and neonatal step-down units. In addition, the researcher evaluated the participants based on eligibility criteria with the help of the patient's medical record numbers. After screening the relevant participants, the researcher shared the aim of the study with the participants. Moreover, the benefits of the study were also

explained. Upon willing agreement from the participants, written informed consent was taken from them and the data collection process was then initiated.

Study Variables

Variables are the different characteristics that can take numerous values, for example age, height, and stress (Polit & Beck, 2017).

Dependent Variable

The dependent variable is the product variable, which is affected by the independent variable (Polit & Beck, 2017). Stress level among mothers with preterm infants was the dependent variable of the study. The stress among mothers was assessed through the PSS. Levels of stress were also linked with factors that are associated with stress among mothers with preterm infants. The conceptual and operational definitions are as follows:

Conceptual Definition of Maternal Stress. Conceptually, maternal stress categorizes the delivery of a preterm infant and the consequences that are linked with this situation (Ionio et al., 2016). Maternal stress is associated with multiple factors, which include the birth of a preterm infant, neonatal mortality, and LBW. Maternal stress increases if the emotional bond and support system are not available for the mothers (Berthelon et al., 2021). These factors amplify maternal stress, which lead to significant outcomes for the mother herself and her newborn.

Operational Definition of Maternal Stress. According to the operational definition, maternal stress in the study was measured by the PSS. This scale measures the overall level of stress by encompassing the control over self and the conditions in life, personal confidence, and ability to control important aspects in life. The scores for the scale were examined in the research study.

Independent Variables

The independent variable is the cause that itself cannot be changed but that will change the outcome of the study (Polit & Beck, 2017). The factors associated with the stress among mothers with preterm infants were taken as the independent variables in the study. The following were the independent variables of the study:

- Newborn's information.
- Mother's demographic data.
- Pregnancy-related variables.
- Family information.
- Coping mechanisms.

Conceptual Definition of Newborn Information. Respecting information related to the newborn it is essential to identify the gestational age, as it depicts the LBW and prematurity status in the newborn. The demographics of the newborn, including prematurity, LBW, and neonatal infections, are pivotal factors that impact neonatal mortality in developing countries (Gebremariam et al., 2022).These factors, including LBW and premature birth of the newborn are the prime aspects that potentially aggravate stress in mothers.

Operational Definition of Newborn Information. The newborn information included age, gender, date of birth, weight, height, presenting complaints, APGAR score, immunization status, the area from where the baby was transferred, and gestational age. It also included the newborn's need for supplemental oxygen, the need for a ventilator, and feed progression.

Conceptual Definition of Mother's Demographic Data .The demographic data of the mother who delivers a preterm infant is of prime importance. Advanced maternal age at the

time of birth is associated with an added risk of premature births (Esposito et al., 2022). Furthermore, a study carried out in Milan, Italy, found that mothers of preterm infants frequently had low levels of education and were unemployed (Esposito et al., 2022). Therefore, the demographic data including age, education status, and occupation of a mother is significant, as she is dealing with early labor and delivery of a preterm infant.

Operational Definition of Mother's Demographic Data. The demographic variables of the mother that were considered for the study included age, education status, occupation status, substance abuse, marital status, type of marriage, and number of years married.

Conceptual Definition of Pregnancy-Related Variables. Data related to previous pregnancies is of prime importance to rule out any risk associated with preterm birth. Maternal factors including parity, multiple pregnancies, PIH, APH, and PROM were correlated with the delivery of a preterm infant (Jena et al., 2022).

Operational Definition of Pregnancy-Related Variables. The variables related to pregnancy that were included in this study were gravida and parity of mother, number of children, mode of delivery, complications during pregnancy, co-morbidities, history of miscarriages, abortion, preterm births, and vaccination status.

Conceptual Definition of Family Information. A support system is a key factor that helps decrease stress and enhances the health of mothers with preterm infants. Good relationships with the husband, family care, and social support are significant in reducing the stress of the mothers and improving their emotional wellbeing at the same time (Lutkiewicz, 2020).

Operational Definition of Family Information. This study included information about the type of family, co-morbidities, educational status of the husband, use of any substance by

the husband, level of satisfaction from the husband, and in-laws. This identified the relationship with the partner and the extent of support being provided by the husband in the overall care of the mother and the newborn.

Conceptual Definition of Coping Mechanisms. Conceptually, coping approaches are utilized by mothers to deal with stressful circumstances. Mothers with preterm infants require and utilize various effective coping strategies to deal with stressful situations. Literature suggests that an individual practices similar coping strategies across various stressful conditions and the person only needs to boost up and recall the coping strategies to be used in different stressful situations (Abd Elrahman Mahmoud et al., 2022). Coping-related factors aid in determining the mother's coping mechanisms when handling stressful situations.

Operational Definition of Coping Mechanisms. Various coping strategies used by the mothers were identified in the study. These included the ability to identify stress, modes of coping, modes of socialization, and the presence of a key person in times of stressful situations.

Data Sources

Demographic data were obtained through the medical records, which were accessed from confidential files and the electronic system of the hospital, taking into consideration both the mother and the newborn. Moreover, a study specific self-developed questionnaire, which included components of demographic data for mothers and newborns, was added. Moreover, pregnancy, family, and coping-related variables were also included. Furthermore, the PSS was applied with regards to mothers for the data collection.

Data Collection Process

The process of data collection includes collecting information on subjects of interest, in an organized manner that assists the researcher to find answers to the study questions and assess

outcomes (Polit & Beck, 2017). The participants were assessed for eligibility by checking the medical records and matching them with the eligibility criteria. Ten participants were recruited on a weekly basis from the neonatal step-down units and NICU, based on their availability. The mothers are not always available when their babies are admitted to the NICU. However, mothers are readily available in the step-down units, as they are advised to stay with their infants when they are shifted to step-down units, so that teaching related to handling and care of the newborn can be explained on a regular basis, until discharge.

The mothers' level of stress was assessed through questionnaires. Each questionnaire was completed in about 20-minutes. Both English and Urdu versions of the questionnaire were made available to avoid any issues related to language. Moreover, factors related to pregnancy, family, and coping were also explored. Upon identification of high levels of stress in mothers, it was suggested to them to consult a psychologist to reduce the level of stress and maintain sound mental health to overcome the difficult situation. Necessary information about consulting a psychologist at the Aga Khan University Hospital was provided upon request. Moreover, the importance of meeting a psychologist in a stressful condition was also explained.

Data Collection Tool

Data collection tools must be validated by the researcher prior to their use to check for appropriateness in a particular context to minimize any bias (Garg, 2016). An internally developed questionnaire was used for the data collection. This tool included components regarding demographic data for mothers and newborns. Moreover, pregnancy, family, and coping-related variables were also included. Furthermore, the PSS was also integrated into the questionnaire.

The study specific tool was run through a content validity index (CVI) where four

experts in the concerned field were approached. All experts gave their marks out of 4 for each question in the questionnaire, for relevance and clarity, simultaneously. Each item was marked from 1 to 4 from 1 being not relevant and not clear, to 4 being very relevant and very clear. Upon their marking, the results were combined, the relevance came out to be 0.86 and clarity came out to be 0.92 which is considered satisfactory.

The PSS is a widely used functional tool for assessing stress among people going through difficult circumstances. This tool has been validated in the Pakistani context for assessing the level of stress among individuals (Schwaiger et al., 2022). This tool consists of 10 items, in which participants give a rating with regard to their emotions and mindset related to the events and circumstances that happened in the last month. Each item is rated on a 5-point Likert scale, from 0 never to 4 very often. Six items are negative (1, 2, 3, 6, 9, 10) and the other four are positive (4, 5, 7, 8). To create the score, the four positive items are scored in a reversed manner and then all the items are added, ranging from 0 to 40. This scoring included three levels, 0 - 13 low stress, 14 - 26 moderate stress and 27 - 40 is considered high perceived stress (Cohen et al., 1983). To confirm, a higher score represents an elevated level of stress.

Internal Consistency

The internal consistency of the measuring tool is determined by the association of all items developed for measurement in the tool (Sürücü & MASLAKÇI, 2020). The internal consistency of the tool is measured with Cronbach's alpha. The Cronbach’s alpha value is 0.87 for the total perceived stress score. This value shows that the internal consistency of the tool is acceptable (Siqueira Reis et al., 2016). The calculated Cronbach’s alpha for the PSS tool in the current study is 70% which is considered satisfactory.

Construct Validity

Validity reflects that the assessing tool measures the attributes it is projected to measure (Sürücü & MASLAKÇI, 2020). The construct validity of the tool was measured, and the factor structure was assessed to observe whether the association between different variables in the tool was measuring a particular construct in the tool or not. The test-retest reliability score (r) is 0.86 for the total perceived stress score (Siqueira Reis et al., 2016). This value depicts a satisfactory construct validity of the tool.

Study Rigor

Rigor in quantitative studies is determined through the tool's validity and reliability. Moreover, the test-retest reliability of a tool portrays the steadiness of the findings achieved, when the measuring tool is used for a similar group at separate periods of time (Sürücü & MASLAKÇI, 2020). A pretesting of 10% of the sample was done to observe the transparency of the tool that was to be used in the study. The findings of the pretesting were considered, and minor changes were made accordingly, before conducting the actual research.

Data collection, analysis, data entry, and interpretation were done by the primary investigator to reduce the chances of any type of error. In addition, the sample size considered for the study was large enough to augment the power of the study. Moreover, data gathered in quantitative research produces factual and accurate information, as it is assembled through systematized methods that can be recreated (Sürücü & MASLAKÇI, 2020).

Data Entry Management

Data entry management was carefully carried out by the primary researcher. When the data was collected, the data was keenly observed for consistency, comprehensiveness, and readability. The data was entered into the SPSS software by giving numbers to the file of each

participant. Moreover, value checks were conducted weekly to rule out any irregularities. In order to check for logical sequence or missing values, the variables were sorted in ascending and descending order before the data was cleaned.

Data Analysis Plan

Analysis of the data was conducted on the SPSS. Descriptive analysis and inferential analysis of the data were considered in the study.

Descriptive Analysis

Descriptive analysis is a method used for portraying the data in a comprehensive manner, such that it examines the styles and connections between the data in the research study (Polit & Beck, 2017). Demographic variables of the study, including categorical data, frequencies, and proportions, were analyzed using descriptive analysis. Data that were continuous in nature were computed by measuring the mean and standard deviation. The level of stress among mothers with preterm infants, assessed through the questionnaire was categorical in nature, and was reported through frequencies and percentage.

Inferential Analysis

The inferential analysis is utilized to determine the consistency of outcomes regarding a population, based on the data collected from the sample in the research study (Polit & Beck, 2017). Inferential analysis of the study findings was carried out firstly by differentiating categorical variables and continuous variables. Analysis was further continued by using the chi-square test for the categorical variables and T-test for two independent samples for continuous variables in the study. During the analysis, the confidence interval of 95% and p-value of less than 0.05 was considered as significant.

Ethical Considerations

Ethical considerations are important throughout the research process. Ethical considerations in a research study are significant as they imply that the researchers have safeguarded the integrity of their participants and published the right information, as it was explored (Akaranga & Makau, 2016). The study was started after obtaining approvals from the CMO, and ERC of Aga Khan University Hospital (AKUH).

Written informed consent of the participants was obtained, after thoroughly explaining the study's purpose, and benefits. Moreover, participants were informed about their autonomy to back out from the study at any time, before the data coding is complete. The participants were also assured that their withdrawal from the study would not affect their treatment process. In addition, the informed consent form was given in both English and Urdu languages, so that the participants could easily understand the process. Furthermore, it was explained to the participants that participation in the study was voluntary, and no incentives will be given for participating in the study.

Privacy during the data collection process is fundamental and needs to be maintained by the researcher. Data collected needs to be in a place where the information is not heard by other persons, and the anonymity of the participants must be maintained (Polit & Beck, 2017). The privacy and confidentiality of the study participants were considered important, and the survey was conducted in separate rooms. Confidentiality of the data has been maintained through specific procedures that safeguard the data of the participants, and its accessibility was limited to the relevant people in the research study (Polit & Beck, 2017).

The data was accessible to the primary investigator, supervisor, and committee members of the research study. It was in both soft and hard formats. The hard copies were with the

primary investigator and were kept under lock and key. The soft copies were saved with the help of passwords. For publication of the research study, the data will be portrayed in a deidentified manner. In addition, participants were assigned codes in the data entry system, to protect their individualities.

Summary

This chapter has systematically explored the methodology incorporated in the research study. It has provided details about the study design, study population, study setting, study period, eligibility criteria, sampling method, sample size, the recruitment process of participants, study variables, data sources, data collection tool utilized in the study, the process of data collection and data analysis plan including descriptive and inferential analysis. In the end, this chapter has portrayed the important aspects of the study, which included ethical considerations.

Chapter Four: Results

This chapter presents details about the results of the study regarding the level of stress and its associated factors among mothers with preterm infants. The section is divided into two parts. The first part comprises the descriptive statistics of the variables in the study. Subsequently, the inferential analysis with regard to the study's outcome variables is discussed. The level of stress among mother with preterm infants was the research study's outcomes.

Descriptive Analysis

A total of two hundred (n=200) mothers who delivered preterm infants were recruited for the study. For descriptive analysis, continuous variables were summarized using mean and standard deviation (SD). The categorical variables were reported through frequencies and percentages.

Socio demographic characteristics of the mothers with preterm infants. The socio-demographic characteristics of the mothers who delivered preterm infants are illustrated in Table 1. The mean age of these mothers was 30.12 years (SD $\pm$ 5.21), with ages ranging from 18-44 years. Most of the participants were Urdu speaking 82.5% (n=165), followed by Sindhi 9.5% (n=19), and other languages 8% (n=16).

Most of the mothers, i.e., around 97% (n=195), had completed their education, ranging from matriculation to postgraduate and above, with 24% (n=48) mothers having completed their matriculation, 23.5% (n=47) intermediate, 40% (n=80) graduate level studies, and 10% (n=20) postgraduate education and above. The use of substances, such as betel nuts, was reported by 9% (n=18) of the mothers. The mothers who were employed accounted for approximately 16.5% (n=33) of the participants, whereas nearly 83.5% (n=167) were housewives. The household income was taken as continuous data, with a mean of 109,250.00 PKR (SD$\pm$21027.32), with the

income ranging from 50,000 to 160,000. Most of the mothers, i.e., around 89.5% (n=179), were satisfied with their financial status.

Table 1 *Socio-demographic Characteristics of Mothers with Preterm Infants (n=200)*

Variables	Frequency (n)	Percentage (%)
Age (in years)	30.12	(SD ± 5.21)
Monthly income in PKR	109,250.00	(SD ± 21027.32)
Language spoken		
Urdu	165	82.5
Sindhi	19	9.5
Other languages	16	8
Educational status		
Below matriculation (Below 10 grade)	5	2
Matriculation (10 grade)	48	24
Intermediate (12 grade)	47	23.5
Graduate (Undergraduate degree)	80	40
Post graduate and above (Masters degree and above)	20	10
Substance abuse		
Yes	18	9
No	182	91
Occupation status		
House wife	167	83.5
Working	33	16.5
Satisfaction with financial status		
Yes	179	89.5
No	21	10.5

Obstetric and gynecological characteristics of mothers with preterm infants. Among the mothers who delivered preterm infants, the participants' average gestational age was 33.26 weeks (SD± 2.86). Nearly 29.5% (n=59) of the mothers were primigravida. Approximately 38.5% (n=77) had one child. However, 7.5% (n=15) of the mothers had a history of deceased children. Among the study participants, 8% (n=16) of the mothers reported co-morbidities in their children which included congenital heart disease, genetic disorders, seizure disorders and/or metabolic disorders.

More than half of the study participant i.e., 59.5% (n=119) reported that during their pregnancy their other children were taken care of by their family members; however, the rest of the mothers i.e., 29.5% (n=59) were primigravida. Almost 73% (n=146) of the mothers reported that their current pregnancy was planned. More than half of the participants, i.e., 53% (n=106) reported that they planned to have more children, and 30.5% (n=61) reported that they will decide later for the planning of further children. Almost half i.e., 42.5% (n=85) reported a preference for male and only 3% (n=6) reported preference for female.

About 12% (n=24) of the mothers had fertility and gynecological issues, including, polycystic ovary syndrome (PCOS), uterine fibroids, bicornuate uterus and, anovulatory infertility. All of the study participants had experienced a complication in their current pregnancy; most of them i.e., 30.5% (n=61) had preterm labor pains, 23% (n=46) suffered from gestational diabetes mellitus (GDM), and 20.5% (n=41) experienced pre-eclampsia.

The mode of delivery was predominantly caesarean section with 81% (n=162) of the mothers undergoing caesarean section as the mode of delivery. Previous history was also noteworthy with miscarriage in 33% (n=66) of the participants, preterm deliveries in 13.5% (n=27) of the mothers, intrauterine deaths (IUD) in 6.5% (n=13) of the participants, and abortion among 2.5% (n=5) of mothers. More than half of the study participants, i.e., 62.5% (n=125), started their antenatal visits during the initial weeks of pregnancy, and a majority of the remainder 33.5% (n=67) started during the first trimester of pregnancy.

Nearly two-thirds 64% (n=128) of the participants reported that they had completed their immunizations. Nearly all the study participants, i.e., 96% (n=192), had conceived naturally. Over three-quarters of the study population 76% (n=152) used artificial methods for family planning. Consuming a well-balanced diet during their pregnancy was reported by 92% (n=184)

of the mothers. About 80% of the study participants (n=159) of the mothers, reported that they slept for 5-6 hours per day. The obstetrical and gynecological characteristics of the mothers with preterm infants are illustrated in Table 2.

Table 2 *Obstetrical and Gynecological Characteristics of the Mothers with Preterm Infants (n=200)*

Variables	Frequency (n)	Percentage (%)
Gravid		
Primigravida	59	29.5
Two pregnancies	51	25.5
Three pregnancies	24	12
Four pregnancies	26	13
More than four pregnancies	40	20
Children alive		
1	77	38.5
2	52	26
3	44	22
More than 3	27	13.5
Children deceased		
None	185	92.5
Yes	15	7.5
Co-morbidities in children		
Yes	16	8
No co-morbidities	184	92
Care of children during pregnancy		
Family member	119	59.5
NA for primigravida	81	40.5
Planned pregnancy		
Yes	146	73
No	54	27
Plan to have more children		
Yes	106	53
No	33	16.5
Will decide later	61	30.5
Gender preference		
Boy	85	42.5
Girl	6	3
No	109	54.5
Gynecological or fertility issues		
Yes	24	12

No	176	88
Mode of delivery		
Spontaneous vaginal delivery without episiotomy	16	8
Spontaneous vaginal delivery with episiotomy	22	11
Caesarean section	162	81
History of miscarriage		
Yes	66	33
No	134	67
History of abortion		
Yes	5	2.5
No	195	97.5
History of preterm deliveries		
Yes	27	13.5
No	173	86.5
History of IUD		
Yes	13	6.5
No	187	93.5
Antenatal visits during pregnancy		
Initial weeks	125	62.5
First trimester	67	33.5
Second trimester and third trimester	8	4
Immunization status		
Complete	128	64
Incomplete	72	36
Mode of conception		
Natural	192	96
Artificial	8	4
Family planning method		
Natural	48	24
Artificial	152	76
Balanced diet		
Yes	184	92
No	16	8
Hours of sleep		
Less than 3 hours	2	1
3 – 4 hours	20	10
5 – 6 hours	159	79.5
7 – 8 hours	19	9.5
Gestational age in weeks	33.26	(SD±2.86)

Marital and familial characteristics. Among the study participants, 75% (n=150) lived in extended families. Nearly all the study participants 96.5% (n=193), had co-morbidities in their families. Among them, 83.5% (n=167) had endocrine disorders. Almost all the families had earning members, out of which, 53.5% (n=107) had two earning members, whilst 27.5% (n=55) had one earning member in the family. The average age of the husbands was 35.08 years (SD±5.43). The educational status of the husbands was high; most of the husbands, i.e., 65% (n=130), had studied up to graduation. All the husbands were employed; 53% (n=106) of them were doing business. There was a wide range of substance abuse among the husbands, which included, 32% (n=64) smoking a cigarette, and 29.5% (n=59) using betel nut, pan, gutka and naswar.

Among the study participants, 65.5% (n=131) had non-consanguineous marriages, while 34.5% (n=69) had consanguineous marriages. Almost half of the study participants 40.5% (n=81) of the mothers, had been married for less than five years, and 37.5% (n=75) between 5 – 10 years. Nearly all the participants, i.e., 97% (n=194) were satisfied to a greater extent in the relationship with their husbands. On the other hand, nearly 85% (n=168) of the mothers, were satisfied to some extent or to lesser extent in their relationship with their in-laws. Marital and familial characteristics of the mothers with preterm infants are illustrated in Table 3.

Table 3 *Marital and Familial Characteristics of the Mothers with Preterm Infants (n=200)*

Variables	Frequency (n)	Percentage (%)
Type of family		
Nuclear	50	25
Extended	150	75
Co-morbidities in family		
Endocrine disorder	167	83.5
Heart diseases	17	8.5
Cancers, neurological and respiratory problems	9	4.5
No co-morbidities	7	3.5

Educational status of husband		
Matriculation (10 grade)	6	3
Intermediate (12 grade)	42	21
Graduate (Undergraduate degree)	134	67
Post graduate and above (Masters degree and above)	18	9
Occupation of husband		
Job	94	47
Business	106	53
Substance abuse by husband		
No substance abuse	77	38.5
Pan, betel nut, gutka and naswar	59	29.5
Cigarette	64	32
Earning members in family		
1	55	27.5
2	107	53.5
3	30	15
More than 3	8	4
Type of marriage		
Consanguinity	69	34.5
Non consanguinity	131	65.5
Years in marriage		
Less than 5 years	81	40.5
5 – 10 years	75	37.5
11 – 15 years	40	20
Above 15 years	4	2
Satisfaction in relationship with husband		
To greater extent	194	97
To some extent and to lesser extent	6	3
Satisfaction in relationship with in-laws		
To greater extent	32	16
To some extent and to lesser extent	168	84
Age of husband (in years)	35.08	(SD±5.43)

Coping related factors. Practicing coping in stressful situations was reported by almost every participant. Among these, 38.5% (n=77) talked to their husbands, and 35% (n=70) shared with someone in time of stressful situation. Almost all the study participants 99% (n=198) worked on finding a solution for the stressful situation. All the participants in the study had some reliable person with whom they could talk and share their feelings in stressful situation.

Socialization was reported by every participant with 39% (n=78) linking family as a mode of socialization. Table 3 illustrates the coping-related factors of mothers with preterm infants.

Table 4 *Coping related Factors of the Mothers with Preterm Infants (n=200)*

Variables	Frequency (n)	Percentage (%)
How do mothers cope in stressful situations		
Share with someone	70	35
Talk to husband	77	38.5
Analyze it	22	11
Other	31	15.5
Finding solutions in stressful situations		
Yes	198	99
No	2	1
Reliable person		
Husband	169	84.5
Mother	27	13.5
Other	4	2
Mode of socialization		
Outing with family	78	39
Outing with friends	45	22.5
Social media	34	17
Other	43	21.5

Newborns characteristics. The average age of preterm neonates was 10.11 days (SD±13.98), ranging from 1 to 88 days. The average weight of the neonate was 1.97 kg (SD±0.65) and the mean length was 43.75 cm (SD±5.46). More than half of the newborns, (n=124) of the preterm neonates, were males. Moreover, the APGAR score of the neonates at the first minute of life was 7.66 (SD±1.04). Moreover, preterm neonates were admitted with a range of health conditions, such as 31.5% (n=63) suffering from the RDS, and 25% (n=50) with neonatal jaundice (NNJ). More than half of the newborns, i.e., 51% (n=102), did not receive their immunizations. Most of the newborns, i.e., 43.5% (n=87) were transferred from the NICU to the step down unit. Nearly two-thirds 65% (n=130) of the preterm infants were on OG tube feeding.

Most of the newborns i.e., 59.5% (n=119) were on breast milk. Newborn characteristics are illustrated in Table 5.

Table 5 *Newborns Characteristics (n=200)*

Variables	Frequency (n)	Percentage (%)
Age in days	10.11	(SD±13.98)
Weight in kg	1.97	(SD±0.65)
Height in cm	43.75	(SD±5.460
APGAR score at 1st minute of life	7.66	(SD±1.04)
Gender		
Male	124	62
Female	76	38
Presenting complaints		
NNJ	50	25
RDS	63	31.5
IUGR and LBW	23	11.5
TTN	24	12
NEC, TNHI, sepsis, cardiac anomalies and others	40	20
Immunization status		
Complete	98	49
Incomplete	102	51
Transferred from		
NICU	87	43.5
B2 Nursery	35	17.5
ER	37	18.5
OR and Other	41	20.5
Mode of feeding		
Direct breast feeding	50	25
Bottle feeding	20	10
OG tube feeding	130	65
Type of feed		
Breast feed	119	59.5
Formula feed	81	40.5

Outcome Variables

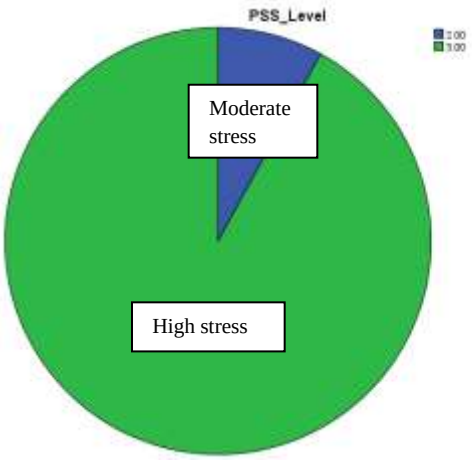
The PSS tool was used in the study to identify the level of stress among mothers with preterm infants. Based on the levels of scoring of the PSS scale, mothers who delivered preterm

infants reported significantly higher levels of stress from the PSS tool. This scoring included three levels, 0 - 13 low stress, 14 - 26 moderate stress and 27 - 40 is considered high perceived stress (Cohen et al., 1983). Based on the criteria of PSS scoring, a majority of the participants i.e., 92% (n=184) were falling under the category of high perceived stress, with the remainder falling into the category of moderate stress. Table 6 depicts the level of stress among mothers with preterm infants.

Table 6 *Perceived Stress Score of Mothers with Preterm Infants (n=200)*

Characteristics	Frequency	Percentage (%)
Moderate stress	16	8
High stress	184	92

Figure 2 *Perceived Stress Score of Mothers with Preterm Infants (n=200)*



Inferential Analysis

Inferential analysis of the study findings was carried out firstly by differentiating categorical variables and continuous variables. Analysis was further continued by using the chi-

square test for the categorical variables and T-test for two independent samples for continuous variables in the study.

Categorical variables. Most of the mothers in the category of high perceived stress were having male child (62.5% n=115), with 31% (n=57) had RDS as the presenting complaints of newborn. More than half of the mothers i.e., 53.3% (n=98) reported high stress as their newborn's immunization status was incomplete and 42.9% (n=79) had their babies transferred from NICU. On the other hand, mothers in moderate level of stress had similar findings except three quarter (75% n=12) of mothers in this category has complete immunization status of their newborn.

Around half of the mothers in the category of high perceived stress had done graduation. However, three quarter i.e., 85.9% (n=158) were housewives, although majority of mothers i.e., 89.7% (n=165) were satisfied with their financial status. Most of the mothers i.e., 65.2% (n=120) were in non-consanguinity type of marriage and 7.6% (n=14) were abusing some form of substance. On the other hand, mothers in the category of moderate stress had similar finding except 37.5% (n=6) had done post graduate and above.

A small number of the mothers in high level of stress i.e., 8.7% (n=16) reported that their children have co-morbidities including congenital heart diseases, metabolic disorders, seizures disorders and genetic disorders. In addition, more than half of the mothers i.e., 59.2% (n=109) had their family members for taking care of other children during pregnancy. Mothers in the category of moderate level of stress had similar findings except none of the mother had any co-morbidity in their children.

Almost three fourth i.e., 74.5% (n=137) of the study participants in high level of stress had planned their pregnancy and more than half i.e., 55.4% (n=102) will also plan for further children. However, 45.1% (n=83) had family preference for male child. The findings are similar in the category of moderate stress except that more than half i.e., 56.3% (n=9) of the mothers will decide later for planning more children.

A minimum number of mothers in the category of high perceived stress i.e., 12.5% (n=23) have gynecological issues. The complications that included in their pregnancies were 31% (n=57) had preterm labor pain, 23.4% (n=43) had GDM, and 21.7% (n=40) had pre-eclampsia. Most of the mothers i.e., 81.5% (n=150) had gone through cesarean section as a mode of delivery. A previous history of miscarriage, abortion, preterm deliveries and IUD was found in 32.6% (n=60), 2.2% (n=4), 13% (n=24), and 6.5% (n=12) of mothers respectively. On the other hand, mothers in the category of moderate stress had similar findings except, 37.5% (n=6) had PROM instead of pre-eclampsia.

Majority of mothers in high perceived stress i.e., 93.5% (n=172) had consumed balanced diet during pregnancy. More than half of the mothers i.e., 64.7% (n=119) started the antenatal visits in initial weeks of pregnancy with 62.5% (n=115) had complete immunization status. The findings from the category of moderate level of stress are similar except majority of the mothers 56.3% (n=9) started the antenatal visits in first trimester of pregnancy.

Majority of the mother in the category of high perceived stress 66.8% (n=123) had their babies' mode of feeding as OG tube feeding. Moreover, majority of them 58.7% (n=108) were giving breast milk to their newborns. Three quarters of mothers i.e., 75% (n=138) were using

artificial methods for family planning. However, there was no difference seen in the category of moderate level of stress for the above mentioned findings.

Majority of the mothers in the category of high perceived stress i.e., 76.1% (n=140) were living in extended families and 85.3% (n=157) had endocrine disorders in their families. Majority of the mothers i.e., 67.4% (n=124) had their husband education status of graduation, 52.7% (n=97) were running their business, 32.6% (n=60) smoked cigarette and 31% (n=57) chewed betelnut, pan, gutka and naswar. Approximately all the mothers i.e., 96.7% (n=178) were satisfied in their relationships with their husbands. However, most of the mothers i.e., 84.8% (n=156) were satisfied to some extent or to a lesser extent in the relationship with their in-laws. The finding of these elements are similar in the category of moderate level of stress except 43.8% (n=7) of mothers had their husband education status of post graduate and above.

Approximately half of the mothers i.e., 40.8% (n=75) were talking to their husband in time of stressful situation, all the mothers i.e., 99.5% (n=183) were finding a solution in times of stressful situation and almost half of the mothers i.e., 39.7% (n=73) had outing with family as a mode of socialization. The findings for the mothers in moderate level of stress were similar except 50% (n=8) were sharing with someone else other than husband in time of stressful situation and had different modes of socialization rather outing with family. The table 7 shows the inferential statistics for the categorical variables in the study.

Table 7 *Inferential Statistics for Categorical Variables of Stress among Mothers with Preterm Infants (n=200)*

Characteristics	**Moderate stress 8% (n= 16)**	**High stress 92% (n=184)**	**P – value**

Neonate gender			
Male	56.3 (9)	62.5 (115)	0.60
Female	43.8 (7)	37.5 (69)	
Presenting complaints			
NNJ	37.5 (6)	23.9 (44)	
RDS	37.5 (6)	31 (57)	0.501
IUGR and LBW	6.3 (1)	12 (22)	
TTN	12.5 (2)	12 (22)	
NEC, TNHI, sepsis, cardiac anomalies and others	6.3 (1)	21.2 (39)	
Immunization of newborn			
Complete	75 (12)	46.7 (86)	0.03*
Incomplete	25 (4)	53.3 (98)	
Transferred from			
NICU	50 (8)	42.9 (79)	
B2 Nursery	12.5 (2)	17.9 (33)	0.300
ER	31.3 (5)	17.4 (32)	
OR and Other	6.3 (1)	21.7 (40)	
Education status of mother			
Below matriculation (Below 10 grade)	6.3 (1)	2.2 (4)	
Matriculation (10 grade)	18.8 (3)	24.5 (45)	0.003*
Intermediate (12 grade)	12.5 (2)	24.5 (45)	
Graduate (Undergraduate degree)	25 (4)	41.3 (76)	
Post graduate and above (Masters degree and above)	37.5 (6)	7.6 (14)	
Language spoken			
Urdu	68.8 (11)	83.7 (154)	
Sindhi	12.5 (2)	9.2 (17)	0.057
Balochi	12.5 (2)	1.6 (3)	
Other	6.3 (1)	5.4 (10)	
Mother's occupation			
House wife	56.3 (9)	85.9 (158)	0.007*
Working	43.8 (7)	14.1 (26)	
Satisfaction with financial status			
Yes	87.5 (14)	89.7 (165)	0.678
No	12.5 (2)	10.3 (19)	
Substance abuse by mother			
No	75 (12)	92.4 (170)	0.042*
Yes	25 (4)	7.6 (14)	
Marriage type			
Consanguinity	31.3 (5)	34.8 (64)	1.000
Non-consanguinity	68.8 (11)	65.2 (120)	
Co-morbidities in children			
Yes	0 (0)	8.7 (16)	0.373
No	100 (16)	91.3 (168)	
Person taking care of other children			

during pregnancy			
Family members	62.5 (10)	59.2 (109)	1.000
NA for primi gavid mothers	37.5 (6)	40.8 (75)	
Planned pregnancy			
Yes	56.3 (9)	74.5 (137)	0.142
No	43.8 (7)	25.5 (47)	
Plan for more children			
Yes	25 (4)	55.4 (102)	0.041*
No	18.8 (3)	16.3 (30)	
Will decide later	56.3 (9)	28.3 (52)	
Gender preference from family			
Boy	12.5 (2)	45.1 (83)	
Girl	6.3 (1)	2.7 (5)	0.037*
No	81.3 (13)	52.2 (96)	
Gynecological issues			
Yes	6.3 (1)	12.5 (23)	0.699
No	93.8 (15)	87.5 (161)	
Complications in pregnancy			
GDM	18.8 (3)	23.4 (43)	
Pre-eclampsia	6.3 (1)	21.7 (40)	
PROM	37.5 (6)	11.4 (21)	0.086
IUGR	6.3 (1)	4.3 (8)	
Preterm labor pain	25 (4)	31 (57)	
APH	6.3 (1)	8.2 (15)	
Mode of delivery			
SVD without episiotomy	12.5 (2)	7.6 (14)	
SVD with episiotomy	12.5 (2)	10.9 (20)	0.758
Cesarean section	75 (12)	81.5 (150)	
History of miscarriage			
Yes	37.5 (6)	32.6 (60)	0.783
No	62.5 (10)	67.4 (124)	
History of abortion			
Yes	6.3 (1)	2.2 (4)	0.344
No	93.8 (15)	97.8 (180)	
History of preterm deliveries			
Yes	18.8 (3)	13 (24)	0.458
No	81.3 (13)	87 (160)	
History of IUD			
Yes	6.3 (1)	6.5 (12)	1.000
No	93.8 (15)	93.5 (172)	
Balance diet			
Yes	75 (12)	93.5 (172)	0.028*
No	25 (4)	6.5 (12)	
Antenatal visits during pregnancy			
Initial weeks	37.5 (6)	64.7 (119)	0.098
First trimester	56.3 (9)	31.5 (58)	

Second and third trimester	6.3 (1)	3.8 (7)	
Immunization status of mother			
Complete	81.3 (13)	62.5 (115)	0.178
Incomplete	18.8 (3)	37.5 (69)	
Mode of feeding baby			
DBF	31.3 (5)	24.5 (45)	0.067
Bottle feeding	25 (4)	8.7 (16)	
OG feeding	43.8 (7)	66.8 (123)	
Type of feed for baby			
Breast feed	68.8 (11)	58.7 (108)	0.597
Formula feed	31.3 (5)	41.3 (76)	
Family planning method			
Natural	12.5 (2)	25 (46)	0.367
Artificial	87.5 (14)	75 (138)	
Type of family			
Nuclear	37.5 (8)	23.9 (44)	0.237
Extended	62.5 (10)	76.1 (140)	
Co-morbidities in family			
Endocrine disorders	62.5 (10)	85.3 (157)	
Heart diseases	25 (4)	7.1 (13)	0.072
Cancers, neurological and respiratory problems	6.3 (1)	4.3 (8)	
No co-morbidities	6.3 (1)	3.3 (6)	
Education status of husband			
Matriculation (10 grade)	12.5 (2)	2.2 (4)	<0.000*
Intermediate (12 grade)	6.3 (1)	22.3 (41)	
Graduate (Undergraduate degree)	37.5 (6)	67.4 (124)	
Post graduate and above (Masters degree and above)	43.8 (7)	8.2 (15)	
Occupation of husband			
Job	43.8 (7)	47.3 (87)	1.000
Business	56.3 (9)	52.7 (97)	
Substance abuse by husband			
No	62.5 (10)	36.4 (67)	0.102
Betelnut, pan, gutka and naswar	12.5 (2)	31 (57)	
Cigarette	25 (4)	32.6 (60)	
Satisfaction in relationship with husband			
To greater extent	100 (16)	96.7 (178)	1.000
To some extent and to lesser extent	0 (0)	3.3 (6)	
Satisfaction in relationship with in-laws			
To greater extent	25 (4)	15.2 (28)	0.294
To some extent and to lesser extent	75 (12)	84.8 (156)	
How do you cope with stressful situation			
Share with someone	50 (8)	33.7 (62)	
Talk to husband	12.5 (2)	40.8 (75)	0.156
Analyze it	12.5 (2)	10.9 (20)	

Other	25 (4)	14.7 (27)	
Finding solution in stressful situation			
Yes	93.8 (15)	99.5 (183)	0.154
No	6.3 (1)	0.5 (1)	
Mode of socialization			
Outing with family	31.3 (5)	39.7 (73)	
Outing with friends	12.5 (2)	23.4 (43)	0.032*
Social media	6.3 (1)	17.9 (33)	
Others	50 (8)	19 (35)	

**Significant P-value*

Continuous variables. The mean age, weight and length of newborns in mothers with high level of perceived stress was 9.88 (SD ±13.47), 1.97 (SD of ±0.66) and 43.75 (±5.54) respectively. The mean APGAR score for neonate was 7.65 (SD ±1.05) and the mean gestational age of mothers was 33.21 (SD ±2.91). However, the scores of these elements for the mothers in moderate level of stress were comparatively higher as compared to mothers with the category of high perceived stress.

The mean age and monthly income of mothers with high level of stress were 30.27 (SD ±5.16) and 110054.35 (SD ±21051.51) which was higher as compared with the category of mothers in moderate level of stress. The mean of years in marriage and number of earning members in family of mothers with high level of stress was 1.80 (SD ±0.80) and 1.93 (SD ±0.75) which was comparatively lower than for the mothers in moderate level of stress. The mean gravid, hours of sleep and age of husband of mothers with high level of stress were 2.78 (SD ±1.65), 3.01 (SD ±0.45) and 35.24 (SD ±5.40) which was higher than for mothers in moderate level of stress. The mean children alive and deceased of mothers with high level of stress were 2.17 (SD ±1.21) and 1.09 (SD ±0.35) which was much similar for the mothers with moderate level of stress. The table 8 shows the inferential statistics for the continuous variables in the study.

Table 8 *Inferential Statistics for Continuous Variables of Stress among Mothers with Preterm Infants (n=200)*

Characteristics	Moderate stress		High stress		P – value
	Mean	SD	Mean	SD	
Neonate age	12.75	±19.19	9.88	±13.47	0.43
Neonate weight	2.06	± 0.57	1.97	±0.66	0.59
Neonate height	43.75	±4.53	43.75	±5.54	1.000
APGAR Score	7.69	±0.87	7.65	±1.05	0.89
Gestational age	33.75	±2.23	33.21	±2.91	0.47
Mother's age	28.44	±5.60	30.27	±5.16	0.17
Monthly income	100000	±18973.66	110054.35	±21051.51	0.06
Years in marriage	2.25	±0.85	1.80	±0.80	0.03*
Gravid	2.69	±1.74	2.78	±1.65	0.83
Children alive	2.13	±1.25	2.17	±1.21	0.87
Children deceased	1.31	±0.87	1.09	±0.35	0.33
Hours of sleep	2.63	±0.71	3.01	±0.45	0.05*
No of earning members	2.25	±0.85	1.93	±0.75	0.10
Age of husband	33.25	±5.58	35.24	±5.40	0.16

**Significant P-value*

Summary

This chapter provided information about the descriptive and inferential analysis of the study. Moreover, it provided details on the socio-demographic characteristics, obstetric and gynecological characteristics, and marital and familial characteristics of the study participants. Furthermore, it provided details on the coping-related factors of the study participants. It also provided details on the newborns' characteristics. Finally, it provided details on the outcome variable, categorical and continuous variables of the study. The chapter ends with a summary.

Chapter Five: Discussion

This chapter discusses the important findings of the study with reference to the literature on stress and its associated factors among mothers with preterm infants. The chapter also provides details on both strengths and limitations of the study. In the later part, this chapter proposes some recommendations and implications for future studies in a similar field and ends with a conclusion.

This chapter reflects this research project's understanding and responses to the research questions regarding the level of stress in mothers with preterm infants and the factors associated to the level of stress among mothers with preterm infants in Karachi, Pakistan.

Level of Stress among Mothers with Preterm Infants

Stress is a significant aspect to deal with while caring for mothers with preterm infants. Pregnant mothers with antenatal stress and depression have been estimated to pose a 1.49 times higher universal risk of preterm birth than mothers without antenatal stress and depression (Lalani et al., 2021). Moreover, according to a research conducted on factors that contribute to maternal distress conditions and preterm birth in Pakistani women, it was highlighted that perceived stress increases the depressive symptoms in mothers with preterm infants (Lalani et al., 2023). According to a comparator study conducted in Kenya on the prevalence of psychological distress among mothers with term and preterm infants, reported that 83.7% who delivered preterm infants were positive for stress (Mutua et al., 2020). This study validates the findings of the current study as results are similar to a great extent.

These literature findings suggest the intense need for assessing the level of stress among mothers who deliver preterm infants. Therefore, this study focused on the level of stress and its

associated factors among mothers with preterm infants in Karachi, Pakistan. To assess the level of stress among mother with preterm infants, the PSS tool was incorporated in a self-developed questionnaire. PSS has been used extensively around the globe to measure stress in various groups of people. Additionally, it is employed to gauge the level of stress experienced by mothers of preterm infants in Taiwan and Pakistan.

According to a systematic review conducted in high income countries (HIC) and LMIC, on post-traumatic stress symptoms in mothers of preterm infants, 77.8% of the mothers with preterm infants had stress and met the criteria for potential post traumatic stress disorder after the birth of a preterm infant (Gondwe & Holditch-Davis, 2015). According to the current study, 92% of mothers reported high perceived stress. Yet, the results of this study indicate that 77.8% of mothers had stress following the delivery of a preterm infant; as a result, this study confirms the current study's findings. According to a recent systematic review, conducted for urban HIC, on the prevalence of stress among mothers with preterm infants who were admitted in the NICU which reported the prevalence of stress was 39.9% in mothers who delivered preterm infants (Malouf et al., 2022). However, this finding is in contradiction with the current study findings conducted in Pakistan.

The PSS tool was used in the study to identify the level of stress among mothers with preterm infants. The level of stress that came out from the PSS tool among mothers who delivered preterm infants based on the levels of scoring of PSS scale is significantly higher as compared to studies conducted in other parts of the world. This scoring included three levels, 0 - 13 low stress, 14 - 26 moderate stress and 27 - 40 is considered high perceived stress (Cohen et al., 1983). In our study, 92% of the study participants fell under the category of high perceived stress, which is considerable higher. On the contrary, the findings from a study conducted in

Malaysia, reported 56.5% of mothers with preterm infants admitted in the NICU had high level of stress which is relatively lower than the findings of the current study (Ong et al., 2019). The plausible difference could be due to the diverse socio-cultural stressors related to the income levels of the two countries, as Malaysia is an upper middle income country (UMIC) while Pakistan comes under the category of LMIC (Waqas et al., 2020).

Another study conducted in the United States of America (USA), regarding the association between preterm birth and maternal mental health, concluded that 11.26% of the mothers those who delivered preterm infants reported stress and symptoms of depression, after delivery (Barber et al., 2021). However, the level of stress mentioned in this study is relatively lower as compared to the current study findings where the stress levels in mothers are significantly high. Again, this study poses contradictory findings from the Pakistani based study which might relate to the income status variance or the care approaches in the two settings.

A recent study conducted in the USA, on maternal mental health after their preterm infants were discharged from NICU, showed that 29% of the mothers had stress and depressive disorders (Franck et al., 2023). The percentage of mothers with high levels of stress mentioned in this study differs to a great extent, as compared to the current study. Comparing the findings of the studies conducted in the USA, which is considered a HIC, with Pakistan, a huge difference can be seen in the levels of stress being reported. This difference may be attributed to Pakistani women's cultural freedom to report stress.

The literature has suggested that the social, cultural, and environmental aspects of a LMIC; like Pakistan, tend to create additional exposures to stressors, thereby adding to increased risk of stress and depression among mothers during pregnancy and childbirth (Lalani et al.,

2023). The literature has also suggested numerous factors that are associated with increased levels of stress among mothers with preterm infants. Studies in the Pakistani context have identified determinants specific to culture. Amongst these, the main cause is unplanned pregnancy, along with preference of male child over female creating a sense of stress among mothers, which augments the risk of post natal stress after the birth of a preterm infant (Lalani et al., 2023).

Another study conducted in Pakistan has also suggested that decreased autonomy of mothers, in making decisions related to pregnancy and reproductive health, is also a major factor associated with increased levels of stress among mothers with preterm infants (Lalani et al., 2021). In addition, Pakistani women are more susceptible to stress and depression due to overlapping socio-economic factors, which include, unemployment and lack of education (Lalani et al., 2021). Obstetric factors are also suggested by literature that increase stress among mothers with preterm infants, which include, multiple and unplanned pregnancies (Lalani et al., 2021). The psycho-social factors are also enlisted by the literature that affect the level of stress among mothers with preterm infants, which include verbal and physical abuse by husbands and mothers-in-law, preference and demand of family for male child (Lalani et al., 2021). When comparing the results of the current study to previous research, it was found that 50% of the mothers had a higher education level still majority of mothers were housewives, this could be a contributing factor to the unemployment. Furthermore, two-third of mothers had planned their pregnancies while majority of them were carrying multiple pregnancies which could be a potential reason for gender preference. This implies that these elements are in line with the literature.

The findings of the literature and the current study show that the level of stress is linked with multiple factors that are associated with the stress among mothers with preterm infants.

These factors include maternal age, educational status of the mother, occupation of the mother, substance abuse by mother, hours of sleep, consumption of balanced diet, relationship with in-laws, socialization, gender preference, education status of husband, and years in marriage.

Factors Affecting Level of Stress among Mothers with Preterm Infants

This study has highlighted multiple factors that are associated with increased levels of stress among mothers with preterm infants. However, only the factors with a P-value of less than 0.05 were considered significant and were taken as important factors that are associated with increased levels of stress. The current study findings are consistent with the factors such as (hours of sleep, immunization of newborn, mode of socialization, occupation status of mothers, substance abuse by mother, gender preference from family, planning for further children and years in marriage), mentioned in the literature that are associated with high levels of stress among mothers with preterm infants.

In the current study, the decreased hours of sleep were found to increase the level of stress among the participants. Mothers who were under the category of high perceived stress had an average sleep duration of 3.01 hours (SD$\pm$0.45). This finding is consistent with the findings of the study conducted in Taiwan, which showed that 65% of the mothers with preterm infants showed insufficient and poor sleep as factors associated with the increased levels of stress (Chang et al., 2022). The disturbed sleep hours were found to be a main factor contributing to increased levels of stress. The possible reasons for disturbed sleep quality could be, frequent awakenings for feeding and handling the preterm infant. Hence, the current study emphasized the need of regular sleep patterns for mothers with preterm infants in order to reduce the high levels of stress.

In the current study, it was identified that mothers with moderate and high level of stress were consuming a balanced diet, yet they were experiencing increased levels of stress. However, this finding is in contradiction with the findings of a study conducted in Taiwan, where a low level of stress was associated with the consumption of a balanced diet (Chang et al., 2022). Hence, the current study suggests that husbands and family members should help the mothers with preterm infants in consuming a balanced diet, which is a source of nourishment for both the mothers and infants.

Immunization of the newborn is another factor associated with the increased levels of stress among mothers with preterm infants. High stress was reported in a significant number of mothers whose preterm infants had an incomplete immunization status. This finding is consistent with a systematic review about vaccination in preterm infants, which suggests that parents feel increased stress while vaccinating the preterm infants as compared to term infants (Chiappini et al., 2019). The plausible reasons for the stress associated with the immunization of the preterm infants included decreased weight of preterm infants, as compared to the term infants, and delay in the vaccination in order to allow for the correct gestation age to be achieved prior to the vaccination of the preterm infants (Chiappini et al., 2019). The study findings emphasize the need of educating the mothers with regard to the importance of timely vaccination of preterm infants, in order to create a sense of awareness about the vaccination and to decrease the stress associated with the immunization of the preterm infants.

Poor relationship with in-laws was also related to increased levels of stress among mothers with preterm stress, in the current study. This finding is also consistent with the finding of the study conducted in Taiwan, which also suggested that poor relationship with the in-laws most specifically mothers in law, had a negative impact on the care of the newborn, which

ultimately increased the level of stress among mothers with preterm infants (Chang et al., 2022). Pakistani women are more vulnerable to stress and antenatal depression due to intersecting socioeconomic factors, including abuse by husbands and mothers in law (Lalani et al., 2023). As mothers in law are considered a significant figure in Pakistan while living in an extended family system; therefore, poor relationship with the mother in law is a significant factor associated with high levels of stress. The current study has emphasized the need of good relationships with the in-laws for reducing the high levels of stress. Moreover, the study suggests that the in-laws must provide additional support to mothers with preterm infants.

Socialization is yet another important factor associated with stress among mothers with preterm infants. In the current study, all the mothers had different modes of socialization, including, outing with family, friends, social media, and others, that decreased the level of stress as it worked as mode of social support for them. This finding is also consistent with the study conducted in Taiwan, that suggested that social support, including family, friends, and social group work as mediators for the mothers; they boost their self esteem and provide emotional stability to mothers with increased levels of stress following the birth of a preterm infant (Chang et al., 2022). The current study has identified support groups and socialization as the most important factors associated in reducing the levels of stress among mothers with preterm infants.

The current study showed that mothers who were not employed had high levels of stress as compared to working mothers. This finding was found to be similar to the findings of the study conducted in south east Ethiopia, that depicted high levels of stress in mothers who were house wives (Engidaw et al., 2019). A potential reason for low level of stress in working mothers could be that they had the advantage of regular social interaction with friends and co-workers, which changed the environment and probably enhanced the mental wellbeing of the mothers

with preterm infants. Hence, the current study highlighted the importance of employment in reducing the stress among mothers with preterm infants.

Substance abuse by mothers is yet another risk factor associated with stress among mothers with preterm stress. In the current study, the level of stress was reported in non significant numbers of mothers among those who were abusing substance; however, these numbers depicted increase levels of stress among mothers with preterm infants. This finding is consistent with the findings of the study conducted in Maichew, North Ethiopia, where tobacco chewing was associated with increased levels of stress among mothers (Mossie et al., 2017). Substance abuse has been associated with many health problems such as; to the impact of chewing the betelnut in the current study includes anemia during pregnancy and lactation. The current study has therefore, identified the need to counsel the mothers to reduce substance abuse, in order to improve the high levels of stress among mothers with preterm infants.

The educational status of mothers was also a pivotal factor associated with the level of stress among mothers with preterm infants. In the current study, moderate and high levels of stress were reported in mothers who had graduated from high school. Contrary to this finding, the study conducted in Maichew, North Ethiopia, showed that no stress was reported in mothers with advanced level of education; however, the level of stress was high in mothers with low level of education or no formal education (Mossie et al., 2017). The reasons for the contradiction could have related to mothers having higher education, in the current study, wanting to work but at the same time had to take care of a preterm infant as a priority. The study findings, therefore, highlighted the need for potential opportunities of employments, in order to create a change in attitude towards employment options for mothers with preterm infants.

Gender preference of the child was also a major factor associated with the increased level of stress in mothers with preterm infants. In the current study, although a majority of mothers reported that there was no gender preference, a significant number of mothers reported male as the preferred gender. This finding is similar to another study conducted in Pakistan that showed that unplanned pregnancy was a factor associated with the increased level of stress among mothers, and the reason for unplanned pregnancies was preference of male child over female (Lalani et al., 2023). The current study findings showed a non-significant number of mothers with gender preference, however, the findings strongly suggest that pressure for a male child needs to be completely eliminated to create a sense of satisfaction and to reduce the levels of stress among mothers giving birth to preterm infants.

Planning for further children was also associated with an increased level of stress among mothers with preterm infants. In the current study, more than half of the mothers in the category of high perceived stress will plan for further children. However, moderate level of stress was reported in mothers who will decide later about planning for further children. According to a study conducted in China, on assessing mothers' parenting stress difference between having one and two children, mothers with two children showed significantly higher stress scores as compared to the mothers with one child (Qian et al., 2021). The finding is consistent to some extent, as planning for further children and parenting two children at a time, while including care of a preterm infant, is a challenging situation that can increase stress in mothers with preterm infants. The reason possibly could be that having minimum age gaps between the two children can cause parenting stress in mothers who have delivered a preterm infant. This finding of the study suggests that mutual consensus between husband and wife, while planning for further children, is of prime significance, as it can provide a sense of comfort, reduce stress, and

improves parenting of the preterm infant by the mothers while planning further children for their family.

The education status of husband was also an important factor associated with the level of stress among mothers with preterm infants. In the current study increased levels of stress were reported among mothers whose husbands were educated up to the graduate level. This finding is contradictory with the findings of a study conducted in India, that showed decreased level of stress among mothers whose husbands had a higher level of education status (Dutta et al., 2016). The core reason for the contradictory findings could possibly be the increased rate of unemployment in Pakistan, as being a graduate and not having employment of that level has been associated with triggering stress. The study findings suggest the need for increased number of employment options in Pakistan, which can produce a sense of comfort and reduce overall stress in mothers with preterm infants.

Years in marriage was another factor associated with the level of stress among mothers with preterm infants. The current study showed that fewer years of being married was proportional to the increased levels of stress among mothers. This finding is similar with another study conducted in Pakistan that showed that increase in the years of marriage gave a sense of satisfaction to mothers, and they could have shared decision making in planning further pregnancies, subsequently decreasing the level of stress, unplanned pregnancies, and gender preference (Lalani et al., 2023). The study findings suggest that women must be equal partners in making decisions for family planning, pregnancy, and childbirth.

Maternal age is a significant factor that is associated with an increase in the level of stress among mothers with preterm infants. The findings of the current study show that advanced

maternal age was linked with increased levels of stress. This finding is consistent with a study conducted in Canada, which depicted that increased maternal age was linked with multiple co-morbidities in pregnancy, including GDM, pre-eclampsia, premature labor, and preterm birth (Fuchs et al., 2018). The findings of the current study are consistent with the literature, and show high levels of stress in mothers with GDM, pre-eclampsia, and premature labor pain. The study's conclusions therefore call for the early detection of mothers' co-morbidities during pregnancy, the immediate implementation of corrective measures, and the provision of thorough counseling to mothers who give birth to preterm children.

The factors associated with stress among mothers with preterm infants are well supported by national and international literature. The overall results of the study in the context of Pakistan, while focusing on the specific sample of mothers with preterm infants show many similarities with the existing literature. The study has also disclosed many contextual realities that include lack of support from in-laws, unemployment, lack of sleep, substance abuse, and gender preference as the major factors associated with the high levels of stress among mothers with preterm infants.

Strengths of the Study

Following are the strengths of the research study:

- To the researcher’s best knowledge, this is the first study that assessed the level of stress among mothers with preterm infants in Karachi, Pakistan.
- The questionnaire used for the study was a self developed tool that was approved by the experts in the required fields and CVI was run for the tool resulting in a satisfactory rating.

- The questionnaire used in the study was culturally appropriate, as validated by experts, and pilot testing was done prior to administering the questionnaire to the participants.
- The PSS tool used in the study has been validated nationally and internationally, in various languages, and has also been administered to similar groups of participants as in the current study, i.e., mothers with preterm infants, in different parts of the world.
- The researcher filled the questionnaire for each mother face-to-face, which helped in catering to the queries of the mothers at the same time while filling up the questionnaire.
- The study findings helped identify the new emerging role of nurse practitioner in the required field.
- This study has provided a base for future studies in the concerned field, in the Pakistani context.
- The study identified the levels of stress and its associated factors among mothers with preterm infants, providing a reference for future studies in LMIC and HIC.
- The participants enlisted for the study belonged to diverse socio-cultural settings, which aids the generalizability of the study, as its findings can be applicable to people of various social and cultural backgrounds.
- The sample size for the study was calculated prior, with a power of 80%.

Limitations of the Study

The limitations of the research study are as follows:

- An analytical cross-sectional study design was used in the study. However, to find the association between outcomes of the study and the factors associated, longitudinal or prospective cohort studies can provide better results.

- The study has limited generalizability, as the sample of the study included only mothers who delivered preterm infants.
- This study was conducted in a private hospital; therefore, its findings cannot be generalized to the mothers who delivered preterm infants in government settings.

Recommendations

The below mentioned are some recommendation based on the findings of the study:

Nursing practice.

- Thorough training of the health care professionals is necessary for the assessment of mental health in mothers with preterm infants, and for conducting interventions for them.
- A specialized clinical pathway for the infants born preterm can be initiated. This pathway can include the details of the child and the mother, the risk factors associated, and the scale that would be assessing the level of stress in mothers. It will also include the pertaining stress during pregnancy and the ongoing stress assessment of the mothers. Teaching related to coping strategies in stress and handling of newborns must be incorporated in the clinical pathway.
- A role of the nurse practitioner, that incorporates the care of the newborns and mothers at the same time must, be initiated. This role will help nurses identify the stress in the mothers under going the process of delivery, neonatal handling, and care.
- The study findings have identified high levels of perceived stress among mothers with preterm infants, hence, there is an immense need to emphasize on the psychological health screening program, that it is incorporated in antenatal and post natal care.

- A support group must be formulated, consisting of mothers who deliver preterm infants. This support group will help decrease the level of stress and boost their coping by giving them an opportunity to express their feelings and concerns related to preterm handling and care.
- The administration of the hospitals should provide a separate area where the mothers with preterm infants can be individually assessed for the level of stress, and teaching for the same can be provided on an individual basis.
- At the policy level, it should be made compulsory while taking into consideration a multidisciplinary team approach, that the team specifically includes a consult by a psychologist for mothers who deliver preterm infants, in the post natal period.

Nursing education.

- Nursing education must contain a separate course related to neonatal handling, care, feeding, teaching of the mothers with preterm infants, and basic assessments tools that assess the stress of the mothers with preterm infants.
- Nursing students must be introduced to the unique role and concept of nurse practitioner in the field. These nurse practitioners will serve as a liaison between both mothers and preterm infants. This will help students identify their area of interest and they can choose their careers in this field accordingly.

Nursing research.

- As the study findings identified an increased level of stress in mothers with preterm infants, there is a need for intervention studies, to identify ways for improving the mental health of mothers with preterm infants.

- As this study identified the level of stress among mothers with preterm infants, a cross sectional study to identify the level of stress among mothers with term infants can be carried out.
- Since this study identified the level of stress and its associated factors among mothers with preterm infants, a similar study could be carried out to identify the level of stress and its associated factors among fathers with preterm infants.
- Future studies, with a multi-centered approach, consisting of large sample sizes, are required to validate the findings of this study.

Conclusion

The study findings suggest high levels of perceived stress among mothers with preterm infants in a private tertiary care hospital of Karachi, Pakistan. The mothers who abuse substance, have gender preference from family, are housewives, and had lack of social support from husbands and in-laws were most likely to experience increased level of stress.

The study findings draw attention towards the need of screening mothers with preterm infants for their mental wellbeing. In addition, the initiation of treatment related to mental wellbeing in the antenatal clinics is of prime importance. Moreover, policy making, regarding the screening and treatment of mental health of mothers, is required for definite interventions. Lastly, further research is necessary to achieve generalizability of the study findings.

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List of Appendices

Appendix A: ERC Approval Letter

آغا خان یونیورسٹی
THE AGA KHAN UNIVERSITY

30-Nov-2022

Ms. YASMIN PARPIO
Department of School of Nursing and Midwifery
Aga Khan University
Karachi

Dear Ms. YASMIN PARPIO,

2022-7808-23288, YASMIN PARPIO: Stress and its associated factors in mother with preterm infants in Karachi, Pakistan.

Thank you for submitting your application for ethical approval regarding the above mentioned study.

Your study was reviewed and discussed in ERC meeting. There were no major ethical issues. The study was given an approval for a period of one year with effect from 30-Nov-2022. For further extension a request must be submitted along with the annual report.

List of document(s) approved with this submission.

Submission Document Name	Submission Document Date	Submission Document Version
CITI certificate Yasmin Nadeem Parpio	19-Jul-2022	1
NIDA Certificate Tazeen Ali	19-Jul-2022	1
CITI Certificate Sobiya Sawani	19-Jul-2022	1
CITI Certificate Salima Akbar Ali	19-Jul-2022	1
CMO Approval for Study	26-Aug-2022	1
Written consent form English pdf	14-Sep-2022	2
Written Consent Form English ERC	05-Oct-2022	3
Written consent form Urdu ERC	05-Oct-2022	2
Affidavit ERC	05-Oct-2022	2
Study Protocol ERC (3)	31-Oct-2022	3
Questionnaire English Version (2)	31-Oct-2022	2
Questionnaire ERC Urdu version (2)	31-Oct-2022	2
Sample form for - ERC Response	31-Oct-2022	1

Any changes in the protocol or extension in the period of study should be notified to the Committee for prior approval. All informed consents should be retained for future reference.

Please ensure that all the national and institutional requirements are met.

Thank you.

Sincerely,

Dr Afia Zafar

Chairperson
Ethics Review Committee

Appendix B: Permission Letter from the CMO

آغا خان یونیورسٹی
THE AGA KHAN UNIVERSITY

Dated: August 25, 2022

Title: Stress and its Associated Factors in Mothers with Preterm Infants, Karachi, Pakistan

Principal Investigator: Ms. Yasmin Parpio
Assistant Professor, School of Nursing
Aga Khan Hospital
Karachi

The above-entitled study is a analytical cross sectional study in the Aga Khan University Hospital, Karachi.

As Chief Medical Officer at the Aga Khan University Hospital, Karachi, I approve the above named study to be conducted within the Hospital, following required approvals and maintaining compliance with all Institutional ethical and regulatory requirements

Asim F. Belgaumi,
Professor, Pediatric Hematology & Oncology,
Department of Oncology.
Chief Medical Officer,
Associate Dean for Clinical Affairs
Aga Khan University Hospital.

Appendix C: Informed Consent (English)

INFORMED CONSENT FORM

PROJECT INFORMATION	
Project Title: Stress and its associated factors in mother with preterm infants in Karachi, Pakistan	Version & Date: 2 and 5 - 10 - 2022
ERC Project No: 7808	Sponsor: NA
Principal Investigator: Yasmin Parpio	Organization: Aga Khan University Hospital
Location: Peads Ward and NICU	Phone: 0315-5948771
Other Investigators: None	Organization: NA
Location: NA	Phone: NA

INTRODUCTION

I Salima Akbar Ali is a student of Masters of Science in Nursing (MScN) at The Aga Khan University School of Nursing and Midwifery and is the primary investigator of the research study. The study topic is stress and its associated factors in mothers with preterm infants in Karachi Pakistan. This topic is of great importance in addressing the area of stress for the mothers which would help in uplifting the overall health of the mothers. This study is a requirement of MScN program. This study will be supervised by Ms. Yasmin Parpio, Assistant Professor and Director at The Aga Khan University School of Nursing and Midwifery.

PURPOSE OF RESEARCH STUDY

The objective of this study is to identify level of stress in mothers associated with the birth of preterm infants. Furthermore, classify the factors that are leading to stress among mother with preterm infants.

PROCEDURES

Three time interaction would be done with participant. First one would be to fill up the questionnaire that would take approximately 15-20 minutes. A questionnaire related to your pregnancy, children, husband, family, and stress while caring for the newborn and the factors associated with stress would be asked. Primary investigator would be present while filling the questionnaire to reply any of the questions. Second would be the educational session for the identified mothers with stress and re-evaluation would be taken at that point in time which would take 30-40 minutes. Lastly, follow-up would only be done for the participants who would be staying for the long term periods.

POSSIBLE RISKS

There is no risk associated with the study.

BENEFITS

Participant would be able to identify their level of stress and the factors that are the cause for their stress. Moreover, participants would be able to work on their stress by taking into consideration different options for coping with their stress. This would not only help in decreasing the level of stress but it would also create a better outcome for both the mothers and the newborn.

FINANCIAL CONSIDERATIONS

Financial reimbursements would not be provided for taking part in the study.

CONFIDENTIALITY

Your privacy and confidentiality would be preserved during the whole study i.e., from collecting data till publication. Your name and medical record number would be substituted by code numbers. This data would only be shared with thesis committee and ethical review committee of AKUH.

RIGHT TO WITHDRAW OR REFUSE

Your participation in the study is based on your willingness. You have a right to refuse your participation in the study and you can withdraw from study at any point in time before data coding.

Contact Information

In case of any queries or concerns, you can contact the primary investigator of the study. Primary investigator of the study, Salima Akbar Ali at The Aga Khan University School of Nursing and Midwifery by contacting on 021-34865495 or send an e-mail on salima.akbar2@scholar.aku.edu

AUTHORIZATION

I have read and understand this consent form, and I volunteer to participate in this research study. I voluntarily choose to participate, but I understand that my consent does not take away any legal rights in the case of negligence or other legal fault of anyone who is involved in this study.

Agreement to Participate

Participant Name: _____ Investigator Name:_____

Signature: _____ Signature: _____

Date: _____ Date: _____

For Participants unable to read

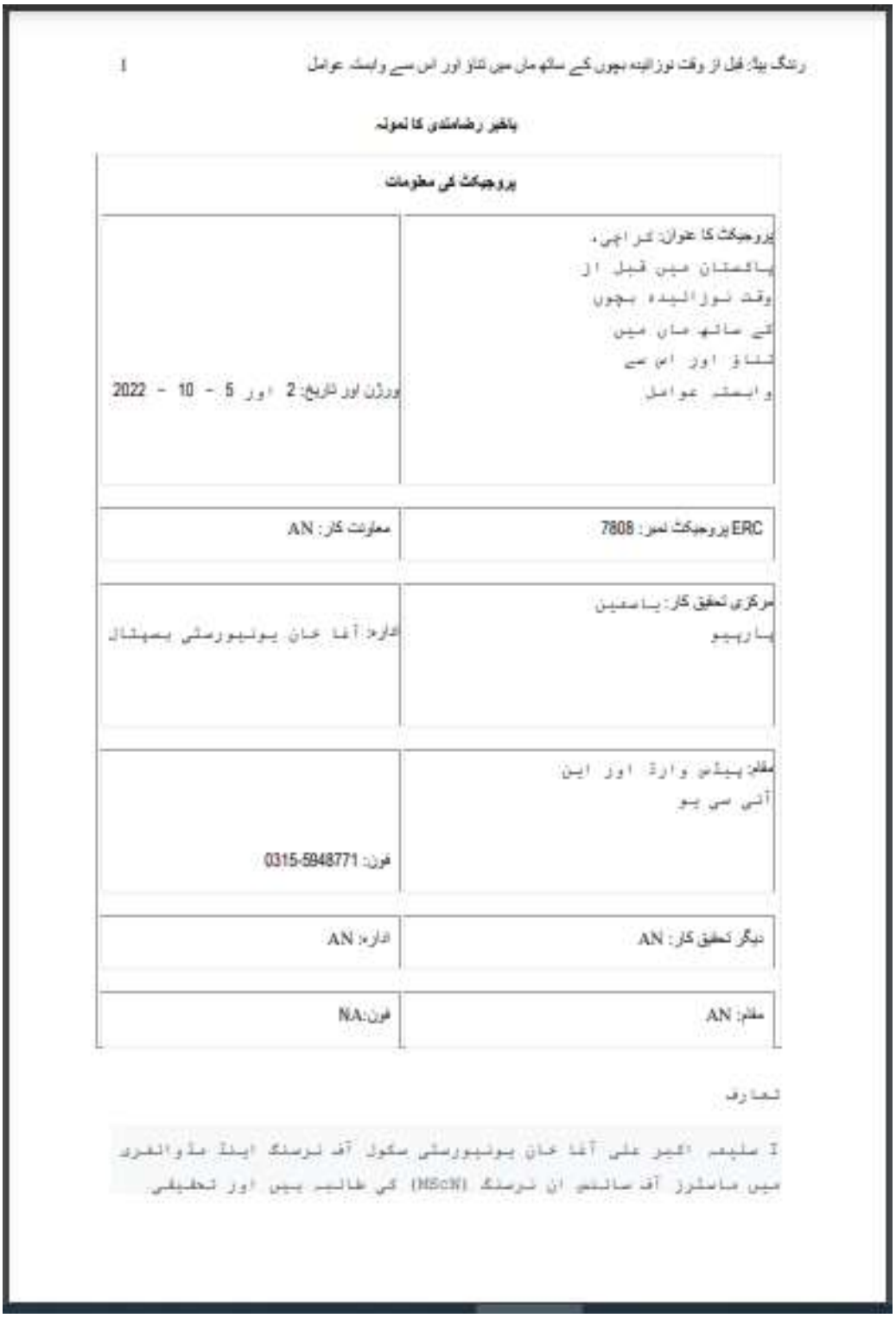
Witness:

I have witnessed the accurate reading of the consent form to the potential participants, and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

Witness Name: _____ Participant's Thumb Print: _____

Signature: _____Date:_____

Appendix D: Informed Consent (Urdu)



رنگ بیاد: قبل از وقت نوزائیدہ بچوں کے ساتھ ماں میں تناؤ اور اس سے وابستہ عوامل 1

باخبر رضامندی کا نمونہ

پروجیکٹ کی معلومات	
پروجیکٹ کا عنوان: کراچی، پاکستان میں قبل از وقت نوزائیدہ بچوں کی ماں میں تناؤ اور اس سے وابستہ عوامل	ورژن اور تاریخ: 2 اور 5 - 10 - 2022
ERC پروجیکٹ نمبر: 7808	معاونت کار: AN
مرکزی تحقیق کار: یاسمین پارہیو	ادارہ: آغا خان یونیورسٹی ہسپتال
مقام: پیدائش وارڈ اور این آئی سی یو	فون: 0315-5948771
دیگر تحقیق کار: AN	ادارہ: AN
مقام: AN	فون:NA

تعارف

I سلیمہ اکبر علی آغا خان یونیورسٹی سکول آف نرسنگ اینڈ مڈوائفری میں ماسٹرز آف سائنس ان نرسنگ (MScN) کی طالبہ ہیں اور تحقیقی

مطالعہ کی بنیادی تفتیش کار ہیں۔ مطالعہ کا موضوع کراچی پاکستان میں قبل از وقت نوزائیدہ بچوں والی ماؤں میں تناؤ اور اس سے وابستہ عوامل ہیں۔ یہ موضوع ماؤں کے لیے دباؤ کے علاقے کو حل کرنے کے لیے بہتر ایمپیکٹ کا حامل ہے جو ماؤں کی مجموعی صحت کو بہتر بنانے میں مددگار ثابت ہوگا۔ یہ مطالعہ MScN پروگرام کی ضرورت ہے۔ اس مطالعہ کی نگرانی آغا خان یونیورسٹی سکول آف نرسنگ اینڈ مڈوائفری کی اسسٹنٹ پروفیسر اور ڈائریکٹر محترمہ یاسمین ناربیو کریں گی۔

تحقیقی مطالعہ کا مقصد

اس تحقیق کا مقصد قبل از وقت نوزائیدہ بچوں کی پیدائش سے منسلک ماؤں میں تناؤ کی سطح کی نشاندہی کرنا ہے۔ مزید برآں، ان عوامل کی درجہ بندی کریں جو قبل از وقت نوزائیدہ بچوں والی ماں کے درمیان تناؤ کا باعث بنتے ہیں۔

طریقہ کار

شریک کے ساتھ تین بار بات چیت کی جائے گی۔ سب سے پہلے سوالنامہ پُر کرنا ہوگا جس میں تقریباً 15-20 منٹ لگیں گے۔ آپ کی حمل، بچوں، شوہر، خاندان، اور نوزائیدہ بچے کی دیکھ بھال کے دوران تناؤ اور تناؤ سے وابستہ عوامل سے متعلق ایک سوالنامہ پوچھا جائے گا۔ پرائمری انوسٹی گیٹر کسی بھی سوال کا جواب دینے کے لیے سوالنامہ بھرتے وقت موجود ہوگا۔ دوسرا تناؤ کے شکار ماؤں کے لیے تعلیمی سیشن ہوگا اور اس وقت دوبارہ جائزہ لیا جائے گا جس میں 30-40 منٹ لگیں گے۔ آخر میں، فالو اپ صرف ان شرکاء کے لیے کیا جائے گا جو طویل مدت کے لیے قیام پذیر ہوں گے۔

ممکنہ خطرات

مطالعہ سے وابستہ کوئی خطرہ نہیں ہے۔

فائدے

شرکاء اپنے تناؤ کی سطح اور ان عوامل کی نشاندہی کر سکیں گے جو ان کے تناؤ کی وجہ ہیں۔ مزید برآں، شرکاء اپنے تناؤ سے نمٹنے کے لیے مختلف آپشنز کو مدنظر رکھ کر اپنے تناؤ پر کام کر سکیں گے۔ اس سے نہ صرف تناؤ کی سطح کو کم کرنے میں مدد ملے گی بلکہ یہ ماؤں اور نوزائیدہ دونوں کے لیے بہتر نتیجہ بھی پیدا کرے گی۔

مالی تحفظات

مطالعہ میں حصہ لینے کے لیے مالی معاوضے فراہم نہیں کیے جائیں گے۔

رازداری

آپ کی رازداری اور رازداری کو پورے مطالعہ کے دوران محفوظ رکھا جائے گا، یعنی ڈیٹا اکٹھا کرنے سے لے کر اشاعت تک۔ آپ کا نام اور میڈیکل ریکارڈ نمبر کوڈ نمبروں سے بدل دیا جائے گا۔ یہ ڈیٹا صرف نیشنل کمیٹی اور AKUH کی اخلاقی جائزہ کمیٹی کے ساتھ شیئر کیا جائے گا۔

واپس لینے یا انکار کرنے کا حق

مطالعہ میں آپ کی شرکت آپ کی رضامندی پر مبنی ہے۔ آپ کو مطالعہ میں اپنی شرکت سے انکار کرنے کا حق ہے اور آپ ڈیٹا کوڈنگ سے پہلے کسی بھی وقت مطالعہ سے دستبردار ہو سکتے ہیں۔

رابطے کی معلومات

کسی بھی سوالات یا خدشات کی صورت میں، آپ مطالعہ کے بنیادی تفتیش کار سے رابطہ کر سکتے ہیں۔ آغا خان یونیورسٹی سکول آف نرسنگ اینڈ مڈوائفری میں مطالعہ کی پرائمری الویسٹی گیٹر ملیحہ اکبر علی 021-

34865495 پر رابطہ کر کے یا salima.akbar2@scholar.aku.edu پر ای میل بھیجیں۔

اجازت دینا

میں نے رضامندی کے اس فارم کو پڑھ اور سمجھ لیا ہے، اور میں اس تحقیقی مطالعہ میں حصہ لینے کے لیے رضاکارانہ طور پر تیار ہوں۔ میں رضاکارانہ طور پر حصہ لینے کا انتخاب کرتا ہوں، لیکن میں سمجھتا ہوں کہ میری رضامندی اس مطالعے میں شامل کسی بھی شخص کی غفلت یا دیگر قانونی غلطی کی صورت میں کوئی قانونی حق نہیں چھپاتی ہے۔

حصہ لینے کا معاہدہ

شریک کا نام:_____ تصدیق کار کا نام:_____
دستخط:_____ دستخط:_____
تاریخ:_____ تاریخ:_____

پڑھنے سے قاصر شرکاء کے لیے

گواہ

میں نے ممکنہ شرکاء کو رضامندی کے فارم کو درست پڑھتے ہوئے دیکھا ہے، اور فرد کو سوالات پوچھنے کا موقع ملا ہے۔ میں تصدیق کرتا ہوں کہ فرد نے آزادانہ طور پر رضامندی دی ہے۔

گواہ کا نام: _____
حصہ لینے والے کے انگوٹھے کا نشان: _____
دستخط:_____
تاریخ:_____

Appendix E: Study Questionnaire (English)

English Version Study Questionnaire

Stress and its associated factors in mothers with preterm infants in a tertiary care hospital of Karachi, Pakistan

Interview date	Day	Month	Year

Participant code							

Interview status: Complete ☐ Incomplete ☐

Eligibility Form			
No.	**Question**	**Response**	**Skip Pattern**
1.	Can you speak and understand the Urdu or English language?	1-☐Yes 2-☐No	If answer is yes then go to next question
2.	Is your age 18 years or above?	1-☐Yes 2-☐No	If answer is yes then go to next question
3.	Was your gestational age below 37weeks at the time of delivery?	1-☐Yes 2-☐No	If answer is yes then go to next question
4.	After reading or listening consent form, do you agree for participation in the study?	1-☐Yes 2-☐No	If answer is yes proceed for next stage of interview.

If answers to all the questions are yes, participant is eligible for the study.

Date of interview __/__/____ Name of interviewee: _____

Time of interview:_____ Contact number of interviewee: _____

Name of interviewer:_____ Signature of interviewee: _____

Newborn information

Age: ----------

Gender: ----------

Date of birth: ----------

Weight: ----------

Height: ----------

Presenting complains: --------

Apgar score: ----------

Immunization status: --------

Transferred from: --------

Gestational age: --------

Mother's information

Section 1: Socio Demographic Information				
Instructions: Please tick the appropriate option or write the answers where indicated.				
No.	Question	Response	Skip	Code
1.1	What is your age?	----------		
1.2	What is your education status?	☐ 1. Primary ☐ 2. Secondary ☐ 3. Matriculation ☐ 4. Intermediate ☐ 5. Graduate ☐ 6. Post graduate and above		
1.3	Which language do you speak?	☐ 1. Urdu ☐ 2. English ☐ 3. Sindhi ☐ 4. Punjabi ☐ 5. Balochi ☐ 6. Pashto ☐ 7. Other:		
1.4	What is your occupational status?	☐ 1. House Wife ☐ 2. Working	If answer is option "2" than move to 1.5	
1.5	What is the nature of your job/occupation?	----------		
1.6	What is your average monthly income?	----------		

1.7	Are you satisfied with your financial status?	☐1. Yes ☐2. No		
1.8	Are you involved in any substance abuse?	☐1. Pan ☐2. Betelnut ☐3. Cigarette ☐4. Gutka ☐5. Alcohol ☐6. Naswar ☐7. Others:		
1.9	What is the type of your marriage?	☐1. Consanguinity marriage ☐2. Non consanguinity marriage		
1.10	How many year have you been in this marriage?	----------		
Section 2: Pregnancy related Variables				
2.1	How many times have you been pregnant including the current pregnancy?	----------		
2.2	How many children do you have?	----------		
2.3	How many of your children are deceased?	----------		
2.4	Are there any of these co-morbidities in your children?	☐1. Genetic disorders ☐2. Developmentally delayed ☐3. Seizure disorders ☐4. Congenital heart diseases ☐1. Metabolic disorders		
2.5	Who takes care of your children during the pregnancy?	☐1. Self ☐2. Family member ☐3. Care taker NA for primi gravid mothers		
2.6	Was your current pregnancy planned?	☐1. Yes ☐2. No		
2.7	Do you plan to have more children?	☐1. Yes ☐2. No		

		☐3. Depends on husband's wish ☐4. Will decide later		
2.8	Is there any demand for gender preference from your family?	☐1. Boy ☐2. Girl		
2.9	Do you have any gynecological or fertility disorders?	☐1. Yes ☐2. No If yes, specify ----------		
2.10	Were there any complications in your pregnancy?	☐1. Yes ☐2. No If yes, specify ----------		
2.11	What is the mode of delivery?	☐1. Spontaneous vaginal delivery without episiotomy ☐2. Spontaneous vaginal delivery with episiotomy ☐3. Cesarean section ☐4. Instrumental		
2.12	Do you have history of any of the following?	1.22(a) Miscarriage ☐1. Yes ☐2. No If yes specify the number: --------- 1.22(b) Abortion ☐1. Yes ☐2. No If yes specify the number: --------- 1.23(c) Pre-term delivery ☐1. Yes ☐2. No If yes specify gestation at time of delivery: --------- 1.22(d) Intra Uterine death ☐1. Yes ☐2. No If yes specify the number: ---------		

		1.22(e) Still births ☐1. Yes ☐2. No If yes specify the number: ----------		
2.13	Do you think you eat a well-balanced diet to meet your body requirements?	☐1. Yes ☐2. No		
2.14	How many hours a day do you sleep?	----------		
2.15	In your opinion, what is the quality of your sleep?	☐1. Excellent ☐2. Good ☐3. Fair ☐4. Poor	If sleep quality is fair or poor then ask Q no 2.16	
2.16	What are the possible reasons for fair or poor quality of sleep?	☐1. Frequent urination ☐2. Unable to breath comfortably ☐3. Feels fearful ☐4. Feeling restless ☐5. Having terrible dreams ☐6. Feeling cold ☐7. Feeling hot		
2.17	When you first started the antenatal visits during pregnancy?	☐1. Initial weeks ☐2. First Trimester ☐3. Second Trimester ☐4. Third Trimester		
2.18	Were you regular in your antenatal visits?	☐1. Yes ☐2. No	If the answer is No ask Qno 2.19	
2.19	What are the reasons for not going regularly for antenatal visits?	☐1. Financial constrains ☐2. Family doesn't allowed for antenatal visits ☐3. There was no one to accompany ☐4. Busy with other works ☐5. Antenatal visits are not		

		important during pregnancy		
2.20	What is your immunization status?	☐1. Complete ☐2. Incomplete ☐3. Not known		
2.21	Are your menstrual cycles regular?	☐1. Yes ☐2. No		
2.22	What was your mode of conception?	☐1. Natural ☐2. Artificial		
2.23	What is the mode of feeding for your baby?	☐1. Direct breast feeding ☐2. Oro-gastric tube feeding ☐3. Nothing per oral		
2.24	Which type of feed is used for your baby?	☐1. Breast feed ☐2. Formula feed ☐3. Donor feed	If answer is option 2 or 3 ask Qno 2.25	
2.25	What are the reasons for formula feeding or donor feeding?	☐1. Not enough breast feed ☐2. Don't know about the technique for breast feeding ☐3. Stressed out due to preterm delivery ☐4. Taking any medications in which breast feed is contraindicated		
2.26	Which type of family planning method do you use?	☐1. Natural ☐2. Artificial What? ----------		
Section 3: Family Information				
3.1	Which type of family do you live?	☐1. Nuclear ☐2. Extended		
3.2	Are there any of these co-morbidities in your family?	☐1. Endocrine disorders ☐2. Heart diseases ☐3. Cancers ☐4. Respiratory diseases		
3.3	How many family members are residing within your house?	----------		
3.4	How many members			

	are earning in your family?	----------		
3.5	What is the age of your husband?	----------		
3.6	What is the educational status of your husband?	☐ 1. Primary ☐ 2. Secondary ☐ 3. Matriculation ☐ 4. Intermediate ☐ 5. Graduate ☐ 6. Post graduate and above		
3.7	What is the occupation of your husband?	☐ 1. Job ☐ 2. Business		
3.8	Are you residing with your husband?	☐ 1. Yes ☐ 2. No	If answer is no ask Qno 3.9	
3.9	What are the reasons for not residing with your husband?	☐ 1. Separated ☐ 2. Divorced ☐ 3. Widowed		
3.10	Does your husband have more than one wife?	☐ 1. Yes ☐ 2. No If yes, specify ----------		
3.11	Is your husband involved in any substance abuse?	☐ 1. Pan ☐ 2. Betelnut ☐ 3. Cigarette ☐ 4. Gutka ☐ 5. Alcohol ☐ 6. Naswar ☐ 7. Others:		
3.12	To what extend you are satisfied with the relationship with your husband?	☐ 1. To a greater extent ☐ 2. To some extent ☐ 3. To a lesser extent ☐ 4. Not satisfied		
3.13	To what extend you are satisfied with the relationship with your in-laws?	☐ 1. To a greater extent ☐ 2. To some extent ☐ 3. To a lesser extent ☐ 4. Not satisfied		

Section 4: Variables related to Coping Mechanism				
4.1	Are you able to identify when you are stressed?	☐1. Yes ☐2. No		
4.2	How do you cope with the stressful situation?	----------		
4.3	When a stressful situation arises, do you attempt to find a solution?	☐1. Yes ☐2. No If no, specify reason ----------		
4.4	Is there a reliable person with whom you can share your feelings, concerns, and problems?	----------		
4.5	What are your modes of socialization?	----------		

Perceived Stress Scale (PSS)							
Instructions: Please respond to the following questions by encircling the correct number							
S.No	**Questions**	**Responses**					**Code**
5.1	In the last month, how often have you been upset because of something that happened unexpectedly?	Never	Almost Never	Some of the time	Fairly Often	Very Often	
		0 ☐	**1** ☐	**2** ☐	**3** ☐	**4** ☐	
5.2	In the last month, how often have you felt that you were unable to control the important things in your life?	Never	Almost Never	Some of the time	Fairly Often	Very Often	
		0 ☐	**1** ☐	**2** ☐	**3** ☐	**4** ☐	
5.3	In the last month, how often have you felt nervous and "stressed"?	Never	Almost Never	Some of the time	Fairly Often	Very Often	
		0 ☐	**1** ☐	**2** ☐	**3** ☐	**4** ☐	
5.4	In the last month, how often have you felt	Never	Almost Never	Some of the time	Fairly Often	Very Often	

	confident about your ability to handle your personal problems?	4☐	3 ☐	2 ☐	1 ☐	0 ☐	
5.5	In the last month, how often have you felt that things were going your way?	Never	Almost Never	Some of the time	Fairly Often	Very Often	
		4☐	3 ☐	2 ☐	1 ☐	0 ☐	
5.6	In the last month, how often have you found that you could not cope with all the things that you had to do?	Never	Almost Never	Some of the time	Fairly Often	Very Often	
		0 ☐	1 ☐	2 ☐	3 ☐	4 ☐	
5.7	In the last month, how often have you been able to control irritations in your life?	Never	Almost Never	Some of the time	Fairly Often	Very Often	
		4☐	3 ☐	2 ☐	1 ☐	0 ☐	
5.8	In the last month, how often have you felt that you were on top of things?	Never	Almost Never	Some of the time	Fairly Often	Very Often	
		4☐	3 ☐	2 ☐	1 ☐	0 ☐	
5.9	In the last month, how often have you been angered because of things that were outside of your control?	Never	Almost Never	Some of the time	Fairly Often	Very Often	
		0 ☐	1 ☐	2 ☐	3 ☐	4 ☐	
5.10	In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?	Never	Almost Never	Some of the time	Fairly Often	Very Often	
		0 ☐	1 ☐	2 ☐	3 ☐	4 ☐	

Appendix F: Study Questionnaire (Urdu)

اردو ورژن مطالعہ سوالنامہ

قبل از وقت نوزائیدہ بچوں والی ماؤں میں تناؤ اور اس سے وابستہ عوامل

شریککوڈ									

انٹرویو کی تاریخ	مہینہ	دن	سال

انٹرویو کی حیثیت: مکمل ☐ نامکمل ☐

ابلیت کا فارم			
نمبر	سوال	جواب	پیٹرن
1.	کیا آپ اردو یا انگریزی زبان بول اور سمجھ سکتے ہیں؟	☐-1جی ہاں ☐-2نہیں	اگر جواب ہاں میں ہے تو اگلے سوال پر جائیں۔
2	کیا آپ کی عمر 18 سال یا اس سے زیادہ ہے؟	☐-1جی ہاں ☐-2نہیں	اگر جواب ہاں میں ہے تو اگلے سوال پر جائیں۔
3.	کیا آپ کی حمل کی عمر ڈیلیوری کے وقت 37 ہفتوں سے کم تھی؟	☐-1جی ہاں ☐-2نہیں	اگر جواب ہاں میں ہے تو اگلے سوال پر جائیں۔
4.	رضامندی کے فارم کو پڑھنے یا سننے کے بعد، کیا آپ مطالعہ میں شرکت کے لیے متفق ہیں؟	☐-1جی ہاں ☐-2نہیں	اگر جواب ہاں میں ہے تو اگلے سوال پر جائیں۔

اگر تمام سوالات کے جوابات ہاں میں ہیں، تو حصہ لینے والا مطالعہ کے لیے ابل ہے۔

انٹرویو کی تاریخ: _____ انٹرویو لینے والے کا نام: _____

انٹرویو کا وقت: _____ انٹرویو لینے والے کا رابطہ نمبر: _____

انٹرویو لینے والے کا نام: _____ انٹرویو لینے والے کے دستخط: _____

Stress and its Associated factors in Mothers with Preterm Infants in a Tertiary Care Hospital of Karachi, Pakistan

نوزائیدہ معلومات

عمر: _____صنف: _____

پیدائش کی تاریخ: _____وزن: _____

اونچائی: _____شکایات : _____

اپگر سکور : _____حفاظتی ٹیکوں کی حیثیت: _____

منتقل شدہ یونٹ : _____حمل کی عمر: _____

والدہ کی معلومات

سیکشن 1: سماجی آبادیاتی معلومات				
. **ہدایات:** براہ کرم مناسب آپشن پر نشان لگائیں یا جوابات لکھیں جہاں اشارہ کیا گیا ہے۔				
نمبر	سوال	جواب	پیٹرن	کوڈ
1.1	آپ کی عمر کیا ہے؟	----------		
1.2	آپ کی تعلیم کی حیثیت کیا ہے ؟	☐ 1پرائمری ☐ 2.ثانوی ☐ 3.میٹرک ☐ 4. انٹرمیڈیٹ ☐ 5.گریجویٹ ☐ 6.پوسٹ گریجویٹ اور اوپر		
1.3	آپ کونسی زبان بولتے ہیں؟	1. اردو ☐ 2. انگریزی ☐ 3. سندھی ☐ 4. پنجابی ☐ 5. بلوچی ☐ 6. پشتو ☐ 7. دیگر: _____		
1.4	آپ کی پیشہ ورانہ حیثیت کیا ہے؟	☐ 1. گھریلو بیوی ☐ 2. کام کرنا	اگر جواب آپشن "2" ہے تو اس میں	

			منتقل کریں۔ 1.5	
1.5	آپ کے کام/پیشہ کی نوعیت کیا ہے؟	----------		
1.6	آپ کی اوسط ماہانہ آمدنی کتنی ہے؟	----------		
1.7	کیا آپ اپنی مالی حیثیت سے مطمئن ہیں؟	1. ہاں ☐ 2. نہیں		
1.8	کیا آپ کسی بھی مادے کے استعمال میں ملوث ہیں؟	☐ 1. پان ☐ 2. سپاری ☐ 3. سگریٹ ☐ 4. گٹکا ☐ 5. شراب ☐ 6. نسوار ☐ 7. دیگر:		
1.9	آپ کی شادی کی قسم کیا ہے؟	☐ 1. ہم آہنگی کی شادی ☐ 2. غیر ہم آہنگی والی شادی		
1.10	آپ کو اس شادی کو کتنے سال ہوئے ہیں؟	----------		
سیکشن 2: حمل سے متعلق متغیرات				
2.1	موجودہ حمل سمیت آپ کتنی بار حاملہ ہوئی ہیں؟	----------		
2.2	آپ کے کتنے بچے ہیں؟	----------		
2.3	آپ کے کتنے بچے مر چکے ہیں؟	----------		
2.4	کیا آپ کے بچوں میں ان میں سے کوئی بیماری ہے؟	☐ 1. جینیاتی عوارض ☐ 2. ترقی میں تاخیر ☐ 3. دوروں کے عوارض ☐ 4. پیدائشی دل کی بیماریاں		

			☐ 5. میٹابولک عوارض	
2.5	حمل کے دوران آپ کے بچوں کی دیکھ بھال کون کرتا ہے؟	☐ 1. خود ☐ 2. فیملی ممبر ☐ 3. دیکھ بھال کرنے والا پرائمری گریوڈ ماؤں کے لیے NA		
2.6	کیا آپ کی موجودہ حمل کی منصوبہ بندی کی گئی تھی؟	1. ہاں ☐ 2. نہیں		
2.7	کیا آپ مزید بچے پیدا کرنے کا ارادہ رکھتے ہیں؟	☐1. ہاں ☐2. نہیں ☐3. شوہر کی مرضی پر منحصر ہے۔ ☐4. بعد میں فیصلہ کریں گے۔		
2.8	کیا آپ کے خاندان کی طرف سے صنفی ترجیح کا کوئی مطالبہ ہے؟	☐ 1. لڑکا ☐ 2. لڑکی		
2.9	کیا آپ کو نسوانی یا زرخیزی کی خرابی ہے؟	☐ 1. ہاں ☐ 2. نمبر اگر ہاں تو وضاحت کریں ---		
2.10	کیا آپ کے حمل میں کوئی پیچیدگیاں تھیں؟	☐ 1. ہاں ☐ 2. نمبر اگر ہاں تو وضاحت کریں ---		
2.11	ترسیل کا طریقہ کیا ہے؟	☐ 1. اپنی سیوٹومی کے بغیر اندام نہانی کی خود بخود ترسیل ☐ 2. اپنی سیوٹومی کے ساتھ اندام نہانی کی خود بخود ترسیل ☐ 3. سیزرین سیکشن		

			□ 5. میٹابولک عوارض	
2.5	حمل کے دوران آپ کے بچوں کی دیکھ بھال کون کرتا ہے؟	□ 1. خود □ 2. فیملی ممبر □ 3. دیکھ بھال کرنے والا پرائمری گریوڈ ماؤں کے لیے NA		
2.6	کیا آپ کی موجودہ حمل کی منصوبہ بندی کی گئی تھی؟	1. ہاں □ 2. نہیں		
2.7	کیا آپ مزید بچے پیدا کرنے کا ارادہ رکھتے ہیں؟	□1. ہاں □2. نہیں □3. شوہر کی مرضی پر منحصر ہے۔ □4. بعد میں فیصلہ کریں گے۔		
2.8	کیا آپ کے خاندان کی طرف سے صنفی ترجیح کا کوئی مطالبہ ہے؟	□ 1. لڑکا □ 2. لڑکی		
2.9	کیا آپ کو نسوانی یا زرخیزی کی خرابی ہے؟	□ 1. ہاں □ 2. نمبر اگر ہاں تو وضاحت کریں --- -		
2.10	کیا آپ کے حمل میں کوئی پیچیدگیاں تھیں؟	□ 1. ہاں □ 2. نمبر اگر ہاں تو وضاحت کریں --- -		
2.11	ترسیل کا طریقہ کیا ہے؟	□ 1. اپنی سیوٹومی کے بغیر اندام نہانی کی خود بخود ترسیل □ 2. اپنی سیوٹومی کے ساتھ اندام نہانی کی خود بخود ترسیل □ 3. سیزرین سیکشن		

		□ 4. آلہ کار		
2.12	کیا آپ کے پاس درج ذیل میں سے کسی کی تاریخ ہے؟	(a) 1.22 اسقاط حمل □ 1. ہاں □ 2. نہیں اگر ہاں تو نمبر بتائیں: - --------- (b) 1.22 اسقاط حمل □ 1. ہاں □ 2. نہیں اگر ہاں تو نمبر بتائیں: - --------- (c) 1.23 قبل از وقت ترسیل □ 1. ہاں □ 2. نہیں اگر ہاں تو حمل کے وقت کی وضاحت کریں. ترسیل: ---------- (d) 1.22 انٹرا یوٹرن موت □ 1. ہاں □ 2. نہیں اگر ہاں تو نمبر بتائیں: - --------- (e) 1.22 اب بھی جنم □ 1. ہاں □ 2. نہیں اگر ہاں تو نمبر بتائیں:--	

2.13	کیا آپ کو لگتا ہے کہ آپ اپنے جسم کی ضروریات کو پورا کرنے کے لیے متوازن غذا کھاتے ہیں؟	☐ 1. ہاں ☐ 2. نہیں		
2.14	آپ دن میں کتنے گھنٹے سوتے ہیں؟	----------		
2.15	آپ کی رائے میں آپ کی نیند کا معیار کیا ہے؟	1. بہترین ☐ 2. اچھا ☐ 3. منصفانہ ☐ 4. بدترین	اگر نیند کا معیار مناسب یا خراب ہے تو سوال نمبر 2.16 سے پوچھیں۔	
2.16	نیند کے منصفانہ یا خراب معیار کی ممکنہ وجوہات کیا ہیں؟	☐ 1. بار بار پیشاب کرنا ☐ 2. آرام سے سانس لینے سے قاصر ☐ 3. خوف محسوس کرنا ☐ 4. بے چینی محسوس کرنا ☐ 5. خوفناک خواب دیکھنا ☐ 6. سردی لگنا ☐ 7. گرمی لگ رہی ہے۔		
2.17	حمل کے دوران آپ نے پہلی بار قبل از پیدائش کے درد کب شروع کیے؟	☐ 1. ابتدائی ہفتے ☐ 2. پہلا سہ ماہی ☐ 3. دوسرا سہ ماہی ☐ 4. تیسرا سہ ماہی		
2.18	کیا آپ اپنے قبل از پیدائش کے دوروں میں باقاعدگی سے تھے؟	☐ 1. ہاں ☐ 2. نہیں	اگر جواب نہیں ہے تو سوال نمبر 2.19 پوچھیں۔	

2.19	قبل از پیدائش دوروں کے لیے باقاعدگی سے نہ جانے کی کیا وجوہات ہیں؟	☐ 1. مالی مجبوریاں ☐ 2. خاندان کو قبل از پیدائش کے دورے کی اجازت نہیں ہے۔ ☐ 3. ساتھ دینے والا کوئی نہیں تھا۔ ☐ 4. دوسرے کاموں میں مصروف ☐ 5. حمل کے دوران قبل از پیدائش کے دورے اہم نہیں ہیں۔		
2.20	آپ کی امیونائزیشن کی حیثیت کیا ہے؟	☐ 1. مکمل ☐ 2. نامکمل ☐ 3. معلوم نہیں۔		
2.21	کیا آپ کا ماہواری باقاعدہ ہے؟	☐ 1. ہاں ☐ 2. نہیں		
2.22	آپ کے تصور کا ہوڈ کیا تھا؟	☐ 1. قدرتی ☐ 2. مصنوعی		
2.23	آپ کے بچے کو کھانا کھلانے کا طریقہ کیا ہے؟	☐ 1. براہ راست دودھ پلانا۔ ☐ 2. اوروگیسٹرک ٹیوب کھانا کھلانا ☐ 3. فی زبانی کچھ نہیں۔		
2.24	آپ کے بچے کے لیے کس قسم کا فیڈ استعمال کیا جاتا ہے؟	☐ 1. بریسٹ فیڈ ☐ 2. فارمولا فیڈ ☐ 3. ڈونر فیڈ	اگر جواب آپشن 2 یا 3 ہے تو پوچھیں۔ Qno 2.25	
2.25	فارمولا فیڈنگ یا ڈونر فیڈنگ کی وجوہات کیا ہیں؟	☐ 1. کافی بریسٹ فیڈ نہیں ہے۔ ☐ 2. بریسٹ فیڈنگ کی تکنیک کے بارے میں نہیں جانتے ☐ 3. قبل از وقت ڈیلیوری کی وجہ سے تناؤ ☐ 4. کوئی بھی ایسی دوائیں لینا جس میں بریسٹ فیڈ سے منع کیا گیا ہو۔		

2.26	آپ خاندانی منصوبہ بندی کا کون سا طریقہ استعمال کرتے ہیں؟	☐ 1. قدرتی ☐ 2. مصنوعی کیا؟ ----------		
سیکشن 3: خاندانی معلومات				
3.1	آپ کس قسم کے خاندان میں رہتے ہیں؟	☐ 1. جوہری ☐ 2. توسیع شدہ		
3.2	کیا آپ کے خاندان میں ان میں سے کوئی بیماری ہے؟	☐ 1. اینڈوکرائن عوارض ☐ 2. دل کی بیماریاں ☐ 3. کینسر ☐ 4. سانس کی بیماریاں		
3.3	آپ کے گھر میں خاندان کے کتنے افراد رہتے ہیں؟	----------		
3.4	آپ کے خاندان میں کتنے ارکان کما رہے ہیں؟	_____		
3.5	آپ کے شوہر کی عمر کیا ہے؟	----------		
3.6	آپ کے شوہر کی تعلیمی حیثیت کیا ہے؟	☐ 1. پرائمری ☐ 2. ثانوی ☐ 3. میٹرک ☐ 4. انٹرمیڈیٹ ☐ 5. گریجویٹ ☐ 6. پوسٹ گریجویٹ اور اس سے اوپر		
3.7	آپ کے شوہر کا پیشہ کیا ہے؟	☐ 1. نوکری ☐ 2. کاروبار		
3.8	کیا آپ اپنے شوہر کے ساتھ رہتی ہیں؟	☐ 1. ہاں ☐ 2. نہیں	اگر جواب نہیں ہے تو پوچھیں۔ سوال نمبر 3.9	

3.9	شوہر کے ساتھ نہ رہنے کی کیا وجوہات ہیں؟	☐ 1. الگ ☐ 2. طلاق یافتہ ☐ 3. بیوہ		
3.10	کیا آپ کے شوہر کی ایک سے زیادہ بیویاں ہیں؟	☐ 1. ہاں ☐ 2. نمبر اگر ہاں تو وضاحت کریں ---		
3.11	کیا آپ کا شوہر کسی نشہ آور چیز میں ملوث ہے؟	☐ 1. پان ☐ 2. سپاری ☐ 3. سگریٹ ☐ 4. گٹکا ☐ 5. شراب ☐ 6. نسوار ☐ 7. دیگر:		
3.12	آپ اپنے شوہر کے ساتھ تعلقات سے کس حد تک مطمئن ہیں؟	☐ 1. زیادہ حد تک ☐ 2. کسی حد تک ☐ 3. ایک حد تک ☐ 4. مطمئن نہیں		
3.13	آپ اپنے سسرال والوں کے ساتھ تعلقات سے کس حد تک مطمئن ہیں؟	☐ 1. زیادہ حد تک ☐ 2. کسی حد تک ☐ 3. ایک حد تک ☐ 4. مطمئن نہیں		
سیکشن 4: کاپنگ میکانزم سے متعلق متغیرات				
4.1	کیا آپ شناخت کر سکتے ہیں جب آپ پریشان ہیں؟	☐ 1. ہاں ☐ 2. نہیں		
4.2	آپ دباؤ والی صورتحال سے کیسے نمٹتے ہیں؟	----------		
4.3	جب کوئی دباؤ والی صورت حال پیدا ہوتی ہے تو کیا آپ اس کا حل تلاش کرنے کی کوشش کرتے ہیں؟	☐ 1. ہاں ☐ 2. نہیں اگر نہیں تو وجہ بیان کریں -----		

4.4	کیا کوئی قابل بھروسہ شخص ہے جس کے ساتھ آپ اپنے احساسات، خدشات اور مسائل بتاسکتے ہیں؟	----------		
4.5	آپ کے سوشلائزیشن کے طریقے کیا ہیں؟	----------		

سمجھا ہوا تناؤ کا پیمانہ (PSS)

ہدایات: براہ کرم صحیح نمبر کو گھیر کر درج ذیل سوالات کا جواب دیں۔

نمبر	سوالات	جوابات					کوڈ
5.1	پچھلے مہینے میں، آپ کتنی بار کسی ایسی چیز کی وجہ سے پریشان ہوئے جو غیر متوقع طور پر ہوا؟	بہت اکثر	کافی کثرت سے	5.1	تقریبا کبھی نہیں	کبھی نہیں۔	
		4☐	3☐		1☐	0☐	
5.2	پچھلے مہینے میں، آپ نے کتنی بار محسوس کیا ہے کہ آپ اپنی زندگی کی اہم چیزوں کو کنٹرول کرنے سے قاصر ہیں؟	بہت اکثر	کافی کثرت سے	5.2	تقریبا کبھی نہیں	کبھی نہیں۔	
		4☐	3☐		1☐	0☐	
5.3	پچھلے مہینے میں، آپ نے کتنی بار گھبراہٹ اور "تناؤ" محسوس کیا ہے؟	بہت اکثر	کافی کثرت سے	5.3	تقریبا کبھی نہیں	کبھی نہیں۔	
		4☐	3☐		1☐	0☐	
5.4	پچھلے مہینے میں، آپ نے کتنی بار اپنے ذاتی مسائل	بہت اکثر	کافی کثرت سے	کچھ وقت	تقریبا کبھی نہیں	کبھی نہیں۔	

						کو سنبھالنے کی اپنی صلاحیت کے بارے میں پر اعتماد محسوس کیا ہے؟	
	4☐	3☐	2☐	1☐	0☐		
	کبھی نہیں۔	تقریبا کبھی نہیں	کچھ وقت	کافی کثرت سے	بہت اکثر	پچھلے مہینے میں، آپ نے کتنی بار محسوس کیا ہے کہ چیزیں آپ کے راستے پر جا رہی ہیں؟	5.5
	4☐	3☐	2☐	1☐	0☐		
	کبھی نہیں۔	تقریبا کبھی نہیں	کچھ وقت	کافی کثرت سے	بہت اکثر	پچھلے مہینے میں، آپ کو کتنی بار معلوم ہوا ہے کہ آپ ان تمام چیزوں سے نمٹ نہیں سکتے جو آپ کو کرنا تھی؟	5.6
	0☐	1☐	2☐	3☐	4☐		
	کبھی نہیں۔	تقریبا کبھی نہیں	کچھ وقت	کافی کثرت سے	بہت اکثر	پچھلے مہینے میں، آپ اپنی زندگی میں کتنی بار جلن پر قابو پا سکے ہیں؟	5.7
	4☐	3☐	2☐	1☐	0☐		
	کبھی نہیں۔	تقریبا کبھی نہیں	کچھ وقت	کافی کثرت سے	بہت اکثر	پچھلے مہینے میں، آپ نے کتنی بار محسوس کیا ہے کہ آپ سب سے اوپر ہیں؟	5.8
	4☐	3☐	2☐	1☐	0☐		
	کبھی نہیں۔	تقریبا کبھی نہیں	کچھ وقت	کافی کثرت سے	بہت اکثر	پچھلے مہینے میں، آپ کتنی بار ان چیزوں کی وجہ سے ناراض ہوئے ہیں جو آپ کے قابو سے	5.9
	0☐	1☐	2☐	3☐	4☐		

						باہر نہیں؟	
	کبھی نہیں۔	تقریباً کبھی نہیں۔	کچھ وقت	کافی کثرت سے	بہت اکثر	پچھلے مہینے میں، آپ نے کتنی بار محسوس کیا کہ مشکلات اتنی زیادہ ہیں کہ آپ ان پر قابو نہیں پا سکے	5.10
	0☐	1☐	2☐	3☐	4☐		