"ASSESSMENT OF ANXIETY AND QUALITY OF SLEEP IN POST-PARTUM MOTHERS: A ONE YEAR CROSS-SECTIONAL HOSPITAL BASED DESCRIPTIVE STUDY"

BY

REGISTRATION NO: BQ0121003

Dissertation

Submitted to
KAHER, Belagavi, Karnataka,
In partial fulfilment of the requirements for the degree of

DOCTOR OF MEDICINE

IN

PSYCHIATRY

JAWAHARLAL NEHRU MEDICAL COLLEGE, KAHER,
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December 2024/January 2025

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ABSTRACT

Background: The postpartum period, often called the "fourth trimester", is vital yet often overlooked. Most mother and infant fatalities happen during this time. This period is also frequently associated with psychiatric illnesses such postpartum depression, PTSD, and psychosis. Post-partum depression is relatively well researched, however, the literature pertaining to post-partum anxiety is sparse- especially in India. The limited data available states prevalence of post-partum anxiety to be as high as 25-30%. Another frequently experienced problem by post-partum women, yet overlooked, is that of disturbed sleep. As high as 60-70% of new mothers may have significantly impaired sleep. Numerous studies have concluded that disrupted sleep patterns could increase the risk of mood and anxiety problems in mothers.

Objectives:

Primary Objective: Estimation of prevalence of anxiety in post-partum mothers.

Secondary Objective: a) Assessment of Quality of Sleep in post-partum mothers.

b) Association between various socio-demographic, clinical variables and anxiety.

c) Association between various socio-demographic, clinical variables and quality of sleep.

Methods: This was an observational study where 256 mothers who were between 6 to12 weeks post-partum, were assessed. Socio-demographic details, obstetric history and neonatal details were taken. Anxiety and quality of sleep were assessed using Hamilton Anxiety scale and

Pittsburgh Sleep Quality Index respectively. The data was analysed with percentages for categorical variables using chi square test. For continuous variables, student t-test and standard deviation was used.

Results: The mean age of mothers in our sample was 27.34 (± 2.44) years. Prevalence of anxiety was found to be 30.47% and 66.8% were found to have significant sleep disturbances. Significant association was found between severity of anxiety with multiples variables such as: sleep disturbances (p=<0.001), higher age of mother (p=0.008), skilled occupation (p=0.0108), presence of family history of psychiatric illness (p=< 0.001), inadequate family support (p=< 0.001), presence of maternal complications (p=< 0.001) and presence of neonatal complications (p=< 0.001), caesarean section delivery (p=<0.001), neonatal hospital admissions (p=< 0.001), breastfeeding (p=< 0.003). Significant association was also seen between quality of sleep with caesarean section delivery (p= < 0.001), occurrence of maternal complications (p=0.006) and neonatal complications (p= < 0.001), and neonatal hospital admissions (p= < 0.001).

Conclusion: Roughly one-third of our study participants were found to have moderate to severe anxiety, and about two thirds of mothers had significant sleep disturbances. higher severity of anxiety was seen in those with significant sleep disturbances, older age, family history of psychiatric illness, skilled occupation, caesarean section delivery, practicing breastfeeding, presence of complications (maternal and neonatal), and history of neonatal hospital admission. Similarly, poorer sleep quality was observed in those with caesarean section delivery, maternal and neonatal complications, and history of neonatal hospital admissions.

Keywords: post-partum, post-natal, anxiety, quality of sleep, India

LIST OF ACRONYMS

Abbreviation	Expansion
HAM-A	Hamilton Anxiety Rating Scale
PSQI	Pittsburgh Sleep Quality Index
C-section	Caesarean section
ICD	International Classification of Diseases
DSM	Diagnostic and Statistical Manual of Mental Disorders
CDC	Child Development Clinic
PTSD	Post-Traumatic Stress Disorder
OCD	Obsessive Compulsive Disorder

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INTRODUCTION

The postpartum period, also known as the puerperium, derives from the Latin words "Puer," meaning baby, and "Parous," meaning to give birth[1]. Pregnancy and childbirth are pivotal moments in a woman's life. It is often a long and tedious journey that a female goes through to birth and care for a new life into the world. The World Health Organization (WHO) states that amongst the different stages of pregnancy and puerperium, post-natal period is considered one of the most crucial and yet the most neglected phase in the lives of mothers.[2] Most maternal and newborn deaths are seen to occur during this period.

Amongst all phases of the post-partum period, the subacute phase (described below) is most associated with psychiatric disorders, as most of them are seen to emerge in this phase.[3] Among these are postpartum depression, post-traumatic stress disorder, and in rare cases, postpartum psychosis. Up to three fourths of all postpartum women seem to experience "baby blues" for the first few days. Between 10 and 20 percent of women may experience postpartum depression, anxiety, or other mood disorders. Early detection and adequate treatment are necessary for all cases.[4]

Discussion of peri-partum onset disorders in classificatory systems such as DSM and ICD are mostly limited to mood disorders and psychosis. Very little mention is made of anxiety disorders specifically related to puerperium and post-natal period. This is surprising considering approximately 18% of women experience experienced significant

anxiety symptoms in the first 4 weeks following childbirth.[5] Therefore, since anxiety is highly common throughout the perinatal period, it deserves the same level of clinical attention as perinatal depression.

As one may expect sleep disturbances are commonly reported by post-partum mothers. Mothers often experience disrupted sleep for at least the first 6–12 months of parenthood[6]. A 2017 study by Badr et al. found that new mothers frequently report significant daytime fatigue, dysfunction, and sleepiness[7]. Interestingly, research indicates that even when new mothers achieve the recommended 7–9 hours of sleep per day they may still feel fatigued and sleepy due to fragmented or disrupted sleep.[8] This sleep disruption is understandable, given the need for overnight infant care, such as frequent feedings during the initial months.[9]

Additionally, new mothers often experience poor sleep postnatally owing to physical or mental health issues, including sleep disorders. [10,11] Other challenges, such as financial stress from unpaid maternity leave,[12] relationship issues [13], and general stress from caring for a newborn can significantly affect quality of sleep experienced and in turn lead to day-time drowsiness and tiredness.

Disrupted sleep cycles have been recognized as a potential risk factor for adverse mental outcomes in mothers, especially- mood disorders and anxiety disorders. These findings underscore the importance of clinicians addressing sleep quality during the perinatal period to better support mothers and infants during the crucial first months so that early intervention can reduce impairment and burden on the mother.[14]

Therefore, all healthcare providers should be cognizant of the distress and anxiety many women and their families face due to these adverse events. Screening for anxiety and sleep disorders in post-partum mothers as well as providing treatment for the same is the need of the hour.[4]

As mentioned previously, there is a relative lack of research pertaining to post-partum anxiety and sleep, especially in the Indian subcontinent. Literature review reflects high prevalence rates for both: post-partum anxiety and sleep disorders in new mothers. Hence, it is crucial that further research is carried out for the same so that better quality of care can be provided to both, mothers as well as their infants.

OBJECTIVES

Primary Objective: Estimation of prevalence of anxiety in post-partum mothers.

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REVIEW OF LITERATURE:

POSTPARTUM PERIOD:

Puerperium is the time after childbirth when a mother's body gradually returns to its pre-pregnancy state. This period is widely agreed to start immediately after the birth of the baby. Its end is often considered to be around six to eight weeks after delivery as most physiological changes return to their pre-pregnancy state by then. However, not all bodily systems may revert to normal within this time frame. This non-uniform recovery has prompted the American College of Obstetricians and Gynaecologists to extend postpartum care period up to 12 weeks post-birth[15]. Physicians often refer to this span as the "fourth trimester."[21] The duration of this period can reportedly last until 12 months in some cases.[16]

There are three phases of the post-partum period. First-the acute phase, lasting for six to twelve hours after birth, followed by the subacute phase- from birth until first six weeks; and lastly the delayed phase: from six weeks after birth until up to 6 months. The subacute phase is one of the most important phases. Both physical and mental health issues are reported in this period.[3]

DISTINCTNESS OF POST-PARTUM PERIOD FROM PREGNANCY:

Although the post-partum period is thought of as an extension to pregnancy, it is essentially quite distinct in its characteristics from the other phases of pregnancy. During this critical transition period, a new mother’s body goes through a multitude of changes-

both externally and internally. Mothers may notice numerous changes in their body as well as emotions. These can be broadly classified as follows:

A) Physiological changes:

Alterations in various body systems are seen after childbirth, for example: reproductive system, breast and uterine changes, gastrointestinal system, urinary system, musculoskeletal, endocrine, haematological and cardiovascular, respiratory, integumentary, and fluid and electrolyte balance systems[17]. These are listed as follows:

a. **Changes in the Reproductive System:** Within twelve hours of birth the uterus starts the process of slowly returning to pre-pregnancy state, which is known as "involution". As progesterone and estrogen levels fall the fundal height starts reducing 1-2 cm every day.
b. **Changes in Breast tissue:** Prolactin is responsible for milk production and enlargement of breast tissue. Oxytocin stimulates the milk let down reflex-causing secretion of breastmilk. This reflex continues for about a year or so until the mother continues to breastfeed her baby.[18]
c. **Changes in the Digestive System:** Postpartum women may experience constipation and loss of appetite.
d. **Changes in the Musculoskeletal System:** After childbirth, the ligaments, fascia, and pelvic diaphragm that stretched during delivery begin to shrink and recover. This process may cause the uterus to become retroflexed as the round

ligaments slacken. Full stabilization typically occurs 6-8 weeks postpartum. The abdominal wall remains soft with reduced tonicity for a while due to the breakdown of skin elastic fibres and prolonged distension from the enlarged uterus during pregnancy.

e. **Changes in the Cardiovascular System:** Postpartum cardiovascular changes include-i) A reduction in the size of maternal blood vessels by 10-15% due to the loss of utero-placental circulation. ii) Elimination of the vasodilation stimulus as the endocrine function of the placenta ceases. iii) Mobilization of extravascular water accumulated during pregnancy.

f. **Changes in the Respiratory System:** Total lung capacity increases after childbirth because the intra-abdominal pressure on the diaphragm decreases. Ventilation at rest and oxygen consumption rise, and the response to exercise may be less efficient during the early postpartum weeks.

g. **Changes in Fluid and Electrolyte Balance Systems:** There is an average net fluid loss of at least 2 litres during the first postpartum week and an additional loss of about 1.5 litres over the next five weeks. Sodium and other cations increase, matching the rise in anions, leading to a plasma osmolality increase of 7 mOsm/L by the end of the first postpartum week.

If a mother experiences prolonged or unexpected pain or discomfort during the postpartum period, health workers should be able to identify any risk factors, difficulties, signs of complications, or changes indicating potential pathology, and take immediate action as part of health management.[19]

B) Psychological changes:

According to Antonelli et al. (2022), depressive and anxiety disorders are among the most common psychiatric conditions that temporarily affect vulnerable women throughout their lives, particularly during the postpartum period.[20] Various mechanisms underlie these conditions, involving interactions between oestrogen and serotoninergic, dopaminergic, and GABAergic receptors in the central nervous system (these will be elaborated further under pathogenesis). During the postpartum period, levels of oestrogen and progesterone gradually decline, while cortisol levels may increase for preparation for birth during this critical time. The combined effect of these neurotransmitters and hormones makes mothers more susceptible to anxiety and depressive disorders.

A study by Fleming et al. (1990) found that apart from the positive feelings of regard and attachment towards their baby, 80-90% mothers also reported feeling a variety of negative feelings and concerns especially in the first three months of postpartum.[22] These were mostly regarding concerns and worries for their neonate and regarding the discomfort of their healing body. The results revealed the presence of an elevated level of dysphoria during pregnancy and the first postpartum month, with a relative improvement in mood by 3 and 16 months postpartum. Improvement in mood began to occur at 3 months postpartum, as indicated by a reduction at this time in the relatively high levels of anxiety that were apparent during late pregnancy and the first few postpartum weeks. It was found that positive feelings about the infant increased linearly over time. These

findings were similar to other studies that show a general improvement in psychological health over the course of the postpartum period. a change that may be related to an improvement in women's physical health, as well as a growing sense of competence in caring for infants. In contrast to feelings about the infants that do change over time, women show remarkably little time-related variation in their feelings about themselves. The results implied mothers are relatively more self-critical throughout the journey towards parenthood. In fact, issues pertaining to the self were a major component of negative mood and depressive symptoms. Two most reported themes during this study were- firstly: mother's levels of physical discomfort and fatigue and second- elevated feelings of inadequacy or apprehension about childrearing. Other themes that emerged were worries regarding ongoing financial issues, breastfeeding difficulties, unpreparedness for new responsibilities, lack of self-care, and job-related stressors.

Psychological stress arising out of the above-mentioned causes severely impacts the health and well-being of both the mother and her baby.

POST-PARTUM PSYCHIATRIC DISORDERS:

Historically, the term "postpartum depression" has been misused as a catch-all for mental health issues during pregnancy (Yeaton-Massey et al, 2019). More recently, "perinatal mood and anxiety disorders (PMADs)" has been adopted to better describe a range of mental health conditions beyond depression, recognizing that these disorders can occur at any stage of pregnancy or after childbirth.[23] However, this term does not cover postpartum psychosis, a severe but rare condition.

The study by Yeaton-Massey et al. (2019) mentions that currently, the terms "maternal mental health" and "perinatal mental health" are becoming more prevalent. The latter term is more inclusive, covering not just mothers but also partners and families.[23] They advocate for the use of these broader terms when discussing mental health issues in the perinatal period.

Some common mental health issues faced by post-partum mothers are:

1) Postpartum blues:

    (also referred to as " Baby Blues ") describes a condition marked by sadness, anxiety, or feelings of being overwhelmed that typically begin 2-3 days after childbirth and usually resolve on their own within about two weeks. Approximately 80% of women go through this experience.[23] (Yeaton-Massey et al., 2019) It is considered almost similar to a type of “adjustment reaction” that

new mothers are often seeing going through in the initial few days following childbirth. As per the International Classification of Diseases (ICD 11), it is characterized by mild intensity, transient depressive symptoms which are not severe enough to be diagnosed as an episode of depression. Due to the low severity and limited time period, it doesn't usually warrant any specific treatment.[24]

2) Depression:

Depression during pregnancy can range from minor to major in severity and affects around 15% of women, many of whom have experienced depression before (Wisner et al., 2010).[25] The Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5), states that a diagnosis of depression requires at least five symptoms, including low mood or disinterest or loss of pleasure, lasting for a minimum of two weeks.[26] It is important to note that the criteria for diagnosing major depression are identical for both men and women, and neither DSM-5 or ICD-11 classify postpartum depression as a separate condition.[23] ICD-11 however does state the need for differentiating baby blues from that of depression as both disorders are similar in their initial presentation. However, a depressive episode will be more marked in severity and longer in duration. A core feature mentioned is the impairment in functioning of the mother. Unlike baby blues, this disorder usually warrants a need for psychiatric treatment.[24] A landmark study conducted by Wisner et al. (2013) involving 10,000 postpartum

women, discovered that 14% screened positive for depression. Among those who screened positive, 68.5% were later diagnosed with unipolar depression, and 22.6% with bipolar depression. Of the women with unipolar depression, more than two-thirds also experienced co-morbid anxiety. The symptoms most frequently began postpartum (40.1%). They also started during pregnancy for some patients (33.4%) and in some before pregnancy (26.5%).[27] The lasting impact of depression can hinder physical and psychological functioning even after recovery.[28]

3) Post-partum psychosis:

This is a relatively rare psychiatric condition affecting 0.1-0.2% of women during pregnancy.[29] Puerperal psychosis has a significant and specific genetic component. The likelihood of recurrence is approximately 25% in subsequent pregnancies[30]. Presentation is often diverse. Its cause could be both psychogenic as well as organic. It involves a loss of touch with reality- which significantly increases the risk of harm to the affected woman or her baby and is often associated with bipolar disorder. ICD-11 describes peripartum psychotic disorders under an umbrella term of Mental and Behavioural disorders associated in pregnancy, childbirth or puerperium associated with psychotic symptoms. It states that in this disorder, affective symptoms are also frequently present alongside delusions, hallucinations and other such psychotic symptoms.[24]

POST-PARTUM ANXIETY:

Research indicates that anxiety disorders are more prevalent among postpartum women compared to the general population, with estimates of incidence during the first 6 months ranging from 6.1% to 27.9%.[31] Yeaton-Massey et al (2019) state that anxiety ranks as the second most common mental health disorder among mothers, affecting approximately 10% of pregnant and postpartum women[23]. This can encompass other conditions such as panic disorder, PTSD, and obsessive-compulsive disorder. Women with anxiety often endure intrusive thoughts, especially regarding harm occurring to their baby, which cause significant distress. Additionally, many women who suffer from depression also experience anxiety.

Prevalence:

A review of data-analysis by Dennis et al. (2017) indicates that the prevalence of anxiety in postpartum women is between 5% to 12%, which is comparable to the prevalence of anxiety in women overall.[5] However, these numbers might be considerably higher- between 20% and 25% (owing to methodological flaws such as poor involvement of mothers with obstetric and neonatal disorders). A small proportion of research data has found that anxiety disorders are 15%–20% more common in the postpartum period and 20%–25% more common during pregnancy. Taking into consideration the degree of general anxiety symptoms, 25–33% of pregnant women reported having high anxiety levels. The incidence in early half of postpartum phase was 17%–22%, and in the latter half of postpartum period was 15%–33%.[5]

Another study by Hung et al. published in 2005 found that on the average, women experienced greater stress several weeks after delivery than they did during either the first or third trimesters. This was even more surprising since nearly two-thirds of the sample had experienced prior pregnancies and childbirths.[32] A study by Bener et al. conducted in 2013 found that postpartum mothers experiencing greater psychological distress tended to be younger, have lower levels of education (less than secondary school education), and came from households with lower income.[33]

The findings from a 2017 study by Dennis et al. align with a systematic review conducted by Fisher et al. (2012). Both studies found that rates of 'common perinatal mental disorders' were significantly higher in World Bank-classified low- and middle-income countries compared to those in high-income countries.[34] Studies by Halpern LF (2001), Holditch-Davis D (2009) also found that psychiatric distress experienced by females was higher amongst the lower SES.[35,36]

Pathophysiology:

Looking at maternal stress from pathophysiological point of view, it is thought that hormones from the reproductive and stress systems significantly impact various aspects of mammalian physiology. These hormones can potentially influence behaviour both directly and indirectly during this post-partum phase.

Amongst hormones, neuropeptides seemingly play a crucial role in coordinating physiological and behavioural interactions.[40] Various factors, including neuroendocrine

peptide hormones, are thought to regulate pregnancy, childbirth, and the post-partum period. Notable among these hormones are corticotrophin-releasing hormone (CRH), oxytocin, and vasopressin. These are essential for integrating physiological processes. CRH is produced in the paraventricular nucleus (PVN) of the hypothalamus and released into the hypothalamo-hypophysial portal system, ultimately reaching the pituitary. There, CRH aids synthesis of adrenocorticotrophic hormone (ACTH). The synthesis and release of CRH are regulated by other endocrine factors, including catecholamines, opioids, and cytokines, and it interacts with vasopressin and other peptides to regulate the HPA axis.[43]

Neurons from stria terminalis, and amygdala project to the brainstem, regulating arousal and autonomic functions. CRH has been shown to activate noradrenergic systems. Consequently, CRH significantly affects stress processing centres in the brain. When the HPA axis is activated, glucocorticoids are secreted by the adrenal gland and provide negative feedback to the cerebral cortex, hippocampus, hypothalamus, and anterior pituitary. These areas express glucocorticoid receptors, which help inhibit the activated HPA axis. Additionally, the production of CRH in certain brain regions, including the central nucleus of the amygdala, is dependent on glucocorticoids. Glucocorticoid action in the amygdala likely enhances fear responses. The involvement of the cerebral cortex in this system allows for the integration of cognitive, endocrine, and autonomic processes. Interestingly, these same HPA axis hormones- including CRH and ACTH, are also produced in the placenta.[43]

At the time of childbirth, the loss of the placental source of CRH leads to a potential readjustment of the maternal HPA axis. The re-setting of the HPA axis and the recovery

of CRH activity after birth is not well understood and varies among women. Hypo functioning of the CRH system has been linked to the symptoms of atypical depression and stress- suggesting that prolonged or exaggerated suppression of hypothalamic CRH during the post-partum period may contribute to the development of post-partum blues, depression and anxiety disorders.[41]

Normal cortisol responses despite reduced ACTH responses suggest that the adrenal cortex's hypertrophy/hyperactivity developed during pregnancy has a delayed recovery in depressed or women. These findings support the hypothesis that suppressed hypothalamic CRH activity, which slowly recovers during the post-partum period as adrenal cortical hypertrophy resolves, is linked to mood changes and anxiety experienced by some women during this time.[42]

Clinical presentation:

Postpartum anxiety may manifest in various ways but usually includes continuous worry, a feeling of impending doom, and a difficulty to relax. Women with this condition may constantly fear for their baby's safety and health, despite there being no concrete reason for concern[44]. Physical symptoms or autonomic symptoms often accompany these worries, such as a racing heart, dizziness, sweating, nausea, and trouble sleeping or concentrating. Additional signs can include feeling overwhelmed by everyday tasks, irritability, and difficulty sitting still or calming down.[31]

Key symptoms for clinicians to look for may include:

- **Excessive Worry**: Intense fear and concern about motherhood and the baby's well-being.
- **Intrusive Thoughts**: Unwanted, persistent thoughts about potential harm to the baby or oneself
- **Restlessness**: A constant feeling of being "on-edge" or unable to relax.
- **Physical and Autonomic Symptoms**: Includes palpitations, shortness of breath, dizziness, sweating, nausea, and fatigue.
- **Sleep Disturbances**: Trouble falling or staying asleep, even when the baby is sleeping.
- **Appetite Changes**: Loss of appetite or overeating in response to stress.
- **Irritability and Anger**: Heightened frustration or anger that seems excessive compared to the situation.

Etiology of post-partum stress:

As can be expected, new mothers attribute their stress to various causes. These include stress arising out of physical health issues, psychosocial issues, interpersonal challenges et cetera. These may be grouped as:

A) Physical health related issues:

During this period, women often face various physical health challenges while caring for their newborns. These challenges include fatigue, physical exhaustion, sleep-related problems, pain, sex-related concerns, haemorrhoids, constipation, and breast issues[45]. Other common complaints among postpartum women also include low back pain, lower extremity discomfort, headaches, carpal tunnel syndrome, dyspareunia, urinary and faecal incontinence, and varicosities.[46] Webb et al. (2008) found that 69%

of approximately 1000 postpartum women reported experiencing at least one physical health problem since childbirth[48]. The severity and cumulative burden of these health problems were linked to women's functional limitations and emotional well-being. Stress arising from these conditions of change, extra demands and health constraints occurring especially within few weeks after delivery, significantly disrupts mothers' bodily functions and health. [47]

B) Psycho-social issues:

A qualitative analysis by S. Knaak in 2009 analysed 33 mothers who were in varying post-partum emotional states[49]. Most frequent causes of stress by mothers were reported to be:

- Lack of any time for prioritization of self-care
- Paucity of help with respect to carrying out daily responsibilities
- Lack of feeling understood emotionally and lack of real emotional connection with others.
- Unrealistic, idealistic beliefs about motherhood which were often unachievable.
- Feeling physically and emotionally unprepared for their baby and new responsibilities.

A similar qualitative study by Jevitt et al. in 2012 which investigated most stressful events reported by 200 post-partum women. The study revealed the following factors as the most frequent cause for their stress in descending order[50]:

1) Stressors pertaining to their newborn:

- Inability to deal with multiple roles and tasks.
- Lack of restful sleep and tiredness
- Worries about their child's health.
- Issues with breastfeeding their infant.
- Postpartum health issues.

2) Other stressors:

- Ongoing financial problems.
- Issues relating to work/workplace.
- Overinvolvement by parents and in-laws.

A study by Lonstein et al (2007) states most common concerns expressed by post-partum women to be pertaining to[80]:

- Their own health and personal appearance
- Concerns for health of their neonate
- Providing adequate care for the neonate
- Increased demands of time and energy
- Maintaining interpersonal relationships

Factors affecting maternal anxiety:

Sociodemographic factors:

In addition to emotional risk factors, sociodemographic and economic issues also contribute to stress.[33] Life stressors such as low economic status (Lin et al. 2017)[51], lower education levels[52,53], unemployment or job strains[54,55], and financial worries can trigger distress during and after pregnancy[56].

A study by Chan et al. (2020) found that women with childbirth related PTSD- tended to be younger, have lower levels of education, and had a history of mental health vulnerabilities- this was found regardless of whether childbirth led to medical complications in the baby[57]. Study by Dunkel Schetter (2011) state the environmental factors most associated with pregnancy stress are sociodemographic variables and psychological conditions include marital status, education level, changes in employment or job loss, poor working conditions, and financial difficulties.[58]

Common psychological conditions contributing to stress are family loss, unplanned pregnancy, previous depression, fear of childbirth, substance abuse, prenatal complications, high-risk pregnancies, domestic violence, and absence of social support-systems.[59]

Family history:

Studies examining association between family history of psychiatric illness with maternal anxiety are scarce. Most of the data available seems to focus more on past history of

psychiatric illness in mothers, with considerably lesser focus on other factors- especially family history.

A study by Breitkopf et al. (2006) which investigated anxiety symptoms during pregnancy and postpartum found significant association to be present between anxiety and only personal history of previous psychiatric illness in mothers. No significant association was found between family history of mental illness and maternal anxiousness.[60].

In a 2022 systematic review and meta-analysis by Kjeldsen et al.- which included 26 studies from five continents and involved approximately 1,00,900 women it was discovered that mothers with a family history of psychiatric related illness had almost twice the chances of developing postpartum depression compared to those without such a history[61].

Considering the co-morbidity and frequent association between maternal anxiety and depression, this can be assumed to apply for maternal stress and anxiety disorders as well.

Social support:

Social support is crucial for helping postpartum women cope with stress. It is recognized as a vital buffer against stressful life events and a significant predictor of emotional and physical well-being.[32] A study by Leahy-Warren et al (2007) found that first-time mothers relied primarily on informal social networks for infant care support six weeks after delivery, with husbands or partners and their own mothers being the most frequently

identified sources of support[62]. In the study mentioned, the perceived support had a statistically significant, moderate relationship with mothers' confidence in infant care practices. On evaluation most mothers reported the following as their main concerns during this crucial period: problems arising in baby's welfare, labour and delivery process, and matters concerning their partner/spouse.

Maternal complications:

Wright et al. (2000) studied how parents adapt when the mother gives birth to a full-term, healthy infant following a high-risk pregnancy. They discovered that experiencing significant obstetric risks tends to negatively influence parents' perception of changes in their lives and greater stress responses.[63]

In a 2012 study by Iyengar et al. involving 430 postpartum women, those who experienced severe complications were significantly higher chances of suffering from depression 6-8 weeks after delivery compared to women who had uncomplicated births. However, by 12 months, these differences had diminished.[64]

A study by Bener et al. (2013) found that mothers with a prior history of preterm labour (30.0% vs. 21.7%), miscarriage (50.0% vs. 38.3%), and delivery complications (52.0% vs. 33.3%) reported significantly higher levels of depression as well as anxiety during the initial post-partum period compared to other participants.[33]

Chan et al.'s study identified emergency caesarean sections, obstetric complications during birth, and the use of medication for birth induction, along with experiencing sleep

deprivation before giving birth- as risk factors for childbirth-related post-traumatic stress disorder (CB-PTSD)[57].

Mode of delivery:

Study by Saisto et al (2013) notes that there is a growing trend among expectant mothers to seek ways to avoid the potentially traumatic aspects of childbirth. This trend has led to a significant increase in elective caesarean sections over the past decade.[65]

A study by Soderquist et al (2002) found that symptoms suggestive of stress disorders have been observed in women following emergency caesarean sections and instrumental vaginal deliveries.[66]

In 2006, Vogl and colleagues conducted a study involving 103 first-time mothers with uncomplicated pregnancies who were carrying a single baby at full term. The study compared women undergoing spontaneous labour for vaginal delivery with those delivering by caesarean section without experiencing labour and measured the endocrine stress response in both groups. Their study findings suggest that elective caesarean sections result in the lowest release of stress-related hormones compared to spontaneous, unassisted vaginal deliveries without pain relief, vaginal deliveries with epidural analgesia, and vacuum extraction deliveries.[67]

Lactation and breastfeeding:

Study by Carter et al (2001) indicates that lactating women interact more positively with their infants, showing more touching and smiling, compared to bottle-feeding mothers. Additionally, they state that nursing mothers often report more positive mood states and lower anxiety levels. Lactation also reduces stress reactivity.[43] Since the 1970s, it is stipulated that lactating female rodents exhibit reduced adrenal reactivity, indicated by lower glucocorticoid (corticosterone) secretion in response to stressors like ether, surgical trauma, and electric shock. In lactating rats, injections of hypertonic saline, normally stressful and expected to enhance CRH and enkephalin synthesis in the parvocellular PVN and increase corticosterone secretion, selectively inhibit these stress responses.[69]

In humans, Wiesenfeld et al. (1985) observed reduced autonomic reactivity (skin conductance and heart rate) in lactating women in response to infant cries, indicating lower sympathetic arousal compared to non-lactating mothers. This reduced stress responsiveness during lactation is considered an adaptive response that helps protect nursing mothers from overreacting to stress, thus promoting successful lactation.[70]

These studies collectively suggest that, in humans and other mammals, lactation reduces physiological reactivity to stressors. This reduction may be seen as an adaptive mechanism that protects nursing females from overreacting to stress and supports successful lactation.

Even when women are not facing issues related to feeding or stress from societal expectations, the inherent challenges of breastfeeding, such as sleep deprivation, can lead to the development or worsening of mental health conditions. The impact of societal

pressure to breastfeed on maternal mental health might be more harmful and could outweigh the potential physical benefits of breastfeeding.

Few studies: Falah-Hassani et al. (2016); Heinrichs et al. (2002) indicated that breastfeeding was linked to a decreased likelihood of experiencing symptoms of postpartum anxiety[71,72]. However, another study by Xu et al. (2022) found that mothers who did not nurse their baby had lower levels of stress and less likelihood of an anxiety disorder eventually.[73]

Parity and children:

Krieg et al (2007) observed that parenthood during a child's first year was found to be more overwhelming than the rest. The study found that first-time mothers expecting their first or second child during the third trimester and at one-month postpartum experienced increased role differentiation and decreased satisfaction with their roles throughout the transition. In contrast, second-time mothers reported relatively stable experiences. This suggests that maternal competence posed a greater challenge for first-time mothers compared with prior experience.[74]

A study conducted by Hung et al. in 2011 discovered that new mothers who had given birth to their first child experienced notably greater postpartum stress compared to mothers with prior history of childbirth and more than one child.[75]

Previous history of psychiatric illness:

Hung's 2011 study showed that women with minor psychiatric issues experienced higher levels of postpartum stress compared to those without such issues. This aligns with a similar discovery by Hung in 2007, where postpartum women with minor psychiatric problems reported greater levels of stress, anxiety, and depression, along with less social support, than those without minor psychiatric concerns. [76]

Neonatal complications:

Numerous factors contribute to the overall distress experienced by parents of neonates in the neonatal intensive care unit (NICU). These include the baby's appearance and behaviour, the use of complex medical terminology and technology, the threat of losing their child's life, and the parents' diminished role in caring for their baby.[77] Such stressors can intensify existing parental concerns about their neonate's illness. In these situations, parents have reported various emotional responses, including sadness, fear, anxiety, grief, and helplessness.[78]

Bener et al. (2013)[33] found that psychological distress was potentially worsened by preterm labour and premature births during the postpartum period. Their study also revealed a greater chance of depression and anxiety in mothers of preterm infants compared to those of full-term infants. Mothers of pre-term babies faced a 2.7 times greater risk of anxiety. Additionally, these mothers experienced higher levels of stress and psychological burden.

Lefkowitz et al. conducted a study in 2010 wherein they screened mothers and fathers of infants recently admitted to the NICU for stress and anxiety. Within 3–5 days of NICU admission, 32% of the 130 participating parents met the criteria for Acute Stress Disorder. Approximately half of the mothers and one-third of the fathers showed symptoms consistent with subclinical Acute Stress Disorder. Additionally, majority of parents (62–70%) reported experiencing at least one clinically significant symptom from the Acute Stress Disorder categories of dissociation, re-experiencing, avoidance, and arousal. Thirty days after admission, 15% of mothers met the criteria for Post-Traumatic Stress Disorder (PTSD) diagnosis, while an additional 11.7% of mothers exhibited symptoms of subsyndromal PTSD.[79]

Effect of post-partum anxiety:

Maternal outcomes:

Various studies identified postpartum stress as a prime determinant contributing to morbidity in postpartum mothers, adversely affecting both their physical and mental health. Postpartum stress has consistently been associated with mothers' mood and well-being. The lasting impact of maternal stress can hinder physical and psychological functioning even after recovery.[81] Similarly, anxiety can affect maternal health and increase parenting stress postpartum.[82]

These mental health challenges can lead to difficulties in establishing strong maternal-infant bonds[83] and cause difficulties in adherence to recommended infant health services and dissatisfaction with the maternal role.[84]

Another study by Mercer et al (2004) describes the importance of new mothers undergoing the process of developing their maternal identity.[85] This involves forming an attachment with their baby, gaining competence in mothering behaviours, and finding pleasure in interacting with their baby. However, this study reported that new mothers reportedly often feel an absence of control and lack of time for themselves due to their responsibilities and lack of baby-care skills due to their constant feelings of stress. In a study by Kanotra et al. conducted in 2007 it was found that child-care duties and inadequate preparation are significant sources of frustration and fatigue.[86]

A study by Yeaton-Masseya et al. (2019) also found that mothers with untreated, higher levels of post-partum anxiety showed lower rates of breast-feeding initiation.[23] Similar findings were observed in a study by Nagel EM et al. (2022), which found that as psychological distress increased in mothers, there was a consequent reduction in exclusive breast feeding practice as well as reduction in breast milk supply. [87]

Hung et al. conducted a study in 2001 with around 500 post-partum women and evaluated the results of postpartum stress on women's health and well-being. They found that as the mothers' post-partum stress score increased, their likelihood to suffer from minor psychiatric morbidity also increased. [88]

In a study by Chan et al. (2020) women diagnosed with childbirth-related stress disorder (CB-PTSD) were found to be less inclined to participate in skin-to-skin contact and exclusive breastfeeding, regardless of any medical complications in the baby. This aligns with the noted impairment in maternal bonding often observed in individuals with CB-PTSD.[57]

Women experiencing postpartum anxiety tend to feel less effective in their role as parents, have reduced coping abilities, and show decreased maternal reactivity and sensitivity. Furthermore, they may exhibit a highly protective parenting style known as "helicopter parenting".[89]

Depression and anxiety are frequently observed co-morbidly postpartum women, with prevalence rates of up to 13% for depression[90] and 8-11% for anxiety.[91] More often than not, both symptoms are seen to occur together, implying that presence of anxiety may also predispose vulnerable mothers to co-morbid depressive episodes as well. Presence of post-partum stress and anxiety is an important risk factor for post-partum depression. It should also be noted that post-partum depression has higher association with anxiety disorders compared to clinical depression (not associated with childbirth).[92]

Neonatal outcomes:

Anxiety and stress during pregnancy are related to baby's heart rate, risk of pre-term delivery, and infant development. This is in turn related to unwanted consequences leading to slowed mental development of infants.[31]

Not receiving treatment for anxiety and depression during pregnancy and the postpartum period is linked to several negative outcomes for the baby, such as an increased risk of preterm birth, low birth weight, NICU admission, and reduced rates of receiving adequate breastfeeding.[23]

Moreover, untreated anxiety and depression during the perinatal period can lead to psychological issues and developmental delays in children, which could have long-term social and economic consequences. The Harvard Center for the Developing Child warns that because chronic and severe maternal depression and anxiety can have widespread harmful effects on families and children, its prevalence can undermine the future prosperity and well-being of society as a whole.

Numerous studies indicate that stress during pregnancy heightens the likelihood of various adverse outcomes as well as conditions like autism spectrum disorder and ADHD. Maternal stress is also linked to poorer neurodevelopmental outcomes of the neonate.[94]

Future implications:

Research indicates that anxiety disorders are more prevalent among postpartum women compared to the general population, with estimates of incidence during the first 6 months ranging from 6.1% to 27.9%. Given the considerable impact of postpartum anxiety on both mother and child, it is crucial to gain a deeper understanding of this phenomenon. Unfortunately, treatment rates for postpartum anxiety are low, highlighting the need for improved identification of women who could benefit from intervention. However, there is currently a lack of consistent screening measures for postpartum anxiety, and anxiety-specific screening tools are not routinely used during this period.[31] Compounding this issue is the overlap between symptoms of anxiety and depression, making it challenging to differentiate between the two disorders and to provide effective interventions.

Incorporating effective assessment tools for anxiety disorders into postpartum care, along with educating healthcare providers to address these issues, could improve outcomes. Additionally, raising public awareness about postpartum anxiety disorders is crucial to ensure that new mothers seek help if they experience symptoms of anxiety during the postpartum period.[31]

SLEEP QUALITY IN PREGNANCY:

Physiological sleep-wake cycle:

"Normal" adults typically get between 7 to 9 hours of sleep per day, following a wake-sleep cycle that repeats roughly every 24 hours. Physiologically, sleep is divided into two phases: rapid eye movement (REM) sleep, characterized by dreams, and non-rapid eye movement (NREM) sleep, which consists of four stages. Stage 1 signifies the change from wakefulness to sleep and is easily disrupted. Stage 2 is considered the first true stage of sleep. Stages 3 and 4, known as delta sleep, are the deepest stages and are marked by difficulty in waking the individual. During sleep, people cycle through one complete REM and NREM phase approximately every 90 minutes, resulting in about five cycles during an 8-hour sleep period.[95]

Sleep disturbances in post-partum period:

Quillin (1997) concluded that women averaged approximately 7.53 hours of sleep in a 24-hour period at one month postpartum, with 6.15 of those hours occurring at night, whereas the nonpregnant average of the same was 8.43 hours.[97] Cottrell and Karraker (2002) reported that

women who were three to four months postpartum had an average of 6.75 hours per night.[98]. Yamazaki et al. (2005) found that there was a decrease in total sleep duration from 7.56 hours in the last trimester to 6.34 hours at 4 to 5 months postpartum amongst 101 Japanese women by evaluating sleep logs.[98]

A study by Karacan et al. (1968) was the first to evaluate postpartum maternal sleep awakenings and NREM-REM sleep characteristics. They observed differences in 10 postpartum women 3 to 4 days after birth compared to non-pregnant and pregnant controls, noting more awakenings, increased Stage 0 sleep, reduced Stage 4 sleep, and reduced REM sleep. This study used electroencephalographic recordings in a hospital, excluding the standard 2 a.m. newborn feeding.[99]

Matsumoto et al. (2003) found that in the early postpartum period, women experienced decreased total sleep time, sleep efficiency, and circadian amplitude, with an increased wake after sleep onset (WASO). They compensated for nocturnal sleep deprivation by taking longer daytime naps. Although all variables improved over time, by 15 weeks postpartum, most had not returned to nonpregnant levels. Circadian amplitude was considered restored by Week 10 as WASO and daytime nap length gradually decreased. The data collection for this study involved both sleep logs and actigraphy.[100]

A study Swain et al. (1997) used sleep diaries to confirm that postpartum women experienced the most disturbed sleep patterns in the first week after childbirth compared to control participants. Although there was some improvement by the third week, their sleep patterns still did not match those of the controls. Results were similar to studies mentioned previously, that is- postpartum women had more nighttime awakenings, stayed awake longer, slept later in the morning, and

took more daytime naps. The study also suggested that sleep loss could impact new mothers' memory and psychomotor performance.[101]

More recently, Parsons et al. (2023) used wrist actigraphs and sleep diaries to study the sleep patterns of 19 women at 1 and 6 weeks postpartum. The first week postpartum showed the most severe sleep disturbances, with the least amount of sleep, the highest number of sleep episodes, greater variability in day-to-day sleep, and increased daytime napping. By 6 weeks postpartum, sleep variables had improved, though they had not returned to pre-pregnancy levels.[102]

Pathophysiology:

From a pathophysiological viewpoint, these sleep disturbances are mostly linked to hormonal changes during the postpartum period. The immediate postpartum decline in progesterone, which has sedative effects, may contribute to these disturbances. Additionally, alterations in melatonin levels, which can affect circadian rhythms within the first three months postpartum, might also play a role.[103] Parry et al. (2006) and Nishihara et al. (2004) suggested that the increase in delta and theta brain wave activity during postpartum sleep could be due to a rebound effect from sleep deprivation related to infant care or from prolactin release associated with breastfeeding. However, in-depth reasons for this are still not fully understood. [104]

Poor sleep is also frequently attributed to physical discomforts like increased urination, lower back pain, and restless legs syndrome, particularly in the third trimester. However, studies suggest that excessive inflammation[105] or hormonal imbalances[106] might also contribute to sleep disturbances.

Common causes:

The primary causes of sleep disturbances are directly related to newborn care, particularly their sleep and feeding patterns.[107] Thomas and Foreman (2005) found that infant sleep and feeding schedules largely dictated maternal sleep patterns, noting that male newborns caused more sleep disturbances than female newborns.[108]

As mentioned previously, physical discomforts arising as a result of the birthing process are also a significant contributor for poor quality of sleep experienced by post-partum mothers. In a hospital setting, Lentz and Killien (1991) reported that the most common reasons for nocturnal awakenings in the first two days postpartum were the need to feed the newborn, followed by being awakened by nurses for procedures, and lastly, the need to use the bathroom. Women reported better sleep when they could complete a normal 90-minute sleep cycle. The authors concluded that the hospital environment was disruptive and did little to help restore a woman's vitality after childbirth.[109]

Association between sleep and various factors:

Quillin and Glenn (2004) investigated how newborn feeding methods and sleep arrangements influenced sleep patterns in first-time mothers during the initial 4 weeks postpartum. Using a self-report sleep instrument, the 33 participants revealed that breastfeeding mothers who "co-slept" with their newborns reported more sleep than bottle-feeding mothers. The authors suggested that reducing sleep loss could be achieved by encouraging safe co-sleeping practices, such as using a firm bed or mat on the floor or an attached infant bed.[110] Milligan, Flenniken, and Pugh (1996) noted that mothers felt less fatigued and more rested when breastfeeding in the side-lying (co-sleep) position rather than sitting up, supporting the idea of napping during the day while the infant slept.[111]

However, the impact of breastfeeding versus bottle-feeding on sleep patterns is not clear. A study by Quillin (1997) found breastfeeding mothers had more nighttime awakenings and sleep fragmentation, but similar total sleep amounts over 24 hours due to napping, compared to bottle-feeding mothers.[96] Doan et al. (2007) conducted a randomized clinical trial with 133 couples at 3 months postpartum and found that mothers who breastfed at night averaged 40 to 45 minutes more sleep than those who bottle-fed. Formula-feeding mothers reported more sleep disturbances. Data were collected using self-reported diaries, wrist actigraphy, and Lee's (1992) 21-item General Sleep Disturbance Scale.[112]

Lee et al. (1998) studied 29 postpartum mothers at home using PSG at 1 and 3 months. All mothers breastfed and supplemented with bottles, experiencing greater sleep disturbances in the first month. First-time mothers had a larger initial decrease in sleep efficiency compared to multiparas. Both groups had disrupted sleep patterns due to nighttime awakenings for newborn feedings at 1 month, resulting in less total sleep time and decreased sleep efficiency compared to their third trimester. By 3 months, both first-time and experienced mothers' sleep patterns returned to pre-pregnancy deep sleep and total sleep time, although sleep efficiency remained reduced. Deep sleep took precedence over REM sleep for recovery from sleep deprivation.[113]

Implications of sleep disturbances in post-partum women:

A common denominator and risk factor for maternal depression and anxiety is sleep disturbance. Up to 90% of individuals with depression report poor sleep, as do up to 70% with anxiety. There is a bidirectional relationship between sleep and mood disturbances, where sleep problems can either precede or result from mood disorders[114]. Disturbed sleep is often a precursor to

depressive episodes- as mentioned in many studies.[115] However, research on sleep disturbances and anxiety, particularly in the postpartum period, is limited.[116,117]

Tham et al. (2009) found that poor sleep quality at three months postpartum had significant association with depression but not anxiety, using the EPDS and STAI with PSQI.[118] Creti et al. (2017) reported that impaired sleep quality at 8 weeks postpartum was linked to increased depressive and anxiety symptoms.[116] Similarly, Lewis et al. (2018) showed that worsening sleep quality from one month to seven months postpartum predicted higher depressive symptoms at seven months.[119] Okun et al. (2011) found that poor PSQI scores within the first 17 weeks postpartum were significantly related to the recurrence of postpartum depression. It is predicted that women with poor sleep quality (PSQI scores >5) will report more symptoms of depression and anxiety at this critical time.[120]

Huang et al. conducted a study in 2004 in which Pittsburgh Sleep Quality Index Questionnaire was used to study 163 women at 3 weeks postpartum and found a link between poor sleep and depression. Depressed mothers identified four key sleep-related issues: sleep disturbances, daytime dysfunction, reduced sleep duration, and the perception that daytime sleepiness impacted infant care.[121]

Recently, researchers have suggested that dysregulated circadian rhythms could cause heightened risk of mood disorders. Study by Sharkey et al. (2013) and Wirz-Justice (2006) showed that variations in fatigue patterns have been linked to different sleep patterns among postpartum women.[122] A study by McBean and colleagues (2013) argues that chronobiology affects fatigue patterns during the postpartum period and that maintaining a rhythmic fatigue pattern might benefit mental health outcomes. Hence, assessment of sleep during and after the

puerperal period is of significance due to its strong associations with poor functioning, fatigue, depression and anxiety.[123]

The current data reveal a clear link between poor sleep quality and depression and anxiety symptoms in women at six months postnatal, even after adjusting for prenatal mood scores and other factors. Prenatal mood scores were highly correlated with postpartum scores, but they did not lessen the repercussions of poor sleep on postpartum mood. These findings underscore the importance of clinicians addressing sleep quality during the perinatal period to better support mothers and infants during the crucial first months. Consequently, these symptoms may result in significant impairment in both the mother's mental and physical health as well as the level of care the mother can provide to her newborn. Thus, it is imperative for clinicians to be on the look-out for these symptoms of distress and make appropriate mental health referrals as and when required.

Future implications:

While many postpartum women experience sleep disorders or deprivation, few researchers have focused on developing or studying clinical strategies to enhance sleep quality. Discovering evidence-based interventions is crucial for improving maternal sleep after childbirth. Future research should also explore the effectiveness of behavioural interventions, such as cognitive behavioural therapy: insomnia (CBT-I), mindfulness meditation, and relaxation techniques, as there is increasing evidence that these methods can improve both sleep and mood symptoms.[124]

Overall, these studies highlight the significance of researching sleep and postpartum mental health to improve maternal and infant well-being.

MATERIALS AND METHODS:

This study was designed as a cross - sectional study, to estimate the prevalence of anxiety disorder in post-partum mothers and assess their quality of sleep.

It was conducted at the Department of Psychiatry over a period of one year from over a one year period from September 2022 to August 2023.

The source of samples in our study were mothers visiting Well-Baby Clinic and Immunization Clinic in Paediatrics OPD during the post-partum period (3 months) at KLE Prabhakar Kore Charitable Hospital.

Inclusion Criteria:

i) All mothers who gave birth in the last 3 months.

ii) Those who give informed consent.

Exclusion criteria:

i) Mothers with known psychiatric illness before pregnancy.

ii) Women suffering from chronic debilitating medical illness.

iii) Mothers whose babies are suffering from chronic debilitating medical illness.

iv) Mothers with substance abuse except nicotine.

Ethical Clearance:

Prior to commencement, ethical clearance was taken from Institutional Ethics Committee, Jawaharlal Nehru Medical College, Belagavi with Ethical Clearance number MDC/JNMCIEC/07.

Informed Consent:

Informed consent was obtained from the patients who fulfilled the inclusion criteria.

Sample Size:

We assume the prevalence of post-partum anxiety to be ~20% based on Western literature[5.] Based on the formula- sample size(n)= $4pq/ r^2$: where: p=20, q=100-20= 80, r=5 (permitted error) with 95% CI.

Sampling Technique:

The sample size was calculated to be 256 and the sampling procedure used was convenience sampling.

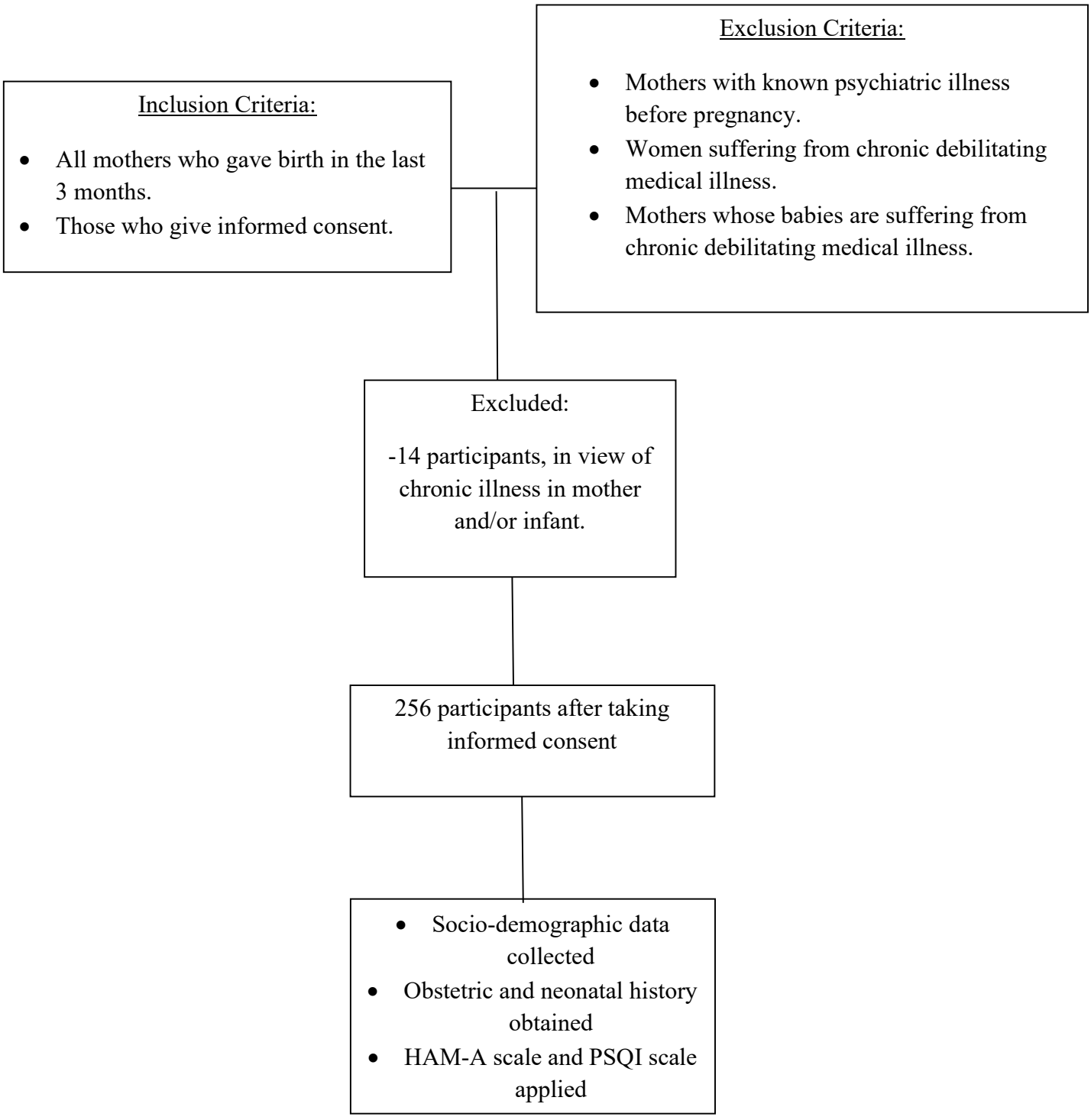
Tools used:

1. Hamilton Anxiety Rating Scale (HAM-A): is a questionnaire used by healthcare professionals to assess the severity of a patient's anxiety.[36] This scale includes fourteen items, each presented with a specific format. Each item is numbered and followed by a brief description that provides details for accurate evaluation. Next to each item is a five-point scale ranging from 0 to 4.[37] The HAM-A is a clinician-administered tool designed to measure anxiety levels in adults, adolescents, and children. Total score ranges from 0–56, where <17 indicates mild severity, 18–24 mild to moderate severity and 25–30 moderate to severe. It typically takes about ten to fifteen minutes to complete and is publicly accessible.

2. Pittsburgh Sleep Quality Index (PSQI): is a self-administered questionnaire designed to evaluate sleep quality over a one-month period. It consists of nineteen items that gives seven component scores, which altogether gives a single global score. Completing the PSQI typically takes between 5 and 10 minutes.[38] Developed by University of Pittsburgh researchers, this standardized sleep assessment tool measures various aspects of sleep. The seven component scores include subjective sleep quality, sleep latency, sleep duration, sleep efficiency, sleep disturbances, use of sleep medication, and daytime impairment. Each item is scored on a scale from 0 to 3.[39] The overall score is derived by summing the seven component scores, giving a total score that extends from 0 to 21, with lower scores indicating better sleep quality. A score above 5 suggests significant sleep disturbances.[168]

Procedure: The mothers who were 3 months post-partum meeting inclusion criteria, without any history of psychiatric illness or chronic debilitating illness in self or infant, were interviewed by the Principal Investigator (PI). They were explained regarding the study and its implications. A written informed consent was obtained from the study participants in their own vernacular language. Following this, study participants meeting inclusion and exclusion criteria were assessed using a detailed proforma to collect various socio-demographic, obstetric and neonatal data. Following this, Hamilton Anxiety Rating Scale (HAM-A) and Pittsburgh Sleep Quality Index (PSQI) were applied.

Flow-chart of Procedure:



Data Analysis:

The data obtained was tabulated in Microsoft Excel version 16.64 and appropriate statistical analysis was done using IBM SPSS 25. The socio-demographic and clinical details of the patients was described using descriptive statistics. Continuous data were represented as mean (±standard deviation). Categorical data were summarized using frequency and percentage. Normality was checked using the Shapiro-Wilk test.

Spearman correlation was conducted to examine the correlation between the Hamilton Anxiety Rating Scale and continuous variables like age, years of education, and sleep quality scores. Similarly, Spearman correlation was used to see the correlation between Pittsburgh Sleep Quality Index with various continuous variables (age, years of education). Chi-Square test was used to assess the association between variables of interest (Hamilton Anxiety Rating Scale and the Pittsburgh Sleep Quality Index) and various demographic and clinical variables, which are categorical in nature. To test for strength of association for continuous variables, Student T-test was used. For categorical variables, Chi square test was used.

All tests were two-tailed with P value of less than 0.05 was considered statistically significant. Statistical analysis was performed using appropriate statistical tests with IBM SPSS v26 (Statistical Package for Social Sciences) software.

RESULTS

Table 1: Socio-demographic details of the study participants:

Variables	Subcategories	n (N=256)	%
Mean Age (years)		27.34 ± 2.438	
Mean years of education		7.2695 ± 5.501	
Occupation	**Semiskilled**	**242**	**94.53%**
	Skilled	14	5.47%
Any family history of psychiatric disorder present	**Yes**	**57**	**22.27%**
	No	199	77.73%
If adequate family support present	**Yes**	**177**	**69.14%**
	No	79	30.86%

Table 1 illustrates the socio-demographic profile of the study sample. In this study, 256 participants were analysed in which mean age of samples was found to be 27.34 (±2.438) years. The average years of education received by participants was approximately 7, with maximum being 19 years of formal education and minimum being no formal education.

Majority of our sample- 94.53% were semi-skilled workers (including housewives) and the remaining 5.47 % were skilled workers.

In this study, most of our study participants 77.73% had no significant family history of psychiatric illness whereas 22.27% of the participants had positive family history for same.

69.14% of women in our study reported that they perceived family support to be adequate whereas 30.86 % of women reported inadequate levels of family support.

Table 2: Distribution of study participants according to the obstetric and neonatal characteristics:

Variables	Subcategories	n (N=256)	Percentage
If pregnancy was planned	No	35	13.7%
	Yes	**221**	**86.3%**
Term of pregnancy	Pre-term	16	6.25%
	Term	**236**	**92.18%**
	Post-term	4	1.56%
Type of Delivery	**Normal vaginal delivery**	**186**	**72.66%**
	Caesarean-section delivery	70	27.34%
Expected Gender	**Male**	**116**	**45.31%**
	Female	27	10.55%
	No expected gender	113	44.14%
If expected gender delivered	Yes	64	25%
	No	79	30.86%
	No expected gender/ not applicable	**113**	**44.14%**
Parity	1	60	23.4%
	2	**175**	**68.4%**
	3	19	7.4%
	4	2	0.8%
Maternal complications during pregnancy	Present	70	27.34%
	Absent	**186**	**72.66%**
Neonatal complication	Present	59	23.05%
	Absent	**197**	**76.95%**
Neonatal hospital admission	Present	52	20.31%
	Absent	**204**	**79.69%**

Table 2 depicts the obstetric and neonatal characteristics of our study participants.

In this study, most women (86.3%) had a planned pregnancy whereas 13.7% had an unplanned pregnancy.

Majority (92.18%) had a full-term pregnancy, followed by 6.25% of women delivering pre-term and least (1.56%) having a post term pregnancy.

Most of the sample: 72.66% delivered vaginally, and the remaining 27.34% delivered via caesarean-section.

Approximately half our sample i.e. 45.31% showed a preference for a male baby and only 10.55% mothers showed a preference for female baby. Remaining 44.14% reported no preferences for gender of baby.

23.82% delivered the same gender baby as expected or preferred. An almost similar proportion of participants (29.30%) delivered baby belonging to the opposite gender as preference. For 44.14% of the participants there was no expected gender for the baby, as mentioned above.

Majority of the sample (68.4%) had 2 children, followed next by 23.4% who were primiparous. 7.4% had parity score 3 and 0.8% had parity score 4.

Most of our participants (72.66%) had an uneventful pregnancy- without any complications. However, 27.34% of women reported presence of complications during their last pregnancy.

Almost three-fourths of the participants (76.95%) reported no neonatal complications with approximately one-fourth of participants (23.05%) reporting history of neonatal complications.

Majority of the mothers (79.69%) gave no history of hospital admission for their neonate. Remaining 20.31% reported neonatal hospital admission.

TABLE 3: Prevalence of anxiety disorder among the study participants:

HAM-A	Frequency	Percent
Mild severity	178	69.5
Mild to moderate severity	52	20.3
Moderate to severe	26	10.2
Total	256	100

Table 3 describes the prevalence of anxiety disorder in our study. Most of our participants (69.5%) had mild severity of anxiety, followed by mild to moderate severity (20.3%) and remaining 10.2% participants had moderate to severe anxiety.

However, for all practical purposes of this study we have assumed mild severity of anxiety to be clinically insignificant. HAM-A scale score interpretation lacks any provision for baseline score for subthreshold symptoms. Therefore, even minor stress experienced by an individual may be potentially over-estimated as anxiety using this scale.

Keeping the above in mind, we have estimated prevalence including only those participants who had mild to moderate severity and moderate to severe anxiety severity. This was found to be 30.47%.

Figure 1: Distribution of participants according to Hamilton Anxiety scale severity:

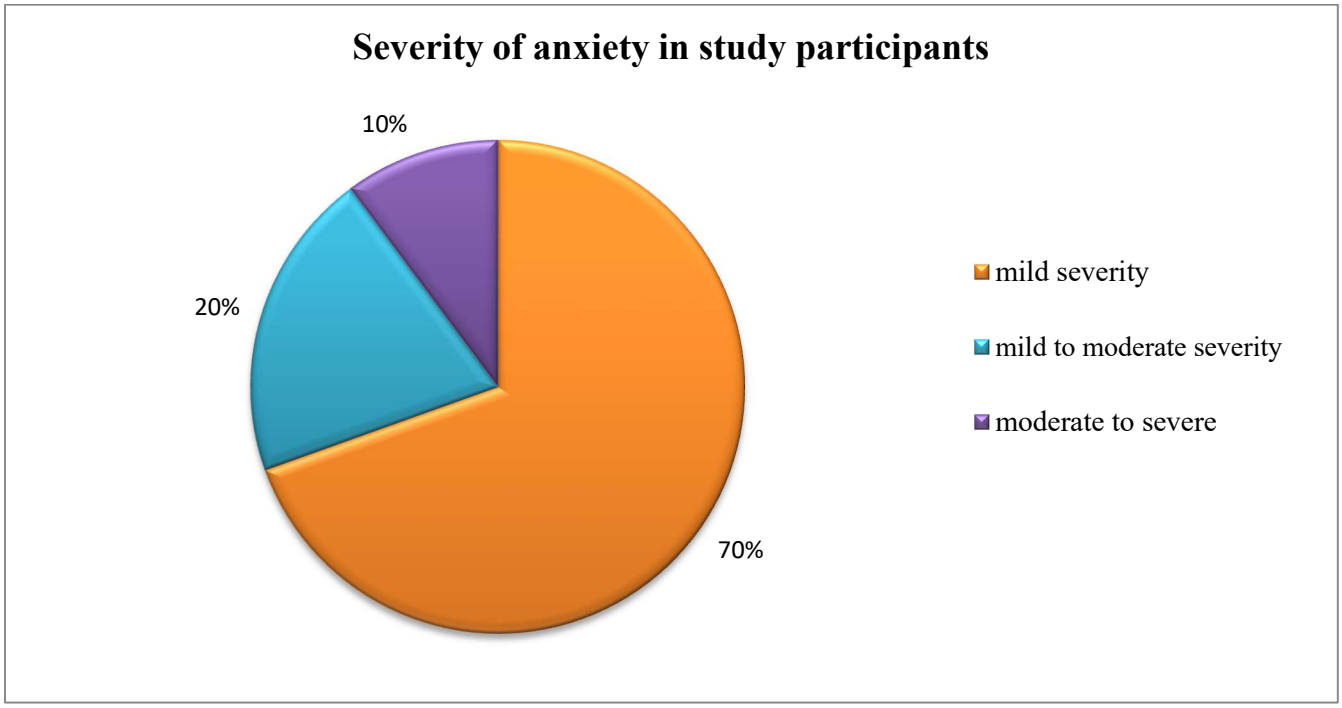


Table 4: Mean anxiety severity score as measured by Hamilton Anxiety scale:

Statistics	HAM-A score
Mean	13.83
Standard Deviation	6.455
Median	13
Minimum	2
Maximum	28

Table 4 describes mean HAM-A score of 256 participants which was found to be 13.83 with a standard deviation of 6.455. Minimum score was 2 and maximum score obtained was 28.

TABLE 5: Evaluation of Quality of Sleep

Pittsburgh Sleep Quality Index (PSQI)	N (no. of samples)	Percent
NIL Significant Sleep Disturbance	85	33.2
Significant Sleep Disturbance	171	66.8
Total	256	100

Table 5 outlines the sleep quality of our study participants. Out of 256 participants, majority (66.8%) had Pittsburgh Sleep Quality Index scores suggestive of significant sleep disturbances and overall poor sleep quality. The remaining 85 participants (33.2%) had PSQI scores suggestive of adequate sleep quality and no significant sleep disturbances.

Figure 2: Distribution of study participants according to Pittsburgh Sleep Quality Index scores:

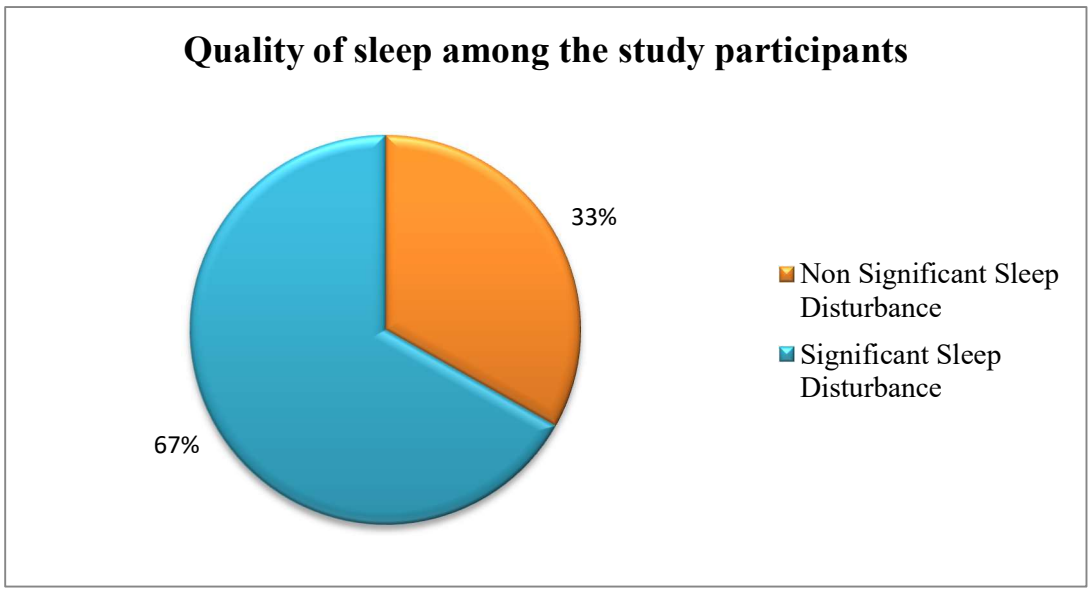


Table 6: Mean Pittsburgh Sleep Quality Index (PSQI) scores:

Statistics	PSQI
Mean	8.09
Std. Deviation	3.986
Median	7
Minimum	2
Maximum	19

Table 6 describes average Pittsburgh Sleep Quality Index score of 256 participants which was found to be 8.09 with a standard deviation of 3.986, which suggests significant sleep disturbances and overall poor sleep quality. The minimum score obtained was 2 and maximum score obtained was 19.

TABLE 7: Correlation between severity of anxiety (HAM-A) with the quality of sleep (PSQI) of study participants:

	HAM-A	**PSQI**
Correlation coefficient 'r'	1	0.62
P Value	.	**<0.001***

Spearman Correlation

***Significant**

Table 7 shows the association between severity of anxiety with the quality of sleep. A strong positive correlation was revealed between Hamilton Anxiety Rating Scale and Pittsburgh Sleep Quality Index, which was statistically significant ($r = 0.62$, $p < 0.001$), indicating that higher anxiety levels are associated with poorer sleep quality.

TABLE 8: Correlation between severity of anxiety and the age of the participants.

		Age
HAM A	Correlation coefficient 'r'	0.165
	P Value	**0.008***
	N	256

Spearman Correlation

***Significant**

Table 8 shows the correlation between severity of anxiety as per Hamilton Anxiety rating scale with the age of study participants. Weak positive correlation was observed between Hamilton Anxiety Rating Scale and age of the participants (r=0.165, p=0.008). This implies older the mother, more severe the anxiety symptoms experienced.

TABLE 9: Correlation between severity of anxiety and number of years of education received by study participants:

	Total years of education	
HAM-A	Correlation coefficient 'r'	0.055
	P Value	0.383*
	N	256

*Not Significant

Table 9 shows the association between severity of anxiety as per Hamilton Anxiety rating scale with number of years of education received by study participants. No significant correlations were observed between Hamilton Anxiety Rating Scale scores with total years of education ($r = 0.055$, $p = 0.383$). Number of years of education did not appear to have any effect on the severity of anxiety experience by post-partum mothers.

TABLE 10: Association between severity of anxiety and occupation of study participants:

Group	N	HAM-A Score		P value
		Mean	SD	
Semiskilled occupation	242	13.58	6.45	**0.0108***
Skilled occupation	14	18.07	4.30	

***significant**

Table 10 shows the association between anxiety as per Hamilton Anxiety rating scale with occupation of study participants. The results revealed a significant association between these two factors. Higher HAM-A score was observed in those with skilled occupations, implying that participants involved in skilled occupations were more likely to experience higher anxiety compared to those in skilled occupations.

TABLE 11: Association between severity of anxiety with family history of psychiatric illness in study participants:

Severity of anxiety as per HAM-A	Family history of psychiatric illness		P Value
	Present	Absent	
Mild anxiety	12 (6.70 %)	166 (93.30 %)	**< 0.001***
Mild to moderate anxiety	23 (44.20 %)	29 (55.80 %)	
Moderate to severe anxiety	22 (84.60 %)	4 (15.40 %)	

Chi Square Test

***Significant**

Table 11 describes the association between severity of anxiety as per Hamilton Anxiety rating scale with family history of psychiatric illness in study participants. Our study found a significant association between presence of family history of psychiatric illness in participants and the severity of anxiety experienced. Family history of psychiatric illness was found highest in mothers experiencing moderate to severe anxiety, followed by mild to moderate anxiety. Least history of psychiatric illness was seen in participants with mild anxiety.

Figure 3:

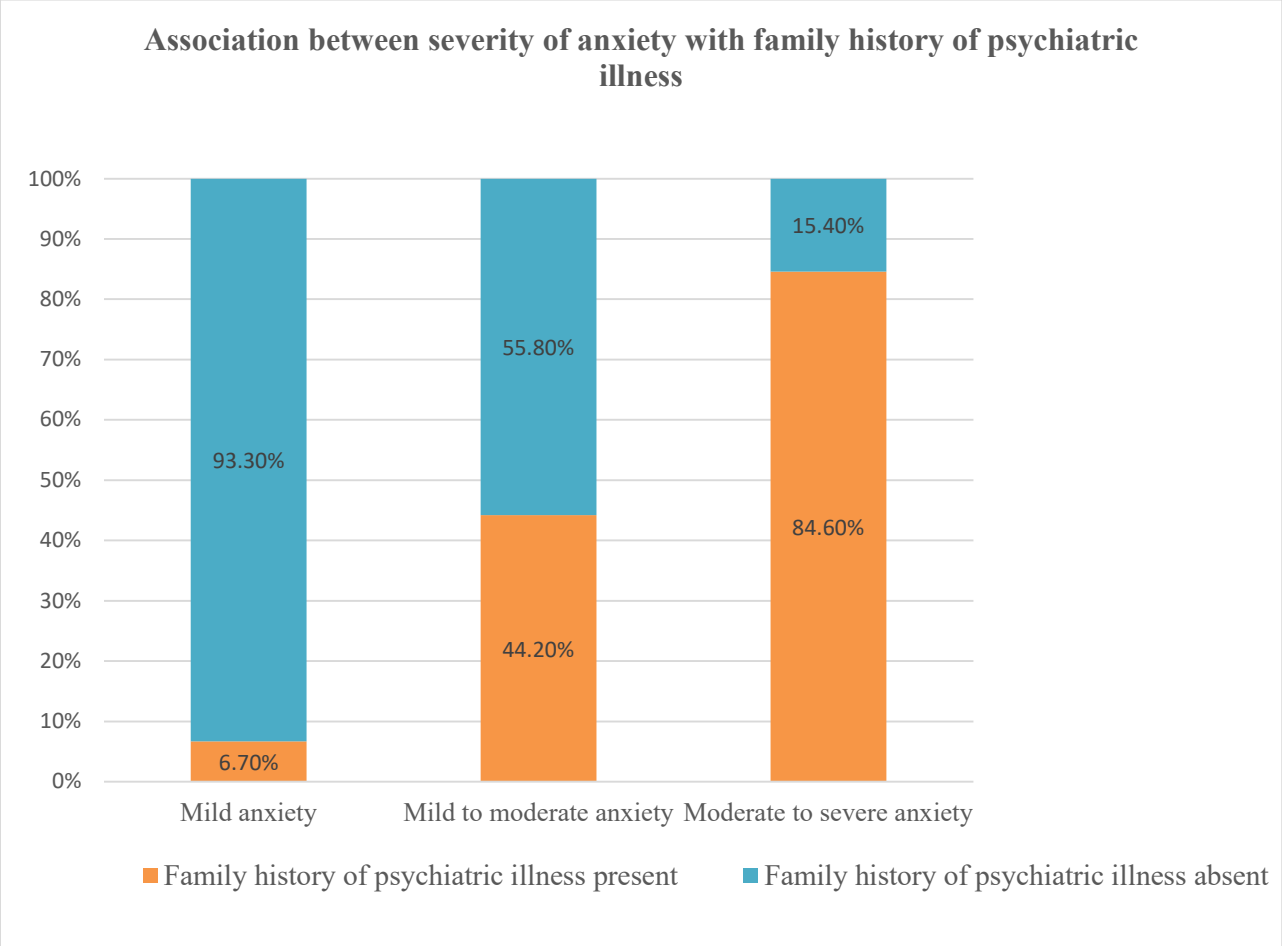

Association between severity of anxiety with family history of psychiatric illness
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
93.30%
6.70%
55.80%
44.20%
15.40%
84.60%
Mild anxiety
Mild to moderate anxiety
Moderate to severe anxiety
Family history of psychiatric illness present
Family history of psychiatric illness absent

TABLE 12: Association between severity of anxiety with adequate family support in study participants:

Severity of anxiety as per HAM-A	Adequate family support		P Value
	Present	Absent	
Mild anxiety	162 (91.00%)	16 (9.00%)	**< 0.001***
Mild to moderate anxiety	13 (25.00%)	39 (75.00%)	
Moderate to severe anxiety	2 (7.70%)	24 (92.30%)	

Chi Square Test

***Significant**

Table 12 depicts the association between severity of anxiety as per Hamilton Anxiety rating scale with presence of adequate family support, as perceived by the participants. The results revealed a significant association between the two variables. Majority (92.30%) of the participants with moderate to severe anxiety perceived family support to be absent. This was followed participants with mild to moderate anxiety, 75% of whom reported absent family support. Highest levels of adequate family support (91%) were reported by mothers with mild anxiety.

Increasing severity of anxiety corresponded with reducing levels of family support perceived by the mother.

Figure 4:

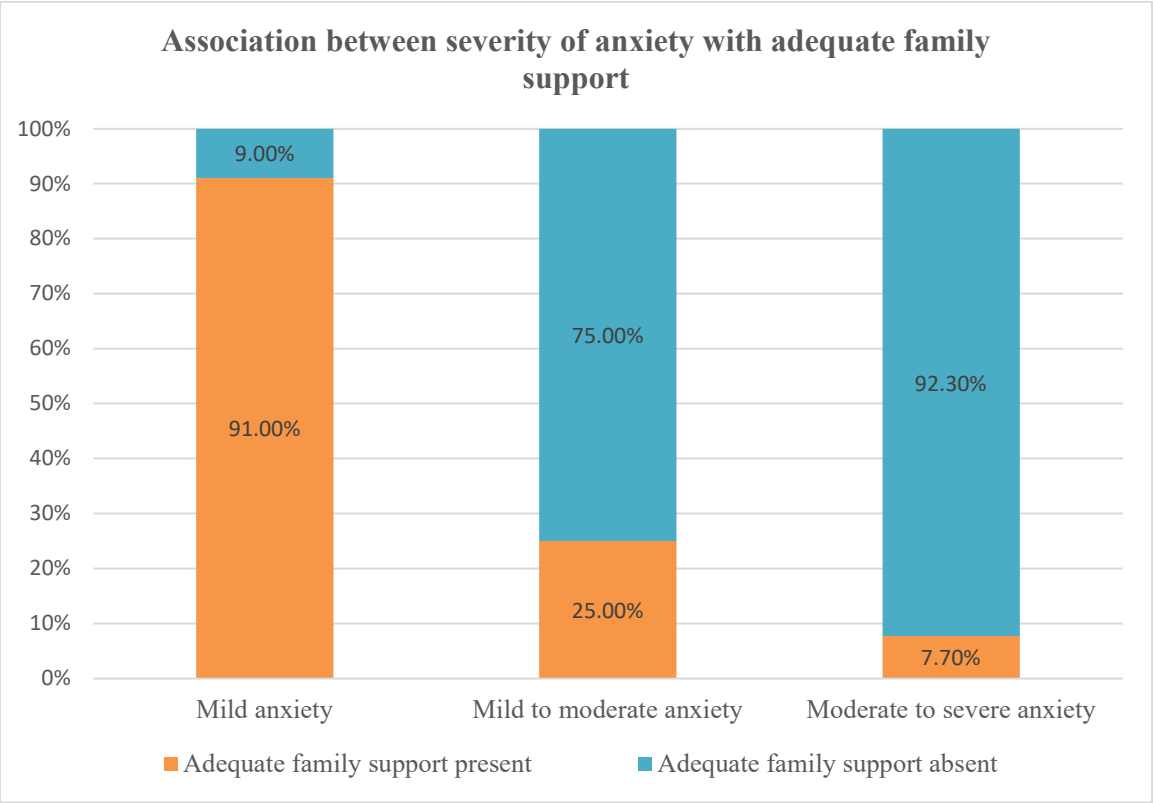

Association between severity of anxiety with adequate family support
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
9.00%
91.00%
75.00%
25.00%
92.30%
7.70%
Mild anxiety
Mild to moderate anxiety
Moderate to severe anxiety
Adequate family support present
Adequate family support absent

TABLE 13: Association between severity of anxiety with preferred gender of baby:

If preferred gender delivered	HAM-A						P value
	Mild severity		Mild to moderate severity		Moderate to severe		
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	
No	41	23.00%	13	25.00%	7	26.90%	0.865*
Yes	53	29.80%	13	25.00%	9	34.60%	
No preferred gender	84	47.20%	26	50.00%	10	38.50%	

Chi Square Test

*Not Significant

Table 13 shows the association between severity of anxiety as per Hamilton Anxiety rating scale with gender of baby. No significant association was found between these two factors. Mothers who did not deliver baby as per expected gender were not found to have higher anxiety, as compared to mothers who delivered baby as per expected gender.

TABLE 14: Association between severity of anxiety with the mode of delivery in study participants:

Mode of Delivery	HAM-A score						P Value
	Mild severity		Mild to Moderate severity		Moderate to severe		
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	
Caesarean-section	6	3.40%	41	78.80%	23	88.50%	**<0.001***
Normal vaginal	172	96.60%	11	21.20%	3	11.50%	

Chi Square Test

***Significant**

Table 14 shows the association between severity of anxiety as per Hamilton Anxiety rating scale (HAM-A) with the mode of delivery in study participants. The results revealed a significant association between the two factors. ($p < 0.001$).

Amongst mothers with moderate to severe anxiety, majority (88.50%) were found to have undergone caesarean-section delivery whereas only 11.50% had a normal vaginal delivery. Caesarean section deliveries were again found to be higher in mothers with mild to moderate anxiety (78.80%), whereas only 21.20% gave birth vaginally. However, amongst mothers who reported mild severity of anxiety, vaginal deliveries were predominant (96.60%) and only 3.4% undergone a Caesarean-section delivery.

Higher severity of anxiety was associated more frequently with Caesarean-section deliveries compared to vaginal births.

Figure 5:

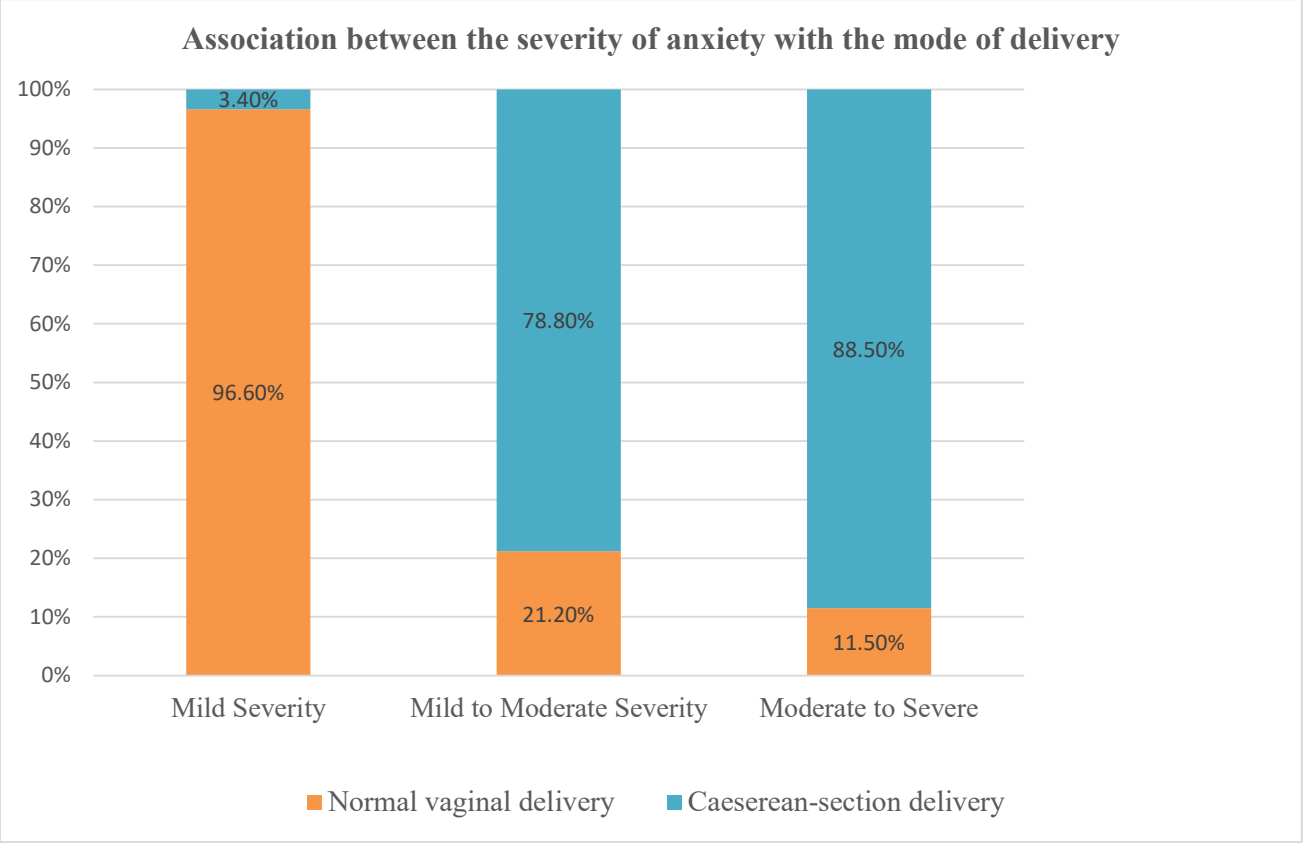

Association between the severity of anxiety with the mode of delivery
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
3.40%
96.60%
78.80%
21.20%
88.50%
11.50%
Mild Severity
Mild to Moderate Severity
Moderate to Severe
Normal vaginal delivery
Caeserean-section delivery

TABLE 15: Association between severity of anxiety with parity/number of children of study participants:

Parity	HAM-A						P value
	Mild severity		Mild to moderate severity		Moderate to severe		
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage	
1	42	23.60%	10	19.20%	8	30.80%	0.331*
2	125	70.20%	35	67.30%	15	57.70%	
3	9	5.10%	7	13.50%	3	11.50%	
4	2	1.10%	0	0.00%	0	0.00%	

Chi Square Test

*Not Significant

Table 15 depicts the association between severity of anxiety with parity/number of children of study participants. No significant association was observed between severity of anxiety as per Hamilton Anxiety Rating Scale scores and parity (number of living children present). Mothers with greater number of children were not found to have any increased anxiety as compared to mothers with fewer or a single child.

TABLE 16: Association between severity of anxiety with maternal complications during pregnancy:

Severity of anxiety as per HAM-A	Maternal complications		P Value
	Present	Absent	
Mild anxiety	33 (18.1%)	145 (81.9%)	**< 0.001***
Mild to moderate anxiety	17 (32.7%)	35 (67.3%)	
Moderate to severe anxiety	20 (76.9%)	6 (23.1%)	

Chi Square Test

***Significant**

Table 16 illustrates the association between the severity of anxiety as per Hamilton Anxiety Rating Scale with maternal complications during pregnancy. The results revealed a significant association between the two factors. ($p < 0.001$).

Patients with moderate to severe anxiety had the highest rate of pregnancy complications (76.9%), followed by those mothers with mild to moderate severity of anxiety (32.7%). Least maternal complications were present in mothers with mild anxiety (18.1%)

These findings indicate that the presence of complications during pregnancy are associated with greater likelihood of higher severity of anxiety in the mother.

Figure 6:

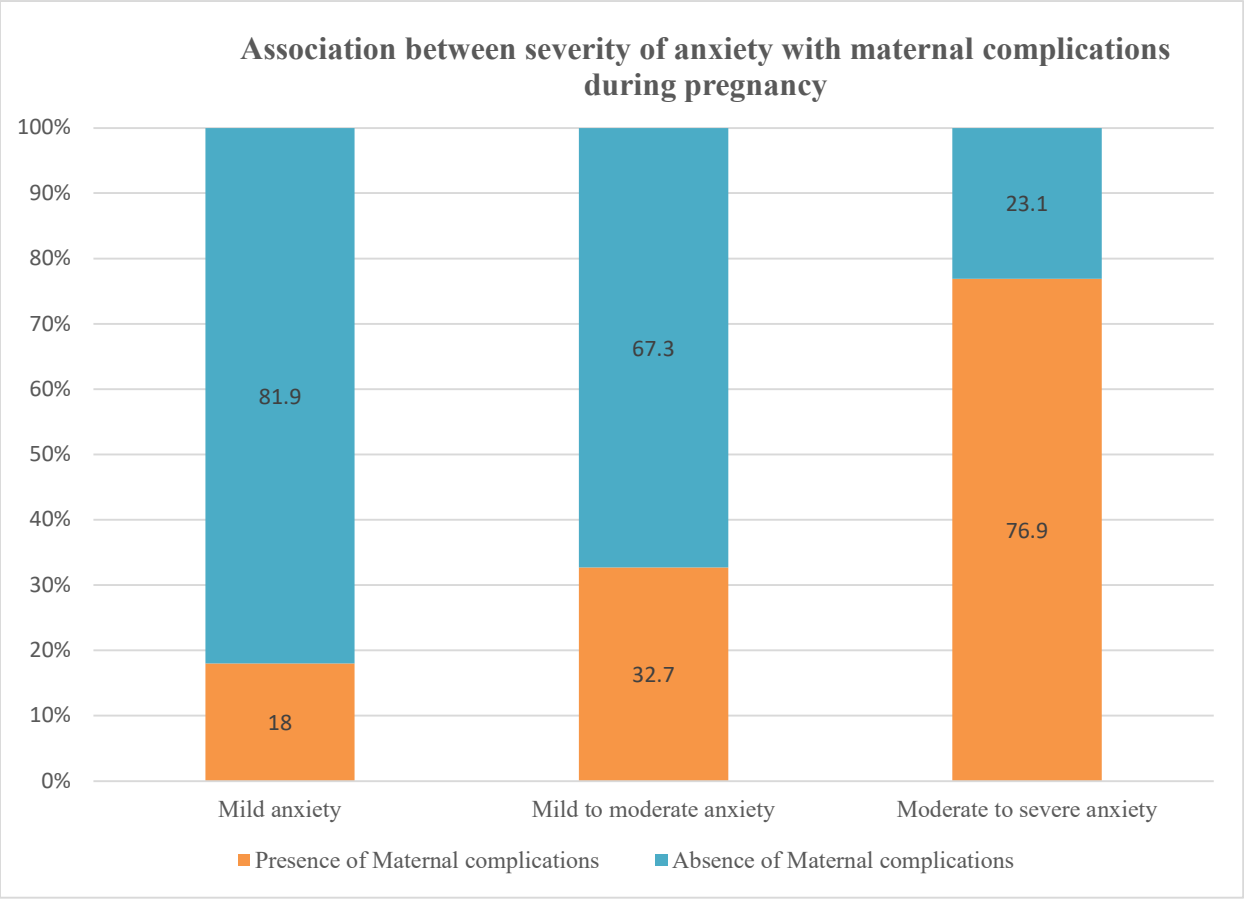

Association between severity of anxiety with maternal complications during pregnancy
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
81.9
18
67.3
32.7
23.1
76.9
Mild anxiety
Mild to moderate anxiety
Moderate to severe anxiety
Presence of Maternal complications
Absence of Maternal complications

TABLE 17: Association between severity of anxiety with occurrence of neonatal complications in study participants:

Severity of anxiety as per HAM-A	Neonatal complications		P Value
	Present	Absent	
Mild anxiety	15 (7.9%)	163 (92.1%)	**< 0.001***
Mild to moderate anxiety	23 (44.2%)	29 (55.8%)	
Moderate to severe anxiety	21(80.8%)	5(19.2%)	

Chi Square Test

***Significant**

Table 17 shows the association between severity of anxiety as per Hamilton Anxiety Rating Scale (HAM-A) with the presence of neonatal complications. The results revealed a significant association between these two factors. ($p < 0.001$).

Patients with moderate to severe anxiety had the highest rate of neonatal complications (80.8%), followed by mild to moderate severity of anxiety (44.2%). Least neonatal complications were present in mothers with mild anxiety (7.9%). As the severity of anxiety increased, presence of neonatal complications was also found to increase.

Figure 7:

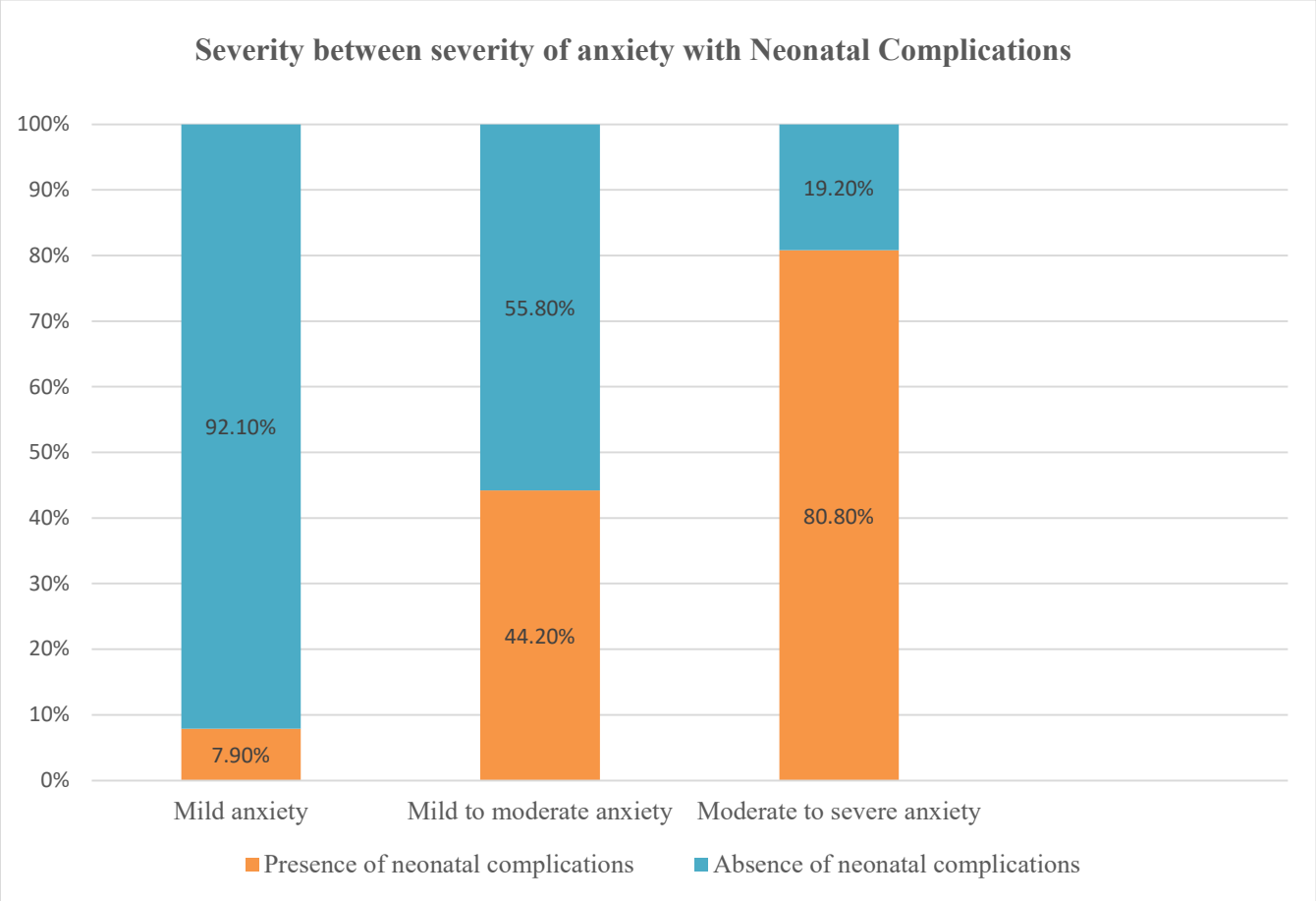

Severity between severity of anxiety with Neonatal Complications
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
92.10%
7.90%
55.80%
44.20%
19.20%
80.80%
Mild anxiety
Mild to moderate anxiety
Moderate to severe anxiety
Presence of neonatal complications
Absence of neonatal complications

TABLE 18: Association between severity of anxiety with neonatal hospital admissions

Severity of anxiety as per HAM-A	Neonatal hospital admissions		P Value
	Present	Absent	
Mild anxiety	6.2%	93.8%	**< 0.001***
Mild to moderate anxiety	40.4%	59.6%	
Moderate to severe anxiety	76.9%	23.1%	

Chi Square Test

***Significant**

Table 18 describes the association between severity of anxiety as per Hamilton Anxiety Rating Scale (HAM-A) with neonatal hospital admissions. Patients with mild severity had the least neonatal hospital admissions (6.2%). As the severity of anxiety increased to mild to moderate, hospital admissions were also found to have increased (40.4%). Patients with moderate to severe anxiety had the highest neonatal hospital admissions (76.9%)

These findings indicate that presence of neonatal hospitalizations may be associated with greater severity of anxiety in the mother.

Figure 8:

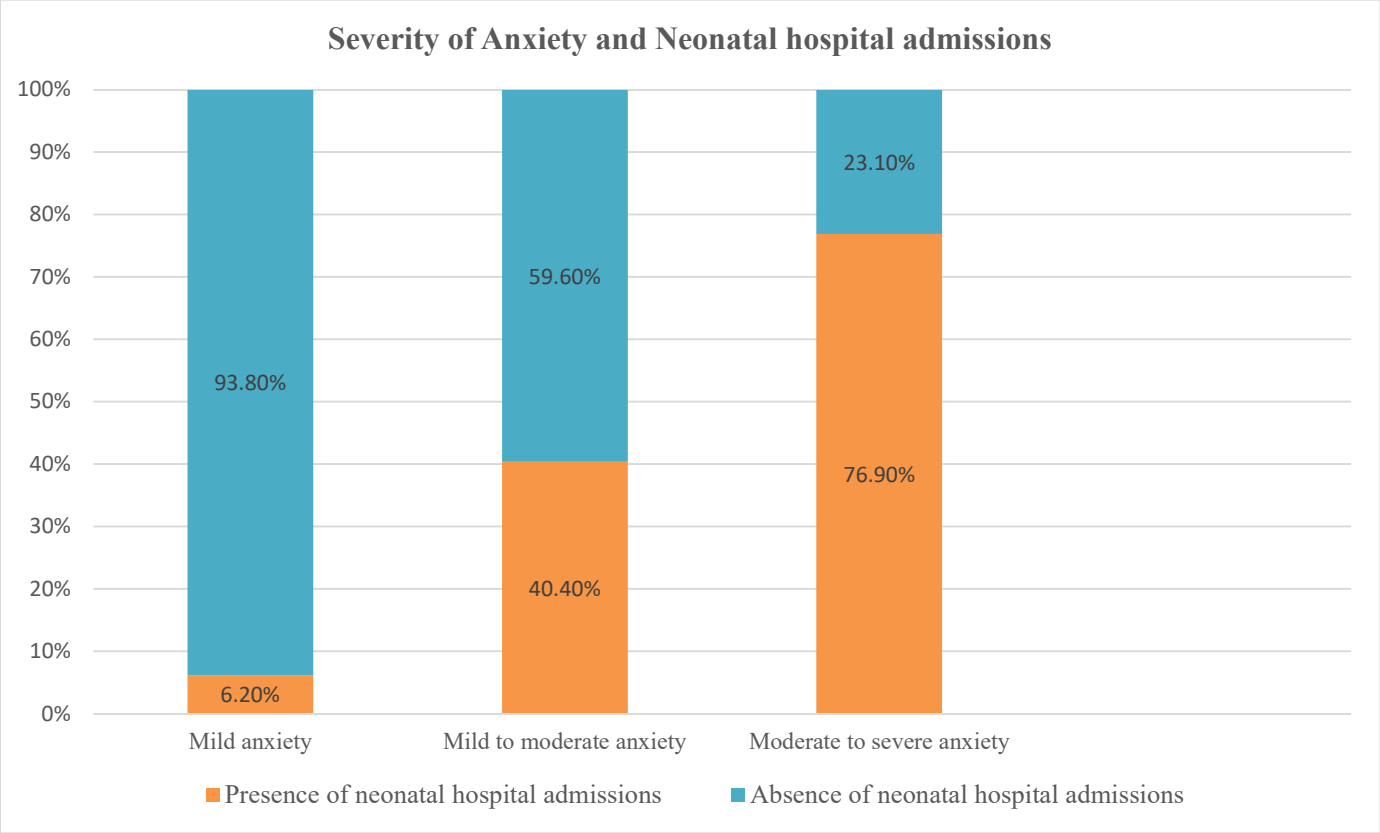

Severity of Anxiety and Neonatal hospital admissions
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
93.80%
6.20%
59.60%
40.40%
23.10%
76.90%
Mild anxiety
Mild to moderate anxiety
Moderate to severe anxiety
Presence of neonatal hospital admissions
Absence of neonatal hospital admissions

TABLE 19: Association between severity of anxiety with breastfeeding

Severity of anxiety as per HAM-A	Breastfeeding		P Value
	Yes	No	
Mild anxiety	163(91.6%)	15(8.4%)	**< 0.003***
Mild to moderate anxiety	50(96.2%)	2(3.8%)	
Moderate to severe anxiety	19(73.1%)	7(26.9%)	

Chi Square Test

***Significant**

Table 19 shows the association between severity of anxiety as per Hamilton Anxiety Rating Scale (HAM-A) with breastfeeding. The results revealed a significant association between HAM-A scores and breastfeeding(p=0.003). Mothers with moderate to severe anxiety were most likely to not breastfeed (26.9%) followed by mothers with mild to moderate anxiety (3.8%) whereas in mild anxiety only 8.4% were not breastfeeding their infant. This could imply that mothers suffering from higher levels of anxiety were less likely to breastfeed their infants.

Figure 9:

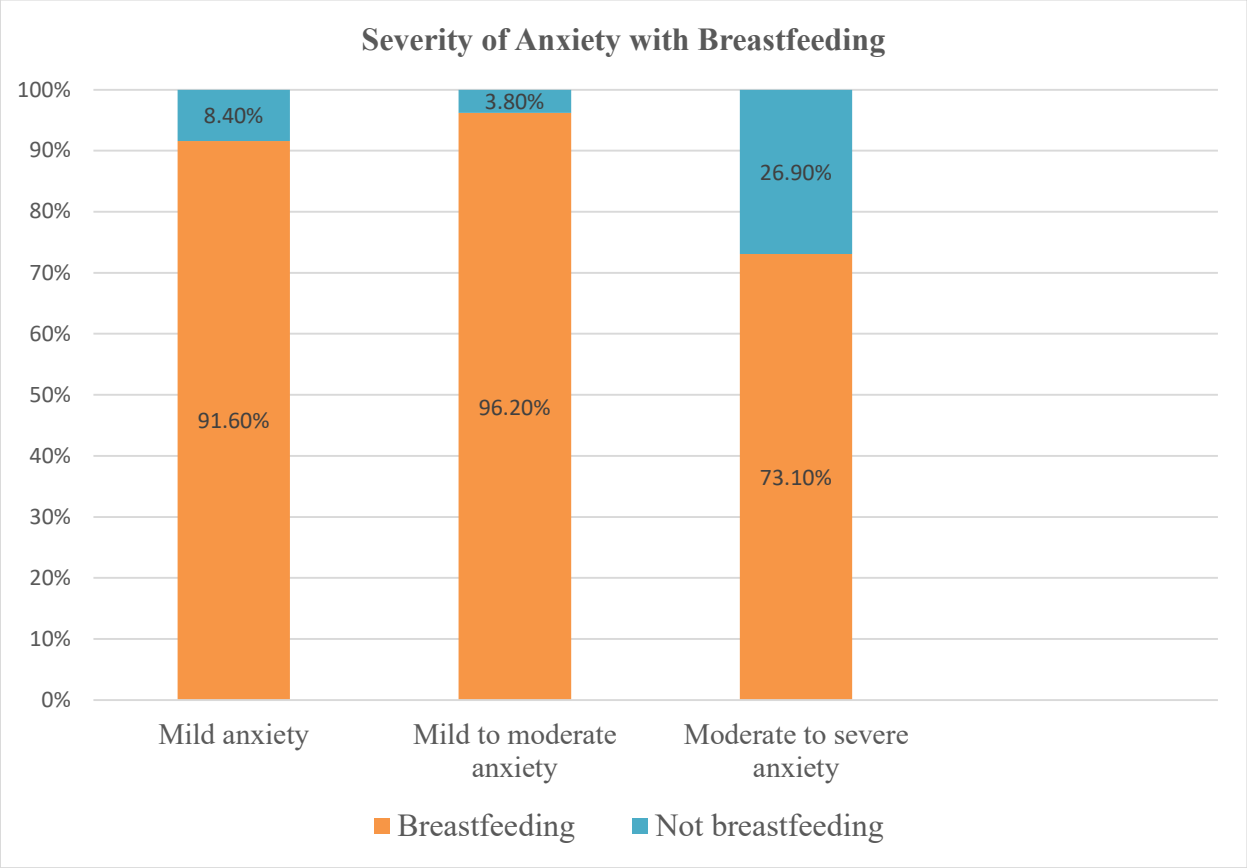

Severity of Anxiety with Breastfeeding
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
8.40%
91.60%
3.80%
96.20%
26.90%
73.10%
Mild anxiety
Mild to moderate anxiety
Moderate to severe anxiety
Breastfeeding
Not breastfeeding

TABLE 20: Association between quality of sleep with mode of delivery:

Mode of Delivery	PSQI				P Value
	Non-Significant Sleep Disturbance		Significant Sleep Disturbance		
	Frequency	Percentage	Frequency	Percentage	
Caesarean-section	6	7.10%	64	37.40%	**<0.001***
Normal vaginal	79	92.90%	107	62.60%	

Chi Square Test

***Significant**

Table 20 depicts the association between quality of sleep as per Pittsburgh Sleep Quality Index with mode of delivery of study participants. The results revealed a significant association between the two. ($p < 0.001$).

Amongst mothers who reported good quality of sleep as per PSQI, 92.9% were found to have given birth vaginally whereas 7.10% delivered via c-section. However, amongst mothers who had significant sleep disturbances, 37.40% had undergone a Caesarean-section delivery and 62.60% gave birth vaginally.

This could imply that Caesarean-section deliveries maybe associated with poorer quality of sleep in mothers.

Figure 10:

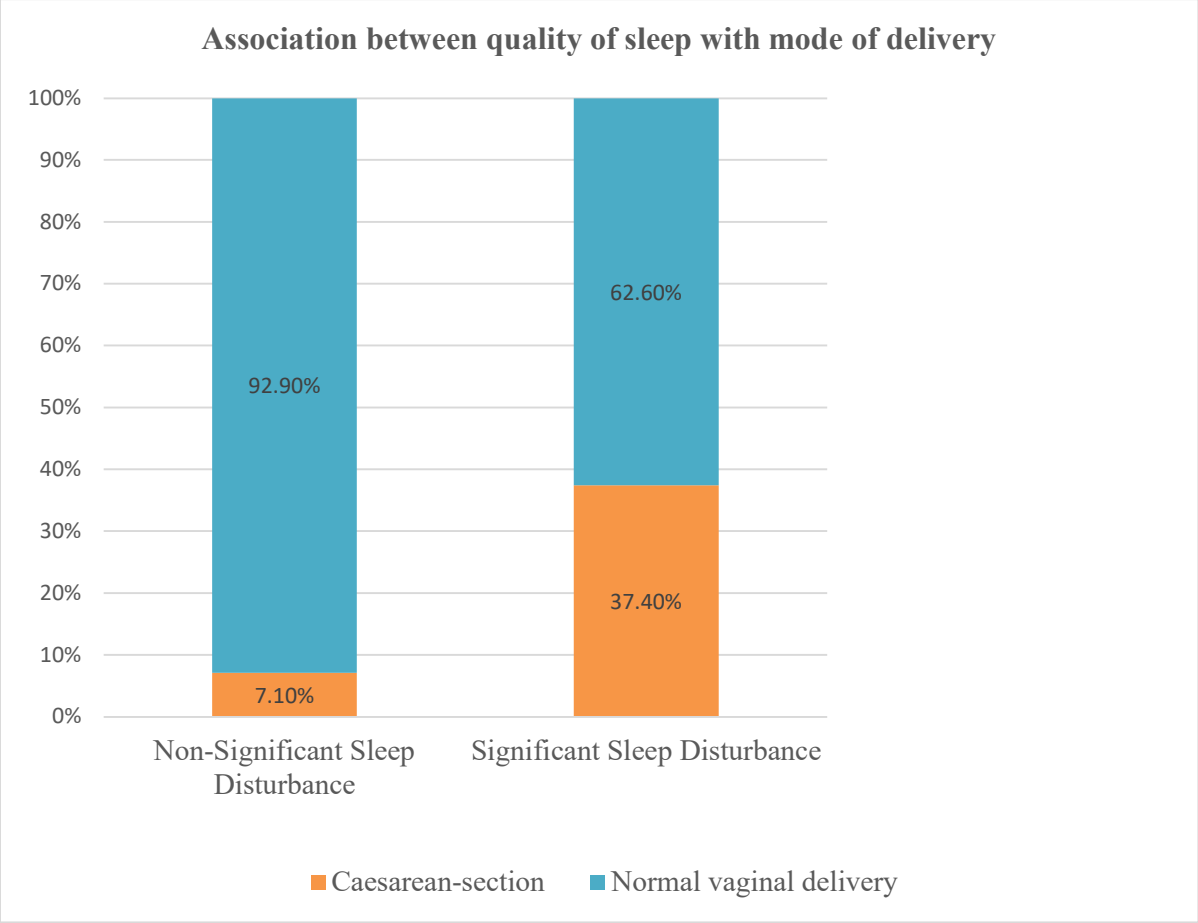

Association between quality of sleep with mode of delivery
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
92.90%
7.10%
62.60%
37.40%
Non-Significant Sleep Disturbance
Significant Sleep Disturbance
Caesarean-section
Normal vaginal delivery

TABLE 21: Association between quality of sleep with maternal complications during pregnancy:

PSQI	Maternal complications		P Value
	Present	**Absent**	
Non-Significant Sleep Disturbance	14(16.5%)	71(83.5%)	**0.006***
Significant Sleep Disturbance	56(32.7%)	115(67.3%)	

Chi Square Test

***Significant**

Table 21 shows the association between quality of sleep as per Pittsburgh Sleep Quality Index with maternal complications during pregnancy. The results revealed a significant association between these two factors. ($p < 0.001$).

Amongst mothers who reported good quality of sleep as per PSQI, 83.5% were found to not have any history of complications during pregnancy whereas 16.5% reported pregnancy related complications.

These figures were higher amongst mothers who had significant sleep disturbances: 32.7% reported history of pregnancy related complications whereas 67.3% reported none.

This could imply that higher incidence of maternal complications is associated with poorer quality of sleep.

Figure 11:

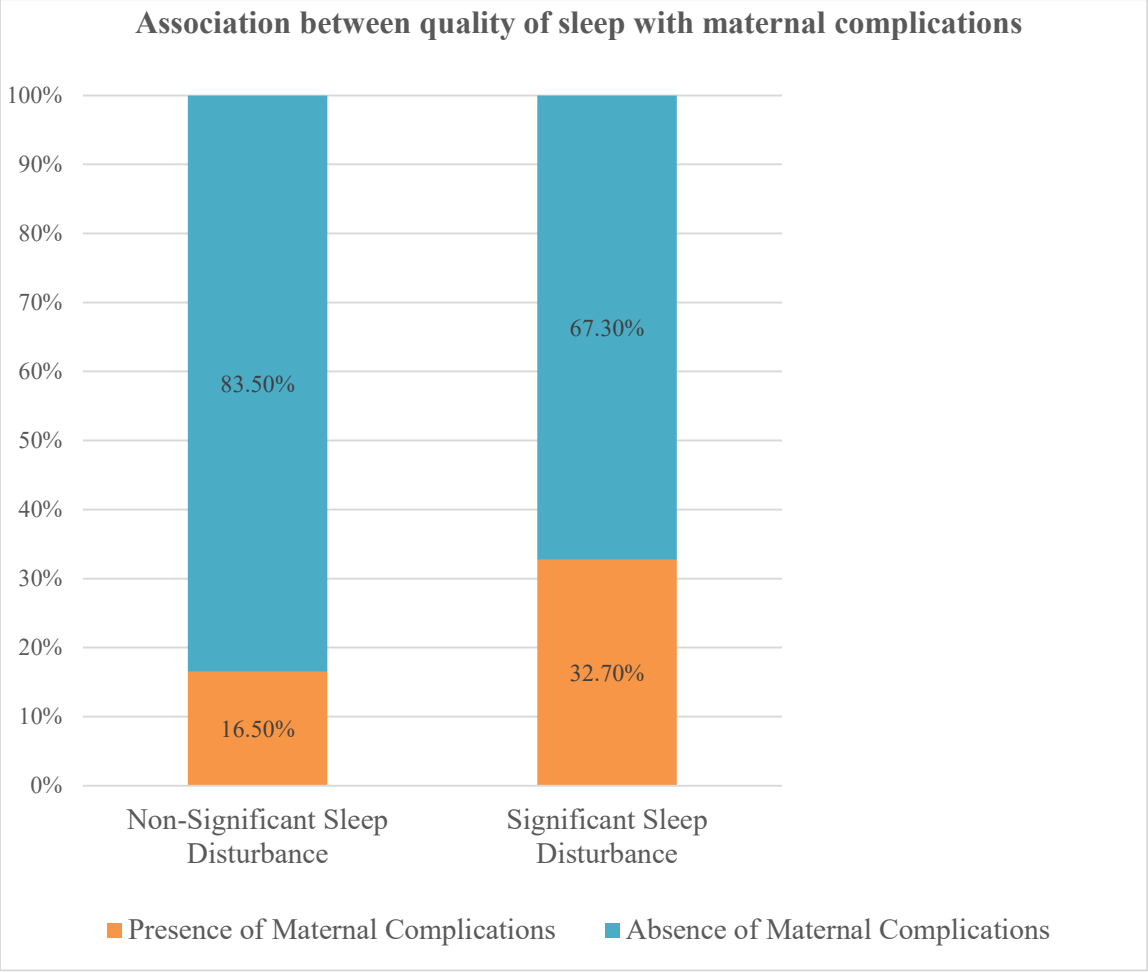

Association between quality of sleep with maternal complications
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
83.50%
16.50%
67.30%
32.70%
Non-Significant Sleep Disturbance
Significant Sleep Disturbance
Presence of Maternal Complications
Absence of Maternal Complications

TABLE 22: Association between quality of sleep with neonatal complications:

PSQI	Neonatal complications		P Value
	Present	**Absent**	
Non-Significant Sleep Disturbance	2(2.4%)	83(97.6%)	**< 0.001***
Significant Sleep Disturbance	57(33.3%)	114(66.7%)	

Chi Square Test

***Significant**

Table 22 shows the association between quality of sleep as per Pittsburgh Sleep Quality Index with neonatal complications. The results revealed a significant association between the two. ($p < 0.001$).

Amongst mothers who reported good quality of sleep as per PSQI, majority (97.6%) reported no complications in their neonate whereas only few (2.4%) reported some neonatal complications. Amongst mothers who had significant sleep disturbances, presence of neonate related complications was much higher (33.3%).

This could imply that mothers with significant sleep disturbances had higher history of neonate related complications.

Figure 12:

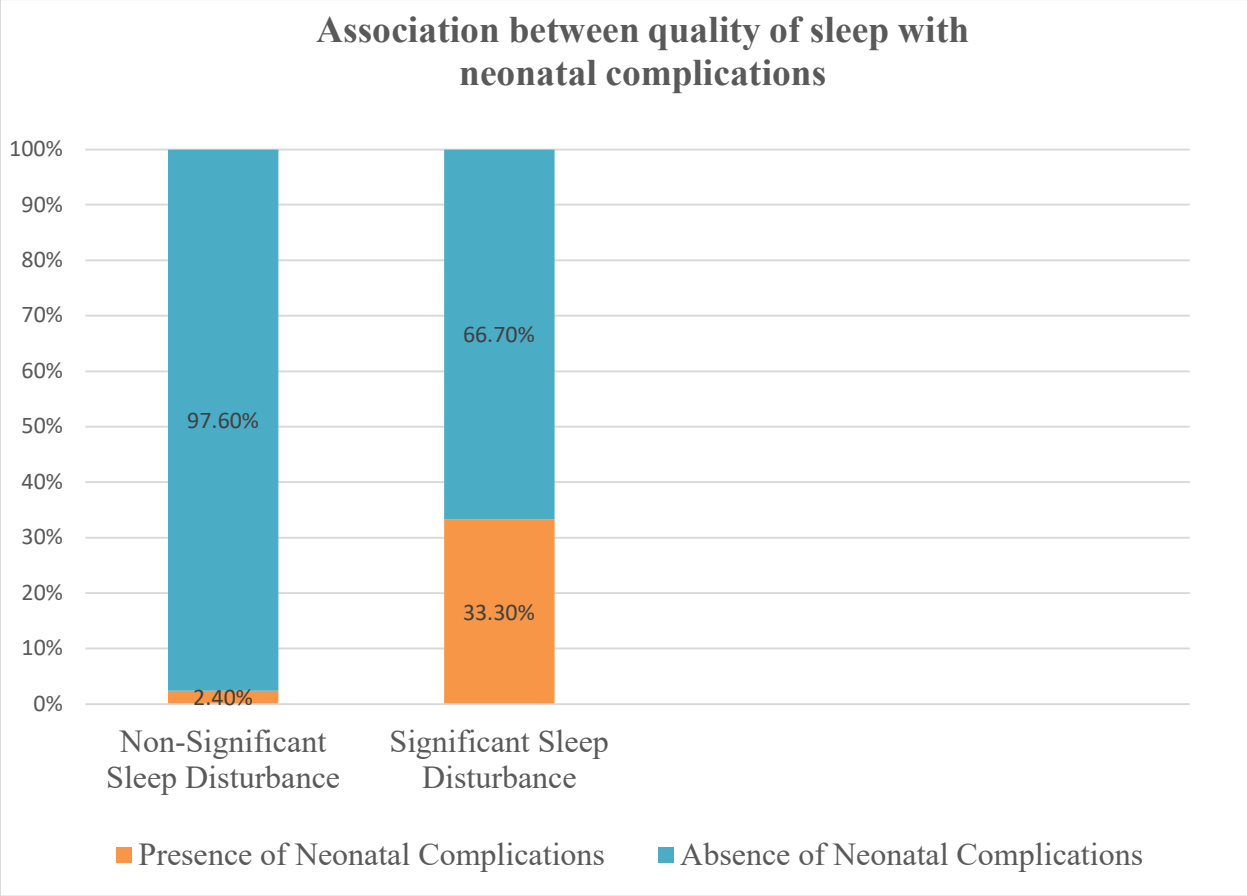

Association between quality of sleep with neonatal complications
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
97.60%
2.40%
66.70%
33.30%
Non-Significant Sleep Disturbance
Significant Sleep Disturbance
Presence of Neonatal Complications
Absence of Neonatal Complications

TABLE 23: Association between quality of sleep with neonatal hospitalizations:

PSQI	Neonatal hospital admissions		P Value
	Present	**Absent**	
Non-Significant Sleep Disturbance	1(1.2%)	84(98.8%)	**< 0.001***
Significant Sleep Disturbance	51(29.8%)	120(70.2%)	

Chi Square Test

***Significant**

Table 23 shows the association between quality of sleep as per Pittsburgh Sleep Quality Index with neonatal hospital admissions. The results revealed a significant association between the two. ($p < 0.001$).

Amongst mothers with reportedly good sleep, 98.8% lacked any history of neonatal hospital admissions with only 1.2% reporting presence of same. However, for mothers with impaired sleep, 29.8% gave a history of neonatal hospital admissions.

Mothers with significant sleep disturbances were found to have higher history of neonatal hospital admissions.

Figure 13:

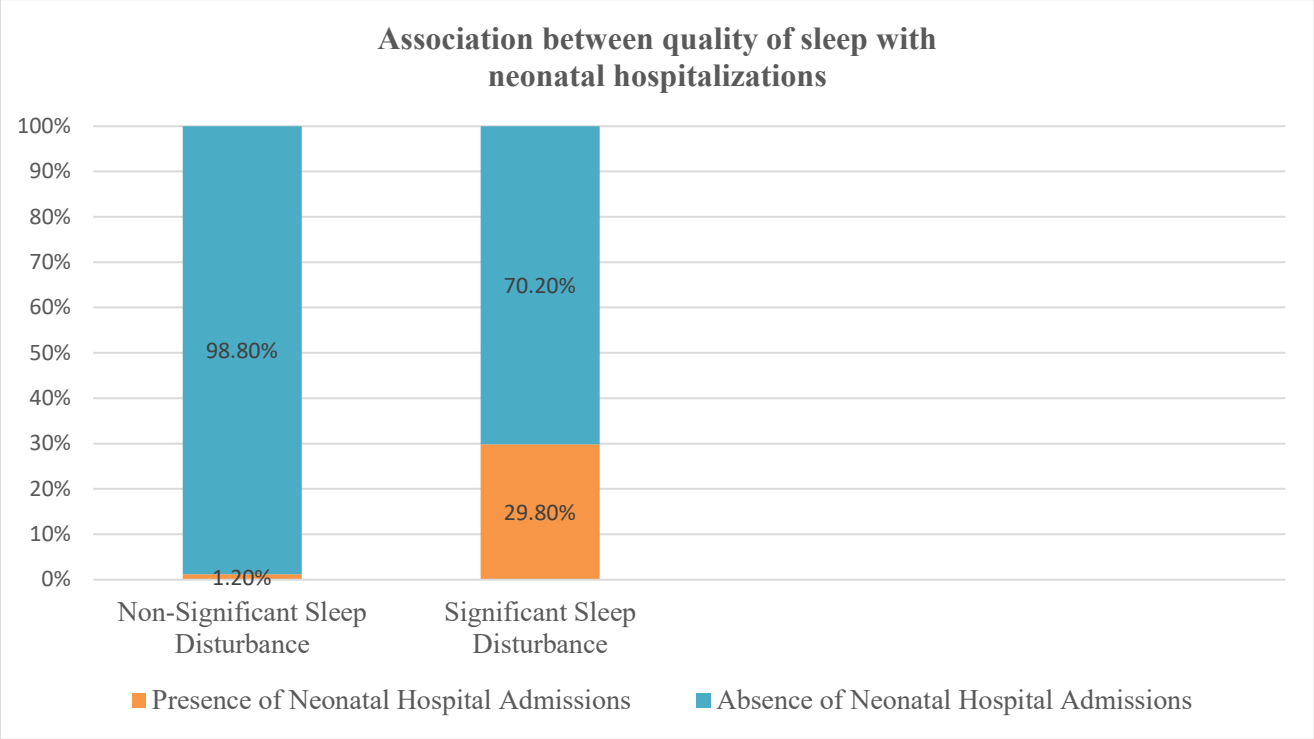

Association between quality of sleep with neonatal hospitalizations
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
98.80%
1.20%
70.20%
29.80%
Non-Significant Sleep Disturbance
Significant Sleep Disturbance
Presence of Neonatal Hospital Admissions
Absence of Neonatal Hospital Admissions

TABLE 24: Association between quality of sleep with breastfeeding:

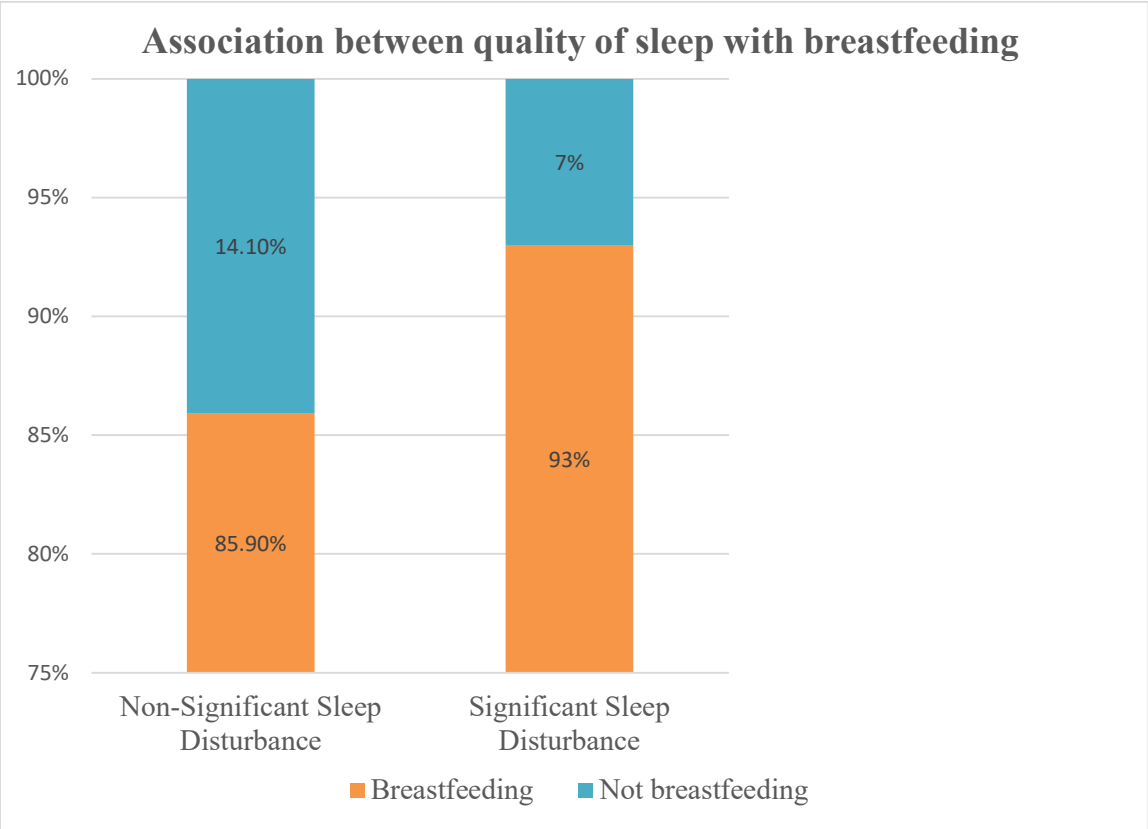
PSQI	Breastfeeding		
	Yes	No	P value
Non-Significant Sleep Disturbance	73(85.9%)	12(14.1%)	0.066*
Significant Sleep Disturbance	159(93%)	12(7%)	

Chi Square

*Not Significant

Table 24 shows the association between quality of sleep as per Pittsburgh Sleep Quality Index with breastfeeding. No significant association was found between the two. Amongst women with no sleep disturbances, 85.9% were found to be breastfeeding compared to 14.1% who were not. Similarly, findings were noted amongst participants with disturbed sleep- 93% women were breastfeeding compared to 7% who weren't. Breastfeeding mothers had similar incidence for both disturbed as well as adequate sleep quality.

Figure 14:


Association between quality of sleep with breastfeeding
100%
95%
90%
85%
80%
75%
14.10%
85.90%
7%
93%
Non-Significant Sleep Disturbance
Significant Sleep Disturbance
Breastfeeding
Not breastfeeding

DISCUSSION

This study was an observational study to assess the prevalence of anxiety and quality of sleep in post-partum mothers.

DISCUSSION OF SOCIO-DEMOGRAPHIC DATA:

Our study was conducted in a charitable hospital which usually caters to a population belonging lower socio-economic status. Hence, the demographic details of our study are mostly reflective of the same.

Age:

In this study, the mean age of participants was roughly 27 years. This figure is somewhat similar to a study conducted in rural North India evaluating post-partum depression and anxiety which found the average age of their participants to be 24 years.[125] Another study conducted in rural South India by Maria et al. (2021) also found mean age of participants to be around 24 years.[126] A study from South-East Asia by Hung et al. in 2011 which found average age of their participants to be 29 years.[75] National Family Health Survey (V) conducted in India from 2019 to 2021 found median age at last birth to be approximately 27 years.[127] Hence, the ages of our participants were overall quite similar to other studies conducted in India and South-East Asia. However, these ages were significantly lower compared to other studies conducted in Western countries. Reck et al. conducted a study in Germany in 2008 to examine post-partum anxiety and depression in which the mean age of their sample was 33 years.[128] Societal norms dictate early marriages for females in India- sometimes even as soon as 18 years of age. As a result, women

conceive sooner than their Western counterparts. This could explain the younger maternal age overall in our population compared with other countries. **(Table 1)**

Years of education:

For our participants, the mean years of education received was 7 years - which was found to be significantly lower compared to other studies. An Indian study by Maria et al. (2021) found an average of years of around 11-12 years of education in their study participants. [126] Hung et al. (2011) found that forty-three per cent women in their study had obtained a senior high school diploma, which can be estimated to be around 12-14 total years of education.[75] Reck et al (2008) found majority of their participants held a university degree, i.e. around 16-17 years of education.[128] Western societies are found to prioritize their education and jobs more frequently over marriage and starting a family. However, cultural norms in India give more priority to marriage over education and career. This is seen especially for females belonging to lower and middle class of society, explaining the lower education levels of our population. **(Table 1)**

Occupation:

In our study, approximately 94% of the participants were in semiskilled labour whereas 6% in skilled labour. It should be noted that we have assumed housewives to be semi-skilled occupation. In the study by Maria et al. (2021), similar figures were seen. Majority of their sample (81%) were housewives (semi-skilled occupation), with 4% in skilled labour, and remaining 15% in unskilled labour.[126] However, studies from other parts of Asia and Europe

found otherwise. In Hung et al.'s study (2011) conducted in Taiwan, 59% were employed in middle-income jobs.[75] In the study by Reck at al. (2008) conducted in Germany, almost 70% women had middle income jobs.[128] As mentioned previously, our sample mostly comprised of participants hailing from lower and lower-middle socio-economic strata, which could explain these findings**. (Table 1)**

Family history of psychiatric illness:

Approximately 20% of the participants reported presence of some psychiatric illness in their family. We could not find studies which evaluated family history of psychiatric disorders in women with post-partum anxiety, rather majority of the studies have enquired regarding a past history of psychiatric morbidity in the mother- however this was an exclusion criteria of our study. **(Table 1)**

Presence of family support:

Roughly 70% of our study participants reported adequate levels of family support. Figures from other studies were found highly variable. However, there is some similarity with study by Hung et al (2007), which found half their sample to have adequate levels of social support available from the community overall.[76] Zivoder et al. (2011) reports 91% of women had adequate levels of social support- which included their partner, family members, as well as friends.[129] However, it should be noted that our study did not use any formal assessment tool to measure family support available to our participants. Hence, these findings should be interpreted keeping the same in mind. **(Table 1)**

DISCUSSION OF OBSTETRIC AND NEONATAL CHARACTERISTICS OF THE PARTICIPANTS:

Planned vs unplanned pregnancy:

In our study, 86% of participants reported last pregnancy being planned and 14% had an unplanned pregnancy. Similar results were reflected in an Indian study conducted by Dadhwal et al. (2013).[125] They found that most women had planned pregnancy in their study as well. However, these figures were quite different compared to another international studies. A study by Hung et al. (2011) reports that among the 859 women investigated, 63% indicated that their pregnancy was unplanned.[75] A review article by Geller (2004) found that forty-eight percent of women in the reproductive age group in the United States had at least one unplanned pregnancy at some point in their lives.[130] All our study participants were married, and it is the cultural norm for Indian females to conceive soon after marriage. This could explain the disparity between Western literature with Indian studies. **(Table 2)**

Term of pregnancy:

Approximately 92% mother had a full-term pregnancy with roughly 6% having a pre-term delivery and 2% women having a post term pregnancy. Data states average gestational period for Indian women is typically around 40 weeks, which is equivalent to a full-term pregnancy.[131] Study by Hung et al (2011) also had similar figures, in which mean gestational age for mothers was 38 weeks (i.e. almost a full-term pregnancy).[75] **(Table 2)**

Parity:

In our study 23% of the sample was primiparous and about 77% were multiparous. Amongst multiparous women majority had 2 children. This was similar to an Indian study by Dadhwal et al. (2013) in which majority of the sample comprised of primiparous women.[125] However, the study by Maria et al. (2021) found majority of their sample to be primiparous.[126] In our study, primiparous women were less compared to other international studies. Most international studies had higher proportion of primiparous women. In a study by Reck et al (2008) conducted in Germany, roughly 60% of the participants were found to have 2 children.[128] In the study by Hung et al (2011) conducted in Taiwan, roughly half the sample had one child, 40% of the sample had two children and the remaining 10% had between 3-5 children.[75] Similarly, a European study by Zivoder et al (2011) found that half of their sample was primiparous, and half was multiparous.[129] The lesser proportion of primiparous women in our study could be potentially due to lack of adequate family-planning practiced by couples-especially in lower socio-economic groups. This could lead to higher parity scores in our study participants. **(Table 2)**

Expected gender:

In our study, 40% mothers had a preference for male gender baby. Almost the same proportion had no preference for either gender. about 20% mothers reported a preference for a girl child. This data is somewhat similar to a study conducted in urban North India evaluating approximately 400 pregnant women, roughly 48% of whom indicated a gender preference (either personally, or from a family member), with about 57% expressing a preference for a male

child.[132] Comparing this data to another study from Taiwan, in which 23% of mothers reported preference for a boy, compared to 18% for a girl and roughly 59% of mothers had NIL gender preferences[75], it was found that preference for male child was higher in our study with lesser mothers reporting NIL gender preferences. The results in our study reflected the cultural norms prevalent in our society. **(Table 2)**

Maternal complications during pregnancy:

Two-thirds of mothers in this study had a healthy pregnancy with no complication detected. Remaining one-third reported presence of some pregnancy related complication. WHO states Maternal Mortality Ratio (as per the year 2000) to be 400 per 100,000 live births (worldwide).[133] Overall, 13 countries were found to be highest contributors to this figure, amongst which India is one.[134] Global estimates for maternal morbidity are still yet to be published by WHO. A study by Filippi et al. (2006) found that worldwide 1.4 million women suffer from acute obstetric morbidity (near-miss) events, while 9.5 million women face other complications.[135] One can assume that these figures will also be similarly high in India. An Indian study by Dadhwal et al. (2013) in which majority of the sample had no pregnancy related complications.[125] Another Indian study conducted in rural Rajasthan by Iyengar et al. (2012) report that roughly 50% of their sample had an uncomplicated pregnancy whereas the remaining 50% had some form of complication ranging from minor to major.[64] Remote location, minimal access to healthcare and poor socio-economic status are a few reasons stated by them as to why their participants had a much higher proportion of pregnancy-related complications. The lower rates of complications in our participants could be attributed to better healthcare facilities and greater overall awareness in

South Indian states when compared with North India. The study by Hung et al. (2011) found 4% of their participants suffered from complications during pregnancy, with 96% participants having a healthy pregnancy- possibly owing to superior healthcare received by their participants.[75] **(Table 2)**

Mode of delivery:

In our study 70% of participants gave birth via vaginal delivery whereas around 30% gave birth via Caesarean-section. A study by Gavvala N et al. (2024) conducted in Andhra Pradesh, India states that the prevalence of Caesarean section (C-section) deliveries in India has risen substantially.[136] Overall prevalence of caesarean section deliveries in India ranges from 14% to 47% (depending on the setup), with an average of roughly 21%. The National Family Health Survey (NFHS-5) conducted from 2019 to 2021 found that approximately 21.5% of all births were through C-sections.[127] This percentage differs notably between public and private healthcare sectors, with private hospitals reporting a 47.4% C-section rate compared to 14.3% in government hospitals. An Indian study by Dadhwal et al. (2013) reports that majority of their sample had given birth vaginally.[125] Another Indian study done by Iyengar et al. conducted in Rajasthan, India found only 2.5% of their sample to have undergone caesarean section delivery.[64] These lower figures could be owing to the rural setup and poorer availability of obstetric healthcare services. Hence, our results seem to fall well within the range of other Indian studies. Literature from Western countries had a higher proportion of vaginal deliveries. Caesarean section deliveries were only indicated in scenarios with severe complications in mother and baby. A study conducted in Croatia, found that 83.04% of their study participants gave birth vaginally whereas 16.96% had had a Caesarean section.[129] Hung et al. (2011) found that their

participants had higher incidence of caesarean-section deliveries (59%) whereas vaginal deliveries were less (41%).[75] **(Table 2)**

Neonatal complications:

Approximately three-fourths of our study participants gave birth to healthy babies with no neonatal complications whereas the remaining one -fourth of mothers reported presence of some complication in their newborn. India's neonatal mortality rate is 20 deaths per 1,000 live births, as per World Health Organization (WHO).[137] However, no official data is published regarding neonatal morbidity rates. An Indian study by Dadhwal et al. (2013) in which majority of the sample had no neonatal complications.[125] A study conducted at a tertiary care hospital in Rawalpindi found that amongst 3210 neonates, approximately 2000 had health-related complications- that is roughly 62%.[138] These figures were quite different from a study in Taiwan in which 96% of mothers reported that their newborn was born without any health problems.[75] Only 4% reported some health-related issues in their newborn. Numerous factors could explain this wide variation in figures- such as: access to good obstetric care, general awareness, antenatal screening of mothers, family history, genetic predisposition to various disorders, et cetera. **(Table 2)**

Neonatal hospital admissions:

About 23% of mothers gave history of hospital admissions for their baby whereas the remaining 76% had no neonatal hospital admissions. UNICEF India states that around roughly 10 lakh newborns are admitted each year to Special Newborn Care Units (SNCUs) throughout the nation, however data regarding incidence rates is unavailable.[139] The previously mentioned study in Rawalpindi (Hussain, 2014) found that amongst 2000 infants with complications, 790 required NICU admission for management of their complications- which amounts to approximately 40%.[138] **(Table 2)**

Breastfeeding:

In our study, the majority of mothers- i.e. 90% were exclusively breastfeeding their infant and the remaining 10% were not. Data from UNICEF and WHO reflects that worldwide, the exclusive breastfeeding rate for infants under six months is 48% as of 2023. This rate, which refers to feeding infants only breast milk for the first six months, varies by region. South Asia has the highest exclusive breastfeeding rate at 60%, whereas Northern America has the lowest at 26%.[139] Additionally, the initiation of breastfeeding within the first hour of birth, critical for newborn health, also differs by region: in Eastern and Southern Africa, 69% of newborns are breastfed within the first hour, compared to 39% in South Asia. The proportion of mothers exclusively breastfeeding in our study was found significantly higher to another study from Taiwan in which only 28% of mothers exclusively breastfed their babies compared to 11% who gave formula feeds.[75] 61% of mothers gave a combination of both. The higher proportion of breastfeeding mothers in our study could be owing to the fact that practicing breastfeeding is the

cultural norm in Indian society. Formula feeds are expensive and not always available in rural setups. **(Table 2)**

Prevalence and severity of anxiety in our study participants:

The average HAM-A score of participants in this study was found to be around 14, which is indicative of mild anxiety. Primary objective of this study was to determine the prevalence of post-partum anxiety in mothers. Our study found that majority of our participants, that is approximately 70% had HAM-A scores suggestive of mild severity of anxiety, whereas 20% had mild to moderate severity and 10% had moderate to severe anxiety. However, for all practical purposes it can be assumed that symptoms amounting to mild anxiety as per HAM-A may not be clinically significant, as the HAM-A scale lacks any criteria for baseline and borderline scores. Hence including mothers with only mild to moderate severity and moderate to severe anxiety, the prevalence rates of anxiety in our study participants estimated to be around 30%. During our literature review, it was found that there is a relative lack of studies in Indian subcontinent specifically analysing post-partum anxiety in mothers. Moreover, available data shows wide variation in post-partum anxiety prevalence rates ranging from 0.74% to 88%[125,126]. A study conducted in a rural south Karnataka district discovered that mild postpartum anxiety affected around 88% of their participants, while 10% experienced generalized anxiety, and roughly 2% experienced severe anxiety.[126] An Indian study conducted in urban Delhi estimated post-partum anxiety in their sample of around 40 women to be 17%.[140] A study done in in 28 villages of rural North India estimated community prevalence to be 0.74%.[125] These varying figures could be attributed to the different socio-demographic details of each study, different assessment tools, and different sample sizes of each study. However, data from Western literature was found

similar to our study. A meta-analysis and systematic review conducted by Dennis et al. in 2017- which analysed more than 2,00,000 women, hailing from more than 30 countries worldwide, found the incidence of anxiety disorders in the early half of postpartum phase to be around 20% and in the second half to be roughly 30%.[5] Overall global prevalence was estimated to be around 25%. They have also remarked that prevalence of anxiety disorders in high to middle-income countries has been found to be lower than low income countries. A German study reports prevalence of post-partum anxiety based on DSM IV diagnostic criteria to be 11% amongst a sample of around 1000 women.[128] A study by Fisher et al. (2012) states that the overall prevalence of postpartum anxiety (PPA) in low- and middle-income countries (LMICs), from 1 to 24 weeks after birth, is around 15%.[34] They reflect that actual figures are estimated to be much higher, especially in India. This is because there has been quite little research conducted in low- and middle-income countries to determine the actual prevalence of this disorder.[125] It should be noted that most of the data available currently seemed to focus on post-partum depression. However, considering the co-morbid nature of anxiety and depression there is a clear need for more studies focusing on maternal anxiety. Prevalence rates estimated from our study underscores the importance of implementing regular screenings for postpartum anxiety disorders. Increasing awareness about post-partum anxiety, amongst health professionals as well as the public, is the need of the hour. This is essential for preventive measures and early remedial actions for mothers. Our collective aim should be to ensure a smooth post-partum period for women as well as healthy development for their children. **(Table 3)**

TABLE 25: Studies assessing post-partum anxiety:

Authors of the study	Country of study	Prevalence
Maria et al. (2021)[126]	India	-Mild postpartum anxiety= 88.17%, Generalized anxiety=10%, Severe anxiety =1.3%.
Dadhwal et al. (2023)[125]	India	-Post-partum anxiety 0.74 %
Mina et al. (2012)[140]	India	-Post-partum anxiety 17%
Dennis et al. (2017)[5]	Systematic review and meta-analysis (worldwide)	Early post-partum phase= 17%-22% and late post-partum phase= 15%-33%.
Brockington et al (2006)[30]	Literature review (worldwide)	-New onset anxiety disorder in puerperium= 10%
Ali et al. (2018)[31]	Literature review from USA, Canada, Australia, UK, Germany	6.1% to 27.9% in first 6 months post-partum
Fisher et al. (2012)[34]	17 low- and lower-middle-income countries	Estimated prevalence= around 15%
Wenzel et al. (2001)[141]	USA	-panic attacks =11% , obsessions= 8%, compulsions=9%
Reck et al. (2008)[128]	Germany	-Post-partum anxiety 11.1%

Quality of sleep among the study participants:

Mean PSQI score of the participants in our study was 9.09- which is suggestive of impaired sleep. In our study, approximately 67% of mothers were found to have significant sleep disturbances whereas 33% reported good quality sleep. A study by Dorheim et al. (2009) found that around 60% of postpartum women report significant sleep disturbances.[142] Common issues include difficulty falling asleep, frequent night awakenings, and poor sleep quality. Data from the National Institute of Health (NIH), USA concurs with our study findings. They state that around 70% of women experience poor sleep quality during the postpartum period- most often due to the demands of infant care, hormonal fluctuations, and stress.[143] This data is also quite similar to that reported in a systematic review and meta-analysis by Yang et al (2020) which stated prevalence of poor sleep quality in post-natal women to be 67.2%.[144] However, these are higher compared to data from a cross-sectional study in Nepal which surveyed 380 women who were 2–12 months postpartum and found that merely 28% of them experienced poor sleep quality.[145] It should be of note that not much data is present assessing post-partum sleep, especially in third-world countries.[116,117] Our study hopes to shed some light on this crucial topic. Numerous studies have found significant associations between maternal sleep disturbances and risk for mood and anxiety disorders.[118,119,116]. Considering these high prevalence rates, clinicians should actively screen post-partum women for sleep disorders- especially in the first 3-6 months.

Efforts to develop a standard clinical tool for screening mothers for the same is also an essential need. Early detection and treatment for post-partum sleep disorders can significantly improve the quality of life for puerperal mothers and the levels of care that they can provide their infant. This could potentially help reduce maternal as well as infant morbidity in the long run. **(Table 4)**

TABLE 26: Studies assessing post-partum sleep:

Authors of the study	**Country of study**	**Result**
Dorheim et al. (2009)[142]	Norway	60% of post-partum women had impaired sleep.
Yang et al. (2020)[144]	Meta-analysis (worldwide)	67.2% of post-partum women had impaired sleep.
Khadka et al. (2019)[145]	Nepal	28% of post-partum women had impaired sleep.
Matsumoto et al. (2013)[100]	Japan	Early post-partum period associated with overall reduced sleep time and sleep efficiency.
Karacan et al. (1969)[99]	USA	Post-partum women had worse quality of sleep compared to pregnant and non-pregnant women.
Quillin (1997)[110]	USA	Total sleep in post-partum significantly reduced from other phases of pregnancy.
Yamazaki et al. (2005)[98]	Japan	Decrease in total sleep duration from last trimester to post-partum period.
Signal et al. (2007)[146]	New Zealand	Most severe sleep disturbances seen between 1-6 weeks post-partum.
Lee et al. (2000)[113]	USA	Post-partum sleep disturbances greatest in first month, especially in primiparous women.

Correlation between severity of anxiety with the quality of sleep of study participants:

This study found a significant strong positive correlation between Hamilton Anxiety severity scale scores and Pittsburgh Sleep Quality Index (r value=0.62, p=<0.001), indicating that higher anxiety levels are associated with poorer sleep quality in post-partum mothers. Poor sleep quality increases symptoms of depression and anxiety in postpartum women. Existing research shows a clear link between sleep disruption and psychiatric disorders. Sleep deprivation has significant association with negative mood and/or psychosis in postpartum women. For instance, insomnia has been identified as a prominent symptom of postpartum psychosis, anxiety, and depression, with prevalence estimates ranging from 42% to 80% of cases[30,147] A study by Calcagni et al. (2012) revealed that inadequate postpartum sleep (subjectively reported) contributed significantly to the increased frequency of anxiety symptoms.[148] In a study by Swanson et al. (2011), they discovered that women who scored above the threshold for postpartum insomnia symptoms had increased probability of having generalised anxiety symptoms.[147] However, most of the available data has investigated association between poor sleep and maternal depression. Very few studies have looked into post-partum anxiety and its relationship with sleep quality. A study from Nepal found significant association between post-partum depression and poor sleep in its participants.[145] Similar results were found in a study by Dorheim et al. (2009) which evaluated approximately 4000 post-partum women in Norway and found significant association between poor quality sleep and incidence of post-partum onset depression in their sample.[142] Rados et al. (2018) comments that post-partum depression has a high association with anxiety.[149] Frequently, both these conditions occur co-morbidly in mothers.[150] Keeping the same in mind, clinicians should frequently screen post-partum mothers with depression for anxiety as well as sleep disturbances. **(Table 7)**

Correlation between severity of anxiety with the age of study participants:

In our study, severity of anxiety experienced by the mother was found to be associated with maternal age. Mothers with higher age had a higher score on HAM-A scale, implying that higher maternal ages were associated with greater severity of anxiety. These results were similar to a few international studies. An Australian study was conducted in 2016 which analysed data from 2900 pregnancies.[166] Their study found that higher maternal age was linked to symptoms of depression, anxiety, and stress in young adult females. Another study from Spain reflected similar results- higher maternal ages corresponded with higher levels of anxiety.[167] **(Table 8)**

Correlation between severity of anxiety with the years of education of study participants:

In our study, severity of anxiety experienced by the mother did not seem to have any significant correlation with the number of years of education received. The literature assessing relation between education and anxiety is inconclusive. Some studies reported an association between anxiety and illiteracy[125,52] ; whereas some report higher levels of education as a risk factor for anxiety.[151] We also found few studies assessing post-partum depression with education levels. Three studies found that low education levels were associated with higher risk of post-partum stress and depression.[117,152,153] McConachie et al. (2008) found that early parenting stress was greater in mothers with higher education levels.[154] A higher maternal education level could be associated with greater maternal involvement with childcare and awareness, which could potentially lead to postpartum stress because of higher expectations regarding motherhood. **(Table 9)**

Association between severity of anxiety with occupation of study participants:

As per our study, mothers involved in skilled work were found to have higher severity of anxiety compared to the mothers working in semiskilled professions. Knauth & Vessey (2001) also reflected that in their study women who were employed had higher reported levels of anxiety compared to unemployed women, owing to work-place stress.[155] Nichols and Roux (2004) in their study state that "new mothers" frequently perceived re-entering the workforce unfavourably, as they encountered more difficulties and stress than they had anticipated.[156] In another study from rural Karnataka, no association was found between gainful employment and anxiety experienced. [126] A study from urban Delhi also found no association between these two factors.[140] Numerous studies have reflected that financial burden or low household income are frequently stated stressors by mothers with post-partum anxiety.[56,157] Awareness regarding the financial burden caused by costs for caring for a newborn, lack of maternity leave, or loss of pay may be potential reasons for higher anxiety. **(Table 10)**

Association between severity of anxiety with family history of psychiatric illness in study participants:

In our study, significant association was found between severity of maternal anxiety and corresponding history of psychiatric illness. Those with presence of family history were found to have higher severity of anxiety compared to their counterparts. As stated previously, not much data is available evaluating the relationship between these two factors. However, a study by Breitkopf et al. (2006) which found that family history played no role in emergence of anxiety

symptoms in pregnancy or post-partum.[60] A likely reason for our findings could be that women with a positive family history might be more genetically vulnerable to psychiatric illnesses. High care-giver burden in families where someone is already suffering from psychiatric illness in the family might make mothers more likely to suffer from higher levels of anxiety as compared to women with no family history. Further studies are needed assessing the association between these factors as family history plays a crucial role in the evolution of psychiatric illnesses. **(Table 11)**

Association between severity of anxiety with family support in study participants:

In our study, a significant association was found between family support and severity of anxiety. Mothers who perceived their family support to be lacking were found to have greater levels of anxiety compared to mothers who reported presence of adequate family support- for whom anxiety severity was the least. These findings were similar to other studies: Dadhwal et al., (2023) found that women who reported less social support, especially from their spouse- were more likely to have post-partum anxiety and depression.[125] Similarly, Hung et al (2005) found that in their study, women with the least social support (either family support or friend support) had the highest levels of postpartum stress.[32] The study recognized the presence of social support as a critical buffer for stressful life events and a major predictor of emotional and physical well-being. A similar study by Leahy-Warren (2007), found that first-time mothers reported informal social networks as their primary source of support in caring for their infants. Husbands or partners and the women's mothers (i.e. family members) were the people identified most frequently providing them with social support.[62] Zivoder et al. (2011) found that lowest or absent social support corresponded with highest severity of post-partum mental health issues overall in

mothers, followed by mothers who had some support reporting mild symptoms. Severe mental health issues were reported mostly by mothers with little- to-no social support.[129] However, as previously reported, our study has not used any formal tools to assess levels of social support. Hence, findings should be interpreted keeping the same in mind. **(Table 12)**

Association between severity of anxiety with maternal complications in study participants: In our study, 75% of mothers with moderate to severe anxiety had a history of pregnancy-related complications, followed next by mild to moderate anxiety (33%) and least complications were noted in mothers with mild anxiety (18%). A study from Nepal found higher degrees of maternal complications predisposed them to post-partum depression.[145] Wright et al. (2000) reported similar findings wherein they found that high obstetric risks appeared to negatively affect mood of mothers.[63] In a study done in 2001, Knauth & Vessey reported that women who had complications during pregnancy had a significantly higher level of postpartum stress than did their counterparts.[155] Healthcare providers should recognize the distress and anxiety many women and their families face due to adverse events and the pressures of caring for a newborn. Additionally, they should be aware of other life stressors that may intensify this distress and make appropriate mental health referrals.[130] **(Table 16)**

Association between severity of anxiety with neonatal complications:

Our study found significant association between severity of anxiety experienced by mothers and presence of neonatal complications. Mothers with moderate to severe anxiety were found to have

higher incidence of complications in their newborn (80%), followed next by mild to moderate anxiety (44%), least in mothers with mild anxiety (8%). Bener et al. (2013) reported that mothers with premature infants had higher risk of both anxiety and depression, almost 2-3 times more than mothers with healthy infants.[33] Not many studies have investigated the association between postpartum anxiety and neonatal complications, with most of them focusing on post-partum depression mainly. A study from Nepal however found no association of post-partum depression with presence of complications in the baby.[145] **(Table 17)**

Association between severity of anxiety with neonatal hospital admission:

Our study found significant association between severity of anxiety experienced by mothers and history of neonatal hospital admissions. Mothers with moderate to severe anxiety were found to have higher incidence of neonatal hospital admissions (77%), followed by mothers with mild to moderate anxiety (40%), and least in mothers with mild anxiety (6%). A study by Lefkowitz et al. (2010) conducted in USA examined parents of newborns admitted in Neonatal Intensive Care Unit of a hospital and found that almost 60-70% of parents suffered from significant stress and anxiety symptoms, with roughly 30% amongst them meeting the criteria of anxiety disorder. Up to 25% of mothers reported symptoms of post-traumatic stress disorder 1 month after discharge.[79] Similar results were reported in other studies as well.[158,159] Common stressors reported by post-partum mothers of infants with complications state that when a pregnancy ends suddenly and the newborn requires immediate NICU care, the mother faces challenges in forming a bond with her baby. This separation can hinder the mother's emotional readiness and delay the development of her maternal identity. [160] Although she has a strong yearning to be

close to her infant, she must prioritize the baby's need for critical medical attention from healthcare professionals .[161] This situation often leaves her feeling like an outsider, unable to make decisions about her child's care and with limited chances to interact with her baby.[162] Keeping this in mind, clinicians should routinely screen parents, especially mothers, of infants admitted in intensive care units for depression and anxiety. **(Table 18)**

Association between severity of anxiety with preferred gender:

In our study, no significant relationship was found between delivering baby opposite to expected gender and severity of maternal anxiety. However, a study by Hung et al (2011) found that women who preferred a boy baby had a higher level of postpartum stress than women who preferred a girl baby, possibly owing to the societal pressures to give birth to a male-child. [75] Similar findings were reported by a study in Nepal which found that mothers with a preference for male baby had a higher risk of anxiety.[145] It is possible that in our study, participants might have under-reported their preference for a male child owing to fear of judgement and gave socially acceptable answers instead, leading to different results. **(Table 12)**

Association between severity of anxiety with parity/living children:

In our study, no significant association was found between parity (number of children) and severity of anxiety. Dadhwal et al. (2023) found a higher prevalence of anxiety disorder amongst primiparous women compared to multiparous women in their study.[125] Zivoder et al. (2011) found that women were more susceptible during first and second childbirth to post-partum depression and psychosis.[129] However, parity did not seem to affect post-partum stress

experienced by the mothers. These results differed from a few other studies. Hung et al. (2011) found that women who had given birth to their first child (i.e. parity: one) had significantly higher postpartum stress levels than mothers with prior experience of childbirth and more than one child.[75] Krieg (2007) also similarly found that first time mothers reported greater stress during the transition to motherhood, whereas second-time mothers' reports were relatively stable.[74] A potential explanation for the results seen in our study could be that in Indian culture, pregnant women (especially primiparous) often stay at their maternal home for a few months before and after delivery. During this time, mothers are adequately cared for and looked after well by their parents and relatives. They often receive sufficient help with neonatal care as well. This might mitigate their anxiety and explain the lack of higher stress levels in primiparous women of our study. **(Table 13)**

Association between severity of anxiety with breastfeeding:

In our study, severity of anxiety seemed to negatively impact breastfeeding practised by mothers. Those with moderate to severe anxiety were less likely to breastfeed their infant compared to those with mild severity of anxiety. Literature states breastfeeding is thought to be protective against maternal stress. However, this relation can be bidirectional. Complications following delivery or increased stress during this period might affect lactation. Consequently, mothers might opt for formula-feeds over breastfeeding their infants. On other hand, mothers who have difficulties in lactation might feel more stressed and anxious regarding the same- leading to further impairment of milk supply. In India, breastfeeding is usually the norm. Inability of a mother to do so might be accompanied by feelings of guilt and agony. In a systematic review by

Hoff et al (2019), it was indicated that postpartum anxiety negatively affects the initiation, duration, and exclusivity of breastfeeding.[163] A Canadian study by Adedinsewo et al. (2013) found that early postpartum maternal anxiety is linked to lower chances of exclusive breastfeeding at 6 months and any breastfeeding at 12 months.[164] In a study by Hung et al. (2007), women who were breastfeeding had significantly higher post-partum stress than women who formula fed their infants.[76] A South Indian study also states that anxious mothers are more likely to prematurely stop breastfeeding, which affects the baby's growth and development.[126] **(Table 19)**

Association between quality of sleep with mode of delivery:

As per our study, women who delivered via caesarean section were found to have poorer sleep quality compared to their counterparts who delivered vaginally. A study conducted by Ryali et al (2023) in a rural tertiary care hospital in South India found that quality of sleep in new mothers was significantly poor following caesarean section delivery as compared to those who underwent vaginal deliveries.[165] Possible reasons for this might be the delayed healing time and prolonged recovery time for women who underwent Caesarean-section deliveries. Any indications for the Caesarean-section- like obstetric complications, might further add to the stress and anxiety experienced by the mother. Soderquist et al (2002) have also reflected that stress symptoms were highest amongst women following emergency caesarean section delivery and instrumental or assisted vaginal deliveries.[66] A selective review by Hunter et al. (2009) found post-partum women who underwent caesarean section deliveries reported disturbed sleep most frequently.[10] However, another study by Vogl et al. (2006) conducted in Austria found lowest rates of anxiety in mothers who had undergone elective caesarean section deliveries.[67] Their study states that elective caesarean sections overall are more "predictable" and less traumatic than vaginal

deliveries and emergency caesarean sections. Our study did not account for the type of caesarean section, that is- emergency or elective. Therefore, our findings need to be interpreted keeping the same in mind. **(Table 20)**

Association between quality of sleep with maternal complications:

As per our study, women who reported presence of pregnancy related complications were found to have poorer sleep quality, compared to their counterparts who had a healthy pregnancy. Higher maternal complications were associated with poorer quality of sleep. Similar findings were reflected in the study conducted by Khadka et al. (2019) in Nepal.[145] Their study also found significant association between poor sleep quality and maternal complications. **(Table 21)**

Association between quality of sleep with neonatal complications:

Our study found a significant relationship between quality of sleep experienced by mothers with presence of neonatal complications. Although not much literature could be found comparing these two factors, it is quite likely that mothers caring for infants with complications will have poorer sleep owing to increased demands of care, hyper-vigilance and stress. Study by Khadka et al. (2019) also found that neonatal complications significantly impair sleep quality in mothers.[145] **(Table 22)**

Association between quality of sleep with neonatal hospital admissions:

Our study found a significant relationship between quality of sleep experienced by mothers with history of neonatal hospital admissions. Mothers whose neonates had a history of hospital admission reported significantly poorer sleep as compared to mothers with healthy infants. These results were similar to an American study by Lefkowitz et al. (2010) evaluated stress and anxiety disorders in parents of infants admitted in intensive care units and found up to two-thirds of parents had significant levels of anxiety.[79] Considering this data, it is likely that parents of infants will also have significantly disrupted sleep too. **(Table 23)**

Association between quality of sleep with breastfeeding:

It is probably expected that breastfeeding mothers would have greater incidence of impaired sleep quality compared to their counterparts, however in our study no significant association was found between quality of sleep and breastfeeding. One possible explanation for this could be that formula fed infants also required similar nighttime feeds, leading to possibly similar levels of impaired sleep in both groups of mothers. Data assessing breastfeeding practice and quality of sleep of mothers is sparse and conflicting. A study by Quillin (1997) concluded that breastfeeding mothers reported poorer sleep quality compared to mothers who bottle fed their infants.[96] However, Doan et al. (2014) found that breastfeeding mothers had greater sleep compared to non-breastfeeding women.[112] Further research is needed regarding this since breastfeeding is a crucial aspect of the post-partum period and a significant factor in the quality of sleep of new mothers. **(Table 23)**

CONCLUSION

Approximately one-third of the participants in our study exhibited moderate to severe anxiety. Around 65% of mothers experienced notable sleep disturbances. Higher levels of anxiety were associated with significant sleep issues, higher maternal age, skilled occupations, presence of family history of psychiatric illness, poor family support, caesarean-section deliveries, breastfeeding, history of maternal and neonatal complications, and neonatal hospital admissions. Likewise, poorer sleep quality was linked to higher anxiety score, caesarean section deliveries, history of maternal and neonatal complications, and neonatal hospital admissions.

STRENGTHS

Our study is one of the few studies, especially in India, assessing post-partum anxiety. Most of the studies published till date focus on post-partum depression, with very few assessing solely for anxiety. A similar lack of Indian literature was observed assessing maternal quality of sleep. Studies assessing anxiety with quality of sleep were even lesser, with the exception of one study from rural North India. This study hopes to provide some insight regarding these issues. Sample size for our study was adequate and calculated based on estimated worldwide prevalence rates. Our study also has analysed association of anxiety with other variables such as breastfeeding, neonatal and maternal complications, etc.- which were found to have a significant association with severity of maternal anxiety.

LIMITATIONS

Our research has a few limitations that must be acknowledged when considering the results. Most of our study sample was restricted to patients visiting a tertiary care hospital, hence this data may not be generalizable to a larger population. We have mentioned previously that the scale used in our study to assess anxiety: Hamilton Anxiety Scale- has no baseline scores. As a result, subjects reporting even with low or subthreshold symptoms may be misinterpreted as having mild anxiety. Scale used to assess sleep quality (PSQI) has not yet been validated officially for use in post-partum or pregnant women. For a few variables (such as, social or family support), no standardized tool was applied to collect the data. We also could not avail of data relating to any ongoing stressors (marital, familial, financial; et cetera) in the participants' lives- in view of shortage of interview time. Presence of these stressors could have confounded our results.

SUMMARY

Post-partum period is a crucial time for mothers during which physical and mental health issues frequently arise. If left unchecked, these can significantly impair mothers' quality of life as well as affect quality of care given to neonates. Apart from depression, anxiety disorders are also frequently seen to arise during this time. Worldwide prevalence rates range from 5% to 33%. With this background in mind, we decided to conduct a study to assess anxiety and sleep quality in post-partum mothers and examine various factors which may affect these variables.

This was an observational study conducted in the Department of Psychiatry,
KLES Prabhakar Kore Hospital and MRC. 256 mothers visiting Well-Baby Clinic and Immunization Clinic in Paediatrics OPD within 3 months of post-partum, who did not have any psychiatric or serious medical co-morbidities were assessed. Hamilton Anxiety Scale was applied to rate the severity of anxiety experienced and Pittsburgh Sleep Quality Index was applied to assess quality of sleep.

It was seen that mean age of our study participants was 27.34 ± 2.44 years, with 7.27 ± 5.50 mean years of education. Majority of the mothers (94.53%) were semi-skilled workers (mostly housewives), multiparous. A small proportion of patients had significant family history of psychiatric illness (22.27%), history of pregnancy-related complications (27.34%), neonatal complications (23.05%) and neonatal hospital admission (20.31%).

Prevalence of moderate to severe anxiety was found to be 30.47%. Severity of anxiety was found to be higher in those with older age, skilled occupation, lack of family support, caesarean delivery, impaired sleep quality, breastfeeding, pregnancy related complications, neonatal complications, and presence of neonatal hospital admissions.

Impaired sleep was seen in 66.8% of participants. Poorer sleep quality was associated with presence of caesarean section delivery, pregnancy related complications, neonatal complications, and presence of neonatal hospital admissions.

The results of this study indicate that, it is vital for the health-providers to routinely screen mothers for anxiety, especially in the presence of depressive symptoms along with the above identified risk factors such as- family history of psychiatric illness, inadequate family support, maternal and neonatal complications, neonatal hospital admissions etc. Addressing these issues early might mitigate unfavourable future outcomes and help improve the overall experience of motherhood, as well as aid in providing better infant care to mothers.

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ANNEXURE I

INFORMED CONSENT

"ASSESSMENT OF ANXIETY AND QUALITY OF SLEEP IN POST-PARTUM MOTHERS: A ONE YEAR CROSS-SECTIONAL HOSPITAL BASED DESCRIPTIVE STUDY"

PRINCIPAL INVESTIGATOR (PI): REGISTRATION NO: **BQ0121003**

Dear Mr./Mrs./Dr., you are kindly requested to enrol yourself in our research study. You have been requested to participate in this as you fit into the laid-out criteria for a study 'subject'/ participant. Your participation in study is voluntary. During the study you will be undergoing an interview session. Your decision whether or not to participate in the study will not affect your treatment in any form. If you decide to participate you are free to withdraw at any time.

PURPOSE OF THE STUDY: To assess for anxiety amongst post-partum mothers and to evaluate their quality of sleep within 3 months of childbirth.

PROCEDURES INVOLVED: If you agree to enrol yourself in our study, a separate proforma which is specially designed will be given to you. Socio-demographic details, obstetric and medical details of you and your baby would be collected. Proforma will also include questions

regarding your pregnancy. You would also be subjected to a mental status examination. If you meet the inclusion criteria and do not fall under the exclusion criteria we will proceed further.

You would then be subjected to HAM-A (Hamilton Anxiety Scale) and a PSQI questionnaire (Pittsburgh Sleep Quality Index). Overall, the collection of this data and application of these questionnaires will take about 45 minutes to an hour.

RISKS AND BENEFITS: There are no potential risks involved in this study. Benefits: By taking part in this study, participants can be screened and evaluated for anxiety and sleep disturbances. Early identification and effective management of postpartum anxiety would have a beneficial overall impact and minimize potential negative effects for mother and baby by enabling appropriate treatment and monitoring. This data can also be utilized to screen for and give proper treatment and therapy to mothers in distress.

ALTERNATIVES: Your decision regarding participation in study will not change present or future health care services offered to you at KLES Dr. Prabhakar Kore Hospital and Medical Research Centre, Belagavi. You would simply be excluded from the study if you wish to, and all your details shall be kept confidential.

PRIVACY AND CONFIDENTIALITY: All data collected or disclosed by you during the course of participation of study, will be kept fully confidential. If, however, during the course it becomes necessary for the progress of the course to disclose the identity, it would be done so only after your informed & written consent. The only people to know that you are a research subject are members of the research team. No information about you will be disclosed to other without your written permission except: In emergency to protect your rights and welfare or if required by law.

INSTITUTIONAL/SPONSERS POLICY: Not applicable to this research.

FINANCIAL INCENTIVES FOR PARTICIPATION: No additional costs shall be incurred upon you for the purpose of this study. It is purely being done with the idea of research and all the cost of study will be borne by the investigator. There will not be any remuneration, reimbursement, compensation or free medical care.

VOLUNTARY PARTICIPATION / WITHDRAWAL FROM THE STUDY: Taking part in the study is voluntary. You may choose not to enrol yourself in this study and may choose to leave the study anytime in between.

AUTHORIZATION TO PUBLISH RESULT: The results of the study may be used to publish an article. When the results of research published or discussed, in a conference, no information will be displayed that would disclose your identity. Any information obtained in connection with this study and that can be identified with you will remain confidential.

QUESTIONS/CONTACT DETAILS: You shall be free to contact the below mentioned name & addresses anytime during the study period for any clarification or help as you may desire for.

In case of the queries during study or in future you may contact following- Dr. Harsha Hegde, Chairperson, J.N.M.C Ethical Committee for Human Research, 9480422500

STATEMENT OF CONSENT

I.D.NO: | | | |

I Ms./Mrs/Dr. ---------- volunteer and consent to participate in this study. I have read the consent document, or it has been read to me in my vernacular language. I accept to participate in the study. All the information regarding this study is provided to me and I have understood the same. I have been given the opportunity to ask questions and obtain appropriate answers.

Participant's name:

Signature or left thumb print of participant:

Witness name:

Signature of witness:

Signature of the investigator:

Date: | | | |

ANNEXURE II

PROFORMA:

1. Age:
2. Occupation: unskilled/ semiskilled (including house-wife)/skilled
3. Total years of education:
4. Planned pregnancy: yes/ no
5. Term of pregnancy: preterm/ term/ post-term
6. Mode of Delivery: vaginal / C-section
7. Obstetric score: P/ L/ A/ G
8. Peri-partum/ post-partum complications: yes/no
    a. -if yes, details:
9. Neonatal complications: yes/ no
    a. -if yes, details:
10. Neonatal hospital admission/ requirement of specialized care: yes/no
    a. -If yes, reason/diagnosis:
11. Breast-feeding: yes/no
12. Expected gender: male/ female
13. Actual gender of baby: male/ female
14. Family history of psychiatric disorder: Yes/No
15. Adequate family support: yes/ no
16. Tobacco consumption

17. HAM-A score

18. Duration of symptoms

19. PSQI score

20. Duration of sleep disturbances

ANNEXURE III:

TOOLS

Hamilton Anxiety Rating Scale (HAM-A)

Reference: **Hamilton M. The assessment of anxiety states by rating. Br J Med Psychol 1959; 32:50–55.**

Rating Clinician-rated

Administration time 10–15 minutes

Main purpose To assess the severity of symptoms of anxiety

Population Adults, adolescents and children

Commentary

The HAM-A was one of the first rating scales developed to measure the severity of anxiety symptoms, and is still widely used today in both clinical and research settings. The scale consists of 14 items, each defined by a series of symptoms, and measures both psychic anxiety (mental agitation and psychological distress) and somatic anxiety (physical complaints related to anxiety). Although the HAM-A remains widely used as an outcome measure in clinical trials, it has been criticized for its sometimes poor ability to discriminate between anxiolytic and antidepressant effects, and somatic anxiety versus somatic side effects. The HAM-A does not provide any standardized probe questions. Despite this, the reported levels of inter-rater reliability for the scale appear to be acceptable.

Scoring

Each item is scored on a scale of 0 (not present) to 4 (severe), with a total score range of 0–56, where <17 indicates mild severity, 18–24 mild to moderate severity and 25–30 moderate to severe.

Versions

The scale has been translated into: Cantonese for China, French and Spanish. An IVR version of the scale is available from Healthcare Technology Systems.

Additional references

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Address for correspondence

The HAM-A is in the public domain.

Hamilton Anxiety Rating Scale (HAM-A)

Below is a list of phrases that describe certain feeling that people have. Rate the patients by finding the answer which best describes the extent to which he/she has these conditions. Select one of the five responses for each of the fourteen questions.

0 = Not present, 1 = Mild, 2 = Moderate, 3 = Severe, 4 = Very severe.

1 Anxious mood [0] [1] [2] [3] [4]

Worries, anticipation of the worst, fearful anticipation, irritability.

2 Tension [0] [1] [2] [3] [4]

Feelings of tension, fatigability, startle response, moved to tears easily, trembling, feelings of restlessness, inability to relax.

3 Fears [0] [1] [2] [3] [4]

Of dark, of strangers, of being left alone, of animals, of traffic, of crowds.

4 Insomnia [0] [1] [2] [3] [4]

Difficulty in falling asleep, broken sleep, unsatisfying sleep and fatigue on waking, dreams, nightmares, night terrors.

5 Intellectual [0] [1] [2] [3] [4]

Difficulty in concentration, poor memory.

6 Depressed mood [0] [1] [2] [3] [4]

Loss of interest, lack of pleasure in hobbies, depression, early waking, diurnal swing.

7 Somatic (muscular) [0] [1] [2] [3] [4]

Pains and aches, twitching, stiffness, myoclonic jerks, grinding of teeth, unsteady voice, increased muscular tone.

8 Somatic (sensory) [0] [1] [2] [3] [4]

Tinnitus, blurring of vision, hot and cold flushes, feelings of weakness, pricking sensation.

9 Cardiovascular symptoms [0] [1] [2] [3] [4]

Tachycardia, palpitations, pain in chest, throbbing of vessels, fainting feelings, missing beat.

10 Respiratory symptoms [0] [1] [2] [3] [4]

Pressure or constriction in chest, choking feelings, sighing, dyspnea.

11 Gastrointestinal symptoms [0] [1] [2] [3] [4]

Difficulty in swallowing, wind abdominal pain, burning sensations, abdominal fullness, nausea, vomiting, borborygmi, looseness of bowels, loss of weight, constipation.

12 Genitourinary symptoms [0] [1] [2] [3] [4]

Frequency of micturition, urgency of micturition, amenorrhea, menorrhagia, development of frigidity, premature ejaculation, loss of libido, impotence.

13 Autonomic symptoms [0] [1] [2] [3] [4]

Dry mouth, flushing, pallor, tendency to sweat, giddiness, tension headache, raising of hair.

14 Behavior at interview [0] [1] [2] [3] [4]

Fidgeting, restlessness or pacing, tremor of hands, furrowed brow, strained face, sighing or rapid respiration, facial pallor, swallowing, etc.

Pittsburgh Sleep Quality Index (PSQI)

Instructions: The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. **Please answer all questions.**

1. During the past month, what time have you usually gone to bed at night? _____
2. During the past month, how long (in minutes) has it usually taken you to fall asleep each night? _____
3. During the past month, what time have you usually gotten up in the morning? _____
4. During the past month, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spent in bed.) _____

5. During the past month, how often have you had trouble sleeping because you…	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
a. Cannot get to sleep within 30 minutes				
b. Wake up in the middle of the night or early morning				
c. Have to get up to use the bathroom				
d. Cannot breathe comfortably				
e. Cough or snore loudly				
f. Feel too cold				
g. Feel too hot				
h. Have bad dreams				
i. Have pain				
j. Other reason(s), please describe:				
6. During the past month, how often have you taken medicine to help you sleep (prescribed or "over the counter")?				
7. During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?				
	No problem at all	Only a very slight problem	Somewhat of a problem	A very big problem
8. During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?				
	Very good	Fairly good	Fairly bad	Very bad
9. During the past month, how would you rate your sleep quality overall?				

	No bed partner or room mate	Partner/room mate in other room	Partner in same room but not same bed	Partner in same bed
10. Do you have a bed partner or room mate?				
	Not during the past month	Less than once a week	Once or twice a week	Three or more times a week
If you have a room mate or bed partner, ask him/her how often in the past month you have had:				
a. Loud snoring				
b. Long pauses between breaths while asleep				
c. Legs twitching or jerking while you sleep				
d. Episodes of disorientation or confusion during sleep				
e. Other restlessness while you sleep, please describe:				

Scoring the PSQI

The order of the PSQI items has been modified from the original order in order to fit the first 9 items (which are the only items that contribute to the total score) on a single page. Item 10, which is the second page of the scale, does not contribute to the PSQI score.

In scoring the PSQI, seven component scores are derived, each scored 0 (no difficulty) to 3 (severe difficulty). The component scores are summed to produce a global score (range 0 to 21). Higher scores indicate worse sleep quality.

Component 1: Subjective sleep quality—question 9

Response to Q9	Component 1 score
Very good	0
Fairly good	1
Fairly bad	2
Very bad	3

Component 1 score:_____

Component 2: Sleep latency—questions 2 and 5a

Response to Q2	Component 2/Q2 subscore
≤ 15 minutes	0
16-30 minutes	1
31-60 minutes	2
> 60 minutes	3

Response to Q5a	Component 2/Q5a subscore
Not during past month	0
Less than once a week	1
Once or twice a week	2
Three or more times a week	3

Sum of Q2 and Q5a subscores	Component 2 score
0	0
1-2	1
3-4	2
5-6	3

Component 2 score:_____

Component 3: Sleep duration—question 4

Response to Q4	Component 3 score
> 7 hours	0
6-7 hours	1
5-6 hours	2
< 5 hours	3

Component 3 score:_____

Component 4: Sleep efficiency—questions 1, 3, and 4

Sleep efficiency = (# hours slept/# hours in bed) X 100%

hours slept—question 4

hours in bed—calculated from responses to questions 1 and 3

Sleep efficiency	Component 4 score
> 85%	0
75-84%	1
65-74%	2
< 65%	3

Component 4 score:_____

Component 5: Sleep disturbance—questions 5b-5j

Questions 5b to 5j should be scored as follows:

Not during past month	0
Less than once a week	1
Once or twice a week	2
Three or more times a week	3

Sum of 5b to 5j scores	Component 5 score
0	0
1-9	1
10-18	2
19-27	3

Component 5 score:_____

Component 6: Use of sleep medication—question 6

Response to Q6	Component 6 score
Not during past month	0
Less than once a week	1
Once or twice a week	2
Three or more times a week	3

Component 6 score:_____

Component 7: Daytime dysfunction—questions 7 and 8

Response to Q7	Component 7/Q7 subscore
Not during past month	0
Less than once a week	1
Once or twice a week	2
Three or more times a week	3

Response to Q8	Component 7/Q8 subscore
No problem at all	0
Only a very slight problem	1
Somewhat of a problem	2
A very big problem	3

Sum of Q7 and Q8 subscores	Component 7 score
0	0
1-2	1
3-4	2
5-6	3

Component 7 score:_____

Global PSQI Score: Sum of seven component scores:_____

Citation: Buysse, DJ, Reynolds CF, Monk TH, Berman SR, Kupfer DJ: The Pittsburgh Sleep Quality Index (PSQI): A new instrument for psychiatric research and practice. Psychiatry Research 28:193-213, 1989

serial no.	age	total yrs of education	occupation	planned preg	preterm/term/post term	mode of delivery	gravida	para	living	abortions	maternal complications	neonatal complications	neonate hosp admission	breastfeeding	expected gender	actual gender	expected gender delivered	Family history of psychiatric illness	adequate family support	substance use	HAM A	duration of anxiety symptoms	psqi	type of sleep disturbances	duration of sleep disturbances
1	28	10	semiskilled	no	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	male	yes	no	yes	nil	5	3 weeks	7	intermittent awakening	4 months
2	31	0	semiskilled	no	term	Csection	2	2	2	0	gestational diabetes	nil	nil	yes	male	female	no	yes	no	nil	20	4 months	15	delayed onset, intermittent awakening,	3 months
3	27	0	semiskilled	no	term	normal vaginal	2	2	2	0	nil	neonatal jaundice	yes	yes	male	male	yes	no	no	nil	18	1 month	14	intermittent awakening, early awakening	5 months
4	25	0	semiskilled	no	preterm	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	male	no	no	yes	nil	8	2 month	5		n/a
5	31	7	semiskilled	no	term	Csection	2	2	2	0	gestational diabetes	respiratory distress	yes	No	none	male	not applicable	yes	no	nil	26	5 month	19	delayed onset, intermittent awakening, early a	8 months
6	26	4	semiskilled	no	term	Csection	2	2	2	0	nil	nil	nil	yes	none	male	not applicable	no	no	nil	19	2 month	13	intermittent awakening, early awakening	3 months
7	31	14	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	female	female	yes	yes	yes	nil	11	6 month	6	intermittent awakening, early awakening	n/a
8	28	8	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	male	yes	no	yes	nil	10	3 weeks	9	intermittent awakening, early awakening	2months
9	25	7	semiskilled	yes	preterm	Csection	1	1	1	0	malposition	neonatal jaundice, hypoglycemi	yes	yes	male	male	yes	yes	no	nil	21	2 month	18	intermittent awakening, early awakening	5 months
10	30	12	semiskilled	no	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	female	female	yes	no	yes	nil	8	3 month	3		
11	29	7	semiskilled	yes	term	normal vaginal	3	2	2	1	nil	nil	nil	yes	male	male	yes	no	yes	nil	6	1 month	8	intermittent awakening	1 month
12	31	0	semiskilled	yes	term	Csection	2	2	2	0	nil	neonatal jaundice	yes	yes	male	female	no	yes	no	nil	24	4 months	14	intermittent awakening, early awakening	2 months
13	30	9	semiskilled	no	term	Csection	3	3	3	0	perineal trauma	cephalohaematoma	nil	yes	none	female	n/a	yes	no	nil	26	2 month	13	intermittent awakening	3 months
14	27	5	semiskilled	yes	term	normal vaginal	1	1	1	0	nil	nil	nil	yes	none	female	n/a	no	yes	nil	5	1 month	3		
15	29	9	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	male	n/a	no	yes	nil	9	4 weeks	6	intermittent awakening	
16	31	17	skilled	no	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	male	yes	yes	no	nil	20	3 months	11	intermittent awakening	5 months
17	27	17	semiskilled	yes	term	Csection	3	3	3	0	pre eclampsia	nil	nil	yes	male	female	no	yes	no	nil	23	4 months	16	delayed onset, intermittent awakening,	2 months
18	25	10	semiskilled	no	term	normal vaginal	1	1	1	0	nil	nil	nil	yes	male	female	no	no	no	nil	17	2 months	17	delayed onset, intermittent awakening,	1 months
19	27	5	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	female	no	no	no	nil	14	5 months	12	intermittent awakening, early awakening	3 months
20	28	17	skilled	yes	term	normal vaginal	2	1	1	1	nil	nil	nil	yes	male	male	yes	no	yes	nil	16	3 months	13	intermittent awakening, early awakening	2months
21	27	0	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	female	no	no	yes	nil	13	1 month	18	delayed onset, intermittent awakening,	4 months
22	28	11	semiskilled	yes	term	Csection	2	2	2	0	nil	nil	nil	yes	none	female	n/a	yes	no	nil	19	4 month	7	intermittent awakening	1 months
23	29	10	semiskilled	yes	term	normal vaginal	4	3	3	1	nil	nil	nil	yes	male	male	yes	no	yes	nil	5	3 weeks	5		
24	26	0	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	male	yes	no	yes	nil	13	2 month	5		
25	30	0	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	female	n/a	no	yes	nil	12	1month	4		
26	28	19	skilled	yes	term	normal vaginal	2	2	2	0	obstructed labour	cephalhaematoma	nil	yes	female	male	no	yes	no	nil	20	3 month	15	intermittent awakening, early awakening	2 months
27	25	8	semiskilled	no	term	normal vaginal	1	1	1	0	nil	nil	nil	yes	male	female	no	no	yes	nil	5	2 weeks	3		
28	26	17	skilled	yes	term	normal vaginal	1	1	1	0	nil	nil	nil	yes	male	male	yes	no	yes	nil	11	4 weeks	5		
29	29	5	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	neonatal jaundice	yes	yes	male	female	no	yes	no	nil	25	2 month	16	intermittent awakening, early awakening	2 months
30	26	0	semiskilled	yes	term	normal vaginal	3	2	2	1	nil	nil	nil	yes	male	female	no	no	yes	nil	12	2 month	14	intermittent awakening, early awakening	3 months
31	30	11	semiskilled	yes	term	normal vaginal	2	2	2	0	perineal trauma	nil	nil	yes	none	female	n/a	no	yes	nil	13	3 month	11	delayed onset, intermittent awakening, early a	8 months
32	28	11	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	female	no	no	no	nil	16	4 month	8	intermittent awakening, early awakening	3 months
33	26	7	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	male	yes	no	yes	nil	11	5 month	9	delayed onset, intermittent awakening,	2 months
34	23	0	semiskilled	yes	term	normal vaginal	1	1	1	0	perineal trauma	nil	nil	yes	none	female	n/a	no	yes	nil	9	1 month	4		
35	26	0	semiskilled	yes	term	normal vaginal	1	1	1	0	nil	nil	nil	yes	none	male	n/a	no	yes	nil	8	3 weeks	6	intermittent awakening	
36	28	6	semiskilled	yes	term	Csection	2	2	2	0	obstructed labour	shoulder dystocia	yes	yes	male	female	no	yes	no	nil	27	4 month	12	intermittent awakening, early awakening	1 months
37	25	9	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	male	yes	no	yes	nil	7	1 month	6	intermittent awakening	
38	31	17	semiskilled	yes	term	Csection	2	2	2	0	pre eclampsia	nil	nil	yes	female	female	yes	yes	no	nil	26	2 month	17	intermittent awakening, early awakening	5 months
39	31	8	semiskilled	yes	term	normal vaginal	4	4	4	0	nil	neonatal jaundice	yes	yes	male	male	yes	yes	yes	nil	5	1 month	8	intermittent awakening	1 months
40	24	6	semiskilled	yes	term	normal vaginal	1	1	1	0	nil	nil	nil	yes	male	male	yes	no	yes	nil	7	3 weeks	5		
41	29	12	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	no	none	female	n/a	no	yes	nil	13	2 month	9	intermittent awakening	1 months
42	31	0	semiskilled	no	term	normal vaginal	3	3	3	0	nil	nil	nil	yes	male	male	yes	no	no	nil	17	1 month	8	intermittent awakening	3 months
43	27	6	semiskilled	yes	term	normal vaginal	2	2	2	0	perineal trauma	nil	nil	yes	male	female	no	yes	no	nil	19	4 weeks	7	intermittent awakening	2 months
44	29	12	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	neonatal jaundice	yes	yes	none	female	n/a	no	yes	nil	13	1 month	6	intermittent awakening	
45	25	11	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	no	male	female	no	no	yes	nil	12	2 months	4		
46	31	0	semiskilled	yes	term	normal vaginal	3	3	3	0	pre eclampsia	nil	nil	yes	male	female	no	yes	no	nil	22	4 months	12	intermittent awakening, early awakening	8 months
47	28	17	semiskilled	yes	term	Csection	2	2	2	0	nil	neonatal jaundice	yes	yes	none	male	n/a	no	no	nil	21	2 months	11	intermittent awakening, early awakening	2 months
48	26	7	semiskilled	yes	term	normal vaginal	2	2	2	0	perineal trauma	nil	nil	yes	male	male	yes	no	yes	nil	14	1 month	9	intermittent awakening	3 months
49	28	7	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	male	n/a	no	yes	nil	12	2 months	6	intermittent awakening	

50	29	0	semiskilled	yes	term	Csection	2	1	1	1	nil	hypoglycemia	yes	yes	none	male	n/a	yes	no	nil	26	3 months	15	intermittent awakening, early awakening	4 months
51	25	7	semiskilled	no	term	normal vaginal	1	1	1	0	nil	nil	nil	yes	male	male	yes	yes	yes	nil	7	1 month	4	delayed onset, intermittent awakening,	
52	24	5	semiskilled	yes	term	normal vaginal	1	1	1	0	anemia	nil	nil	yes	none	male	n/a	no	yes	nil	9	2 months	7	intermittent awakening, early awakening	2 months
53	29	7	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	female	female	yes	no	yes	nil	5	1 month	3		
54	27	0	semiskilled	no	term	normal vaginal	2	2	2	0	nil	neonatal jaundice	yes	yes	male	female	n/a	no	yes	nil	13	3 months	8	intermittent awakening, early awakening	
55	31	0	semiskilled	yes	term	normal vaginal	3	3	3	0	nil	nil	nil	yes	male	female	n/a	no	yes	nil	21	3 month	14	intermittent awakening, early awakening	2 months
56	30	12	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	male	yes	no	yes	nil	14	2 months	11	intermittent awakening	3 months
57	25	0	semiskilled	yes	term	Csection	2	2	2	0	obstructed labour	shoulder dystocia	yes	yes	male	female	n/a	yes	no	nil	22	3 months	12	intermittent awakening	7 months
58	28	8	semiskilled	yes	term	normal vaginal	1	1	1	0	nil	nil	nil	yes	male	female	n/a	no	yes	nil	17	1 month	13	intermittent awakening	1 months
59	27	10	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	male	n/a	no	yes	nil	16	2 months	8	intermittent awakening, early awakening	2 months
60	23	0	semiskilled	yes	term	normal vaginal	1	1	1	0	anemia	respiratory distress	yes	yes	male	male	yes	yes	yes	nil	26	4 months	14	delayed onset, intermittent awakening,	3 months
61	27	0	semiskilled	no	term	normal vaginal	2	2	2	0	nil	nil	nil	no	none	male	n/a	no	yes	nil	10	1 month	4		
62	25	14	semiskilled	yes	term	normal vaginal	1	1	1	0	nil	nil	nil	yes	none	female	n/a	no	yes	nil	11	2 weeks	5		
63	29	8	semiskilled	yes	term	Csection	2	2	2	0	nil	neonatal jaundice	yes	yes	none	male	n/a	yes	no	nil	25	3 month	13	delayed onset, intermittent awakening,	3 months
64	27	12	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	male	yes	no	yes	nil	12	1 month	9	delayed onset, intermittent awakening,	1 months
65	22	5	semiskilled	yes	term	normal vaginal	1	1	1	0	anemia	nil	nil	yes	male	female	no	no	yes	nil	13	4 weeks	7	intermittent awakening	
66	30	14	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	female	n/a	no	yes	nil	14	1 month	12	delayed onset, intermittent awakening,	4 months
67	28	0	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	male	n/a	no	yes	nil	8	2 weeks	4		
68	27	7	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	neonatal jaundice	yes	yes	none	female	n/a	no	yes	nil	12	1 month	11	intermittent awakening, early awakening	2 months
69	30	9	semiskilled	yes	term	Csection	2	2	2	0	nil	nil	nil	yes	male	male	yes	no	no	nil	19	2 month	9	intermittent awakening, early awakening	1 months
70	28	7	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	female	n/a	no	yes	nil	5	1 week	3		
71	26	11	semiskilled	yes	term	normal vaginal	1	1	1	0	nil	nil	nil	yes	none	female	n/a	yes	yes	nil	6	1 month	5	intermittent awakening	
72	27	7	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	female	no	no	yes	nil	5	1 month	2		
73	28	14	semiskilled	yes	term	Csection	2	2	2	0	IUGR, UTI	LBW,neonatal jaundice	yes	yes	male	male	yes	yes	no	nil	28	3 months	18	delayed onset, intermittent awakening,	5 months
74	29	7	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	male	n/a	no	yes	nil	14	4 months	8	delayed onset, intermittent awakening,	3 months
75	24	10	semiskilled	no	term	Csection	2	1	1	1	nil	neonatal jaundice	yes	yes	none	male	n/a	no	no	nil	19	2 months	7	intermittent awakening	2months
76	29	8	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	male	n/a	no	yes	nil	9	1 month	5		
77	28	9	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	male	n/a	no	yes	nil	7	3 weeks	6	intermittent awakening	
78	25	14	semiskilled	yes	term	c section	2	2	2	0	fetal malposition	nil	nil	yes	none	female	n/a	no	no	nil	22	4 month	14	intermittent awakening, early awakening	4 months
79	30	0	semiskilled	yes	term	normal vaginal	3	3	3	0	nil	neonatal jaundice	yes	yes	male	female	no	no	yes	nil	12	1 month	13	intermittent awakening, early awakening	2 months
80	26	7	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	male	yes	no	yes	nil	16	2 months	12	delayed onset, intermittent awakening, early a	3 months
81	29	9	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	male	n/a	no	yes	nil	12	1 month	8	intermittent awakening	1 months
82	26	7	semiskilled	no	term	normal vaginal	2	2	2	0	perineal trauma	nil	nil	yes	none	male	n/a	no	no	nil	15	1 month	9	intermittent awakening	2 months
83	23	7	semiskilled	no	term	normal vaginal	1	1	1	0	nil	nil	nil	yes	male	female	no	no	yes	nil	14	2 weeks	9	intermittent awakening	1 months
84	28	17	skilled	yes	term	Csection	1	1	1	0	gestational diabetes	hypoglycemia	yes	yes	none	female	n/a	no	yes	nil	22	2 months	13	delayed onset, intermittent awakening, early a	2 months
85	31	12	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	female	female	yes	no	yes	nil	13	1 month	8	delayed onset, intermittent awakening,	3 months
86	27	0	semiskilled	no	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	female	n/a	no	yes	nil	4	2 weeks	3		
87	31	6	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	female	no	no	yes	nil	9	1 month	5		
88	29	10	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	male	n/a	no	yes	nil	15	2 month	6	intermittent awakening	
89	27	0	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	female	n/a	no	yes	nil	20	3 month	8	delayed onset, intermittent awakening,	2 months
90	28	17	semiskilled	no	term	c section	2	2	2	0	delayed labour	nil	nil	yes	none	male	n/a	no	no	nil	19	2 month	4		
91	21	0	semiskilled	no	term	Csection	1	1	1	0	nil	nil	nil	yes	female	male	no	no	yes	nil	21	4 month	10	intermittent awakening, early awakening	4 months
92	31	7	semiskilled	yes	term	normal vaginal	3	3	3	0	nil	nil	nil	yes	male	male	yes	no	no	nil	19	5 month	11	intermittent awakening, early awakening	1 months
93	28	7	semiskilled	yes	term	normal vaginal	3	3	3	0	nil	nil	nil	yes	female	male	no	no	yes	nil	17	3 month	9	intermittent awakening, early awakening	1 months
94	26	8	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	female	no	no	yes	nil	12	1 month	8	delayed onset, intermittent awakening,	2 months
95	24	7	semiskilled	yes	term	normal vaginal	2	2	2	0	gestational diabetes	nil	nil	yes	none	male	n/a	no	no	nil	17	2 month	9	delayed onset, intermittent awakening,	1 months
96	28	11	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	female	n/a	no	yes	nil	11	3 month	7	intermittent awakening	1 months
97	27	14	semiskilled	yes	term	c section	2	2	2	0	nil	nil	nil	yes	none	male	n/a	no	yes	nil	17	2 month	5		
98	26	0	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	respiratory distress	yes	yes	male	female	no	no	yes	nil	8	1 month	6	intermittent awakening	
99	26	0	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	male	yes	no	yes	nil	12	2 month	9	intermittent awakening, early awakening	2 months
100	27	7	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	female	n/a	no	yes	nil	13	3 month	7	intermittent awakening, early awakening	1 months

101	24	10	semiskilled	no	term	normal vaginal	1	1	1	0	nil	nil	nil	yes	none	male	n/a	no	yes	nil	8	1 month	5		
102	28	7	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	male	n/a	no	no	nil	9	3 weeks	4		
103	29	12	semiskilled	no	term	c section	1	1	1	0	fetal malposition	respiratory distress	yes	no	none	male	n/a	no	no	nil	25	4 month	15	intermittent awakening, early awakening	3 months
104	28	10	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	male	n/a	yes	yes	nil	7	2 weeks	3		
105	30	12	semiskilled	yes	preterm	c section	2	2	2	0	nil	nil	nil	yes	male	female	no	no	yes	nil	10	1 month	6	intermittent awakening	
106	30	9	semiskilled	yes	term	Csection	3	3	3	0	nil	neonatal jaundice	yes	yes	none	male	n/a	no	no	nil	19	3 months	11	intermittent awakening	3 months
107	28	11	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	male	n/a	no	yes	nil	7	1 month	5		
108	31	7	semiskilled	no	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	male	n/a	no	yes	nil	9	2 months	4		
109	27	0	semiskilled	yes	term	normal vaginal	1	1	1	0	nil	nil	nil	yes	male	male	yes	no	yes	nil	5	1 week	4		
110	30	17	skilled	yes	preterm	c section	1	1	1	0	PROM	LBW	yes	no	male	female	no	no	no	nil	28	2 month	18	delayed onset, intermittent awakening, early	4 months
111	30	0	semiskilled	yes	term	Csection	3	2	2	1	gestational diabetes	hypoglycemia	yes	yes	male	male	yes	no	no	nil	26	3 months	17	delayed onset, intermittent awakening, early	2 months
112	25	0	semiskilled	yes	term	Csection	2	2	2	0	nil	nil	nil	yes	none	male	n/a	no	no	nil	19	2 months	19	delayed onset, intermittent awakening, early	3 months
113	28	12	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	no	male	male	yes	no	yes	nil	2	1 week	4		
114	27	19	skilled	yes	term	c section	1	1	1	0	nil	nil	nil	yes	none	female	n/a	no	yes	nil	13	1 month	6	intermittent awakening	
115	29	12	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	LBW	nil	yes	male	male	yes	no	yes	nil	6	3 weeks	5		
116	25	5	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	male	n/a	no	no	nil	11	2 weeks	9	intermittent awakening, early awakening	2 months
117	27	10	semiskilled	no	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	male	n/a	no	yes	nil	10	2 months	5		
118	25	11	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	female	n/a	no	yes	nil	9	1 month	7	intermittent awakening	1 months
119	29	0	semiskilled	yes	term	Csection	3	3	3	0	perineal trauma, PROM	Respiratory distress	yes	yes	male	female	no	yes	no	nil	26	4 month	11	intermittent awakening, early awakening	2 months
120	25	10	semiskilled	no	term	normal vaginal	1	1	1	0	nil	nil	nil	yes	none	male	n/a	no	yes	nil	9	2 month	4	intermittent awakening	
121	29	13	semiskilled	yes	postterm	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	female	n/a	no	yes	nil	7	1 month	3	intermittent awakening	
122	25	5	semiskilled	yes	term	Csection	2	2	2	0	nil	respiratory distress	yes	yes	male	female	n/a	yes	no	nil	21	3 months	12	intermittent awakening, early awakening	1 month
123	23	0	semiskilled	no	term	normal vaginal	1	1	1	0	nil	nil	nil	yes	none	male	n/a	no	yes	nil	12	3 month	7	intermittent awakening	1 month
124	31	4	semiskilled	yes	term	Csection	3	2	2	1	pre eclampsia	nil	nil	yes	none	female	n/a	yes	no	nil	25	5 months	18	delayed onset, intermittent awakening, early	4 months
125	27	7	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	female	no	no	yes	nil	6	2 month	5	intermittent awakening	
126	25	8	semiskilled	yes	term	Csection	2	2	2	0	nil	respiratory distress	yes	yes	male	male	yes	no	yes	nil	20	3 month	13	intermittent awakening, early awakening	2 months
127	29	8	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	female	no	no	yes	nil	5	2 weeks	7	intermittent awakening	1 month
128	27	12	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	male	n/a	no	yes	nil	6	1 week	4	intermittent awakening	
129	30	10	semiskilled	yes	term	c section	2	2	2	0	gestational diabetes	hypoglycemia	nil	yes	none	female	n/a	yes	no	nil	27	4 month	15	intermittent awakening, early awakening	4 months
130	28	14	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	male	n/a	no	yes	nil	10	1 month	5		
131	25	8	semiskilled	no	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	female	n/a	no	yes	nil	13	2 month	8	intermittent awakening, early awakening	months
132	27	7	semiskilled	yes	term	c section	2	2	2	0	nil	nil	nil	yes	none	male	n/a	yes	yes	nil	3	2 weeks	5	intermittent awakening, early awakening	
133	30	10	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	female	female	yes	no	yes	nil	6	1 week	3		
134	29	10	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	no	none	female	n/a	no	yes	nil	11	1 month	3		
135	27	0	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	male	yes	no	yes	nil	9	4 weeks	4		
136	30	14	semiskilled	yes	term	normal vaginal	2	2	2	0	UTI	nil	nil	yes	none	male	n/a	no	yes	nil	11	2 month	5	intermittent awakening	
137	28	6	semiskilled	no	term	Csection	2	2	2	0	nil	nil	nil	yes	none	female	n/a	yes	yes	nil	20	3 month	8	intermittent awakening, early awakening	2 months
138	25	12	semiskilled	yes	preterm	normal vaginal	2	2	2	0	nil	respiratory distress, neonatal ja	yes	yes	none	male	n/a	yes	no	nil	25	4 month	9	intermittent awakening, early awakening	2 months
139	26	14	semiskilled	yes	term	normal vaginal	2	2	2	0	anemia	nil	nil	no	male	male	yes	no	yes	nil	12	1 month	5	intermittent awakening	
140	29	7	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	female	female	yes	no	yes	nil	13	3 weeks	2		
141	30	11	semiskilled	yes	term	normal vaginal	1	1	1	0	nil	nil	nil	yes	none	female	n/a	no	yes	nil	6	1 week	3		
142	26	10	semiskilled	yes	term	normal vaginal	1	1	1	0	nil	nil	nil	yes	none	female	n/a	yes	yes	nil	19	3 month	15	intermittent awakening, early awakening	5 months
143	30	0	semiskilled	yes	term	c section	2	2	2	0	delayed labour	nil	nil	yes	male	male	yes	no	yes	nil	13	1 week	11	intermittent awakening	3 months
144	25	0	semiskilled	yes	term	normal vaginal	1	1	1	0	nil	nil	nil	yes	none	male	n/a	yes	yes	nil	17	2 weeks	9	intermittent awakening	2 months
145	28	0	semiskilled	yes	term	Csection	2	2	2	0	anemia, preeclampsia	respiratory distress	yes	yes	male	male	yes	yes	no	nil	27	3 months	16	delayed onset, intermittent awakening, early	4 months
146	26	0	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	female	no	no	yes	nil	8	1 week	4		
147	25	4	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	female	no	no	yes	nil	13	1 month	7	intermittent awakening	2 months
148	30	0	semiskilled	yes	post-term	c section	3	2	2	1	fetal malposition	nil	nil	yes	male	male	yes	yes	no	nil	20	5 month	12	delayed onset, intermittent awakening, early	1 months
149	28	17	semiskilled	yes	term	normal vaginal	1	1	1	0	nil	nil	nil	yes	female	female	yes	no	yes	nil	16	3 weeks	4		
150	29	8	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	male	n/a	yes	yes	nil	10	4 weeks	6	intermittent awakening	
151	26	7	semiskilled	yes	preterm	Csection	2	2	2	0	nil	respiratory distress, jaundice, h	yes	no	male	female	no	yes	no	nil	26	3 month	9	intermittent awakening, early awakening	1 months

152	26	17	semiskilled	yes	term	normal vaginal	2	2	2	0	UTI	nil	nil	yes	none	male	n/a	yes	no	nil	21	3 month	10	intermittent awakening, early awakening	2 months
153	28	4	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	female	n/a	no	yes	nil	14	1 month	7	intermittent awakening	1 months
154	31	0	semiskilled	yes	preterm	normal vaginal	2	2	2	0	nil	respiratory distress, jaundice	yes	yes	male	female	no	no	no	nil	19	3 month	8	intermittent awakening, early awakening	3 months
155	29	7	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	female	n/a	no	no	nil	7	1 month	4		
156	28	0	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	male	n/a	no	yes	nil	5	1 week	4		
157	25	0	semiskilled	yes	preterm	c section	1	1	1	0	PROM	respiratory distress, jaundice, h	yes	no	male	male	yes	yes	no	nil	26	3 months	17	delayed onset, intermittent awakening, early	4 months
158	29	17	semiskilled	yes	term	c section	1	1	1	0	nil	nil	nil	yes	female	male	no	no	no	nil	25	2 months	3		
159	30	6	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	female	no	no	yes	nil	9	1 month	6	intermittent awakening	
160	27	13	semiskilled	yes	term	c section	2	2	2	0	nil	nil	nil	yes	male	male	yes	no	yes	nil	3	1 week	5		
161	24	9	semiskilled	yes	preterm	normal vaginal	1	1	1	0	oligohydramnios	respiratory distress	yes	yes	male	male	yes	no	yes	nil	15	4 weeks	7	intermittent awakening	1 months
162	26	7	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	male	yes	no	yes	nil	6	1 month	5	intermittent awakening	
163	24	0	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	female	female	yes	no	yes	nil	9	2 month	4		
164	29	12	semiskilled	yes	term	normal vaginal	1	1	1	0	IUGR	hypoglycemia	yes	yes	none	male	n/a	no	yes	nil	17	1 month	8	intermittent awakening	2 months
165	26	10	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	female	n/a	no	yes	nil	10	month	5	intermittent awakening	
166	28	7	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	respiratory distress	yes	yes	male	female	no	no	yes	nil	11	3 weeks	4		
167	27	8	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	female	n/a	no	no	nil	12	1 month	6	intermittent awakening	
168	31	6	semiskilled	yes	term	Csection	3	3	3	0	anemia	nil	nil	yes	female	female	yes	yes	no	nil	25	4 months	9	intermittent awakening	3 months
169	30	7	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	no	male	male	yes	yes	yes	nil	16	3 month	10	intermittent awakening, early awakening	1 months
170	29	7	semiskilled	yes	term	normal vaginal	2	2	2	0	anemia	nil	nil	yes	male	male	yes	no	yes	nil	14	2 month	7	intermittent awakening	2 months
171	30	0	semiskilled	yes	term	Csection	2	2	2	0	nil	nil	nil	yes	female	female	yes	no	yes	nil	18	1 month	11	intermittent awakening, early awakening	3 months
172	28	0	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	no	male	male	yes	no	yes	nil	12	2 months	5		
173	25	14	semiskilled	yes	term	Csection	1	1	1	0	nil	nil	nil	yes	male	male	yes	yes	no	nil	22	4 months	9	intermittent awakening, early awakening	1 months
174	26	12	semiskilled	yes	term	normal vaginal	1	1	1	0	nil	nil	nil	yes	none	male	n/a	no	yes	nil	13	3 weeks	7	intermittent awakening	1 months
175	29	11	semiskilled	yes	term	normal vaginal	3	3	3	0	Anemia	nil	nil	yes	male	male	yes	no	yes	nil	12	1 month	5	intermittent awakening	
176	30	10	semiskilled	yes	term	c section	3	3	3	0	oligohydramnios	respiratory distress	yes	yes	male	male	yes	yes	no	nil	21	4 months	6	intermittent awakening	
177	28	0	semiskilled	yes	term	normal vaginal	2	2	2	0	UTI	nil	nil	yes	none	female	n/a	no	yes	nil	15	2 months	6	intermittent awakening	
178	27	0	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	female	male	no	no	yes	nil	12	3 weeks	7	intermittent awakening	2 months
179	29	7	semiskilled	yes	term	Csection	2	2	2	0	nil	LBW, neonatal jaundice	yes	no	female	male	no	no	no	nil	20	2 months	10	intermittent awakening, early awakening	3 months
180	30	9	semiskilled	yes	term	normal vaginal	3	3	3	0	nil	nil	nil	yes	male	female	no	no	no	nil	10	1 month	6	intermittent awakening	
181	31	0	semiskilled	yes	term	normal vaginal	2	2	2	0	anemia	nil	nil	yes	male	female	no	no	yes	nil	8	1 month	5	intermittent awakening	
182	29	8	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	LBW	nil	yes	none	female	n/a	no	yes	nil	11	2 months	6	intermittent awakening	
183	28	19	skilled	yes	term	Csection	1	1	1	0	nil	nil	nil	yes	none	male	n/a	no	yes	nil	18	3 months	7	intermittent awakening	4 months
184	27	0	semiskilled	yes	term	normal vaginal	1	1	1	0	nil	nil	nil	yes	male	male	yes	no	yes	nil	9	1 month	6	intermittent awakening	
185	28	0	semiskilled	yes	term	normal vaginal	2	2	2	0	UTI	nil	nil	yes	female	female	yes	no	yes	nil	10	1 months	4		
186	30	0	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	female	n/a	no	yes	nil	9	2 months	5		
187	31	12	semiskilled	yes	term	c section	3	3	3	0	oligohydramnios	respiratory distress	yes	yes	male	male	yes	no	yes	nil	18	1 month	11	intermittent awakening	2 months
188	22	0	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	male	yes	no	yes	nil	9	1 week	8	intermittent awakening	1 months
189	27	10	semiskilled	yes	term	Csection	2	2	2	0	IUGR	Hypoglycemia, LBW, neonatal ja	yes	no	none	female	n/a	yes	no	nil	27	2 month	15	delayed onset, intermittent awakening, early	4 months
190	28	9	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	female	no	no	yes	nil	10	2 weeks	7	intermittent awakening	1 months
191	22	12	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	male	n/a	no	yes	nil	11	1 month	7	intermittent awakening	2 months
192	26	0	semiskilled	yes	term	Csection	2	2	2	0	nil	hypoglycemia	yes	yes	none	female	n/a	no	yes	nil	18	3 month	13	intermittent awakening, early awakening	1 months
193	31	0	semiskilled	yes	term	normal vaginal	3	2	2	1	anemia	nil	nil	yes	male	male	yes	no	yes	nil	10	2 month	5		
194	30	10	semiskilled	yes	term	normal vaginal	4	4	4	0	nil	nil	nil	yes	male	male	yes	no	no	nil	11	1 month	8	intermittent awakening	2 months
195	25	10	semiskilled	yes	preterm	c section	2	2	2	0	nil	LBW, neonatal jaundice, respira	yes	yes	none	male	n/a	yes	no	nil	21	3 month	9	intermittent awakening, early awakening	1 months
196	29	7	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	female	n/a	no	yes	nil	4	2 weeks	3		
197	26	0	semiskilled	yes	term	normal vaginal	1	1	1	0	nil	nil	nil	yes	male	male	yes	no	yes	nil	6	2 weeks	6	intermittent awakening	
198	27	8	semiskilled	yes	term	normal vaginal	2	2	2	0	Anemia	nil	nil	no	none	female	n/a	no	yes	nil	6	1 month	3		
199	25	17	semiskilled	yes	term	normal vaginal	1	1	1	0	nil	nil	nil	yes	female	male	no	no	no	nil	17	3 months	4		
200	31	7	semiskilled	yes	preterm	c section	2	2	2	0	IUGR	LBW, neonatal jaundice, respira	yes	yes	none	male	n/a	yes	yes	nil	19	2 months	11	intermittent awakening, early awakening	2 months
201	29	14	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	male	n/a	no	yes	nil	8	1 month	5	intermittent awakening	
202	26	0	semiskilled	yes	term	normal vaginal	2	2	2	0	anemia	nil	nil	yes	none	male	n/a	no	yes	nil	12	2 months	9	intermittent awakening	2 months
203	21	0	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	female	no	no	yes	nil	5	2 weeks	4	intermittent awakening	
204	25	5	semiskilled	yes	term	Csection	2	2	2	0	nil	LBW	yes	yes	female	male	no	yes	no	nil	19	2 month	14	delayed onset, intermittent awakening, early	3 months
205	20	0	semiskilled	no	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	female	female	yes	no	no	nil	15	1 month	9	intermittent awakening, early awakening	1 months

206	30	12	semiskilled	yes	postterm	normal vaginal	2	2	2	0	Obstructed labour	nil	nil	yes	male	male	yes	no	yes	nil	9	2 weeks	8	intermittent awakening, early awakening	5 months
207	26	0	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	male	n/a	no	yes	nil	11	3 months	5	intermittent awakening	
208	24	10	semiskilled	yes	term	normal vaginal	2	2	2	0	Anemia	nil	nil	no	female	male	no	yes	yes	nil	7	1 month	5	intermittent awakening	
209	26	9	semiskilled	yes	term	Csection	2	2	2	0	nil	nil	nil	yes	female	female	yes	yes	no	nil	21	3 months	16	delayed onset, intermittent awakening, early	4 months
210	29	0	semiskilled	yes	term	Csection	2	2	2	0	nil	nil	nil	yes	none	female	n/a	no	no	nil	19	2 months	9	intermittent awakening	6 months
211	30	9	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	male	n/a	no	yes	nil	8	1 month	5	intermittent awakening	
212	26	8	semiskilled	no	term	Csection	2	1	1	1	IUGR	LBW, neonatal jaundice, respira	yes	no	male	male	yes	yes	no	nil	26	3 months	14	delayed onset, intermittent awakening, early	7 months
213	23	0	semiskilled	yes	term	normal vaginal	1	1	1	0	nil	nil	nil	yes	none	female	n/a	no	yes	nil	5	1 month	4	intermittent awakening	
214	25	19	skilled	yes	term	normal vaginal	1	1	1	0	Anemia	nil	nil	yes	male	female	no	no	yes	nil	14	2 months	8	intermittent awakening, early awakening	3 months
215	27	10	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	no	male	female	no	no	yes	nil	12	1 month	5	intermittent awakening	
216	28	0	semiskilled	yes	term	normal vaginal	2	2	2	0	gestational diabetes	nil	nil	yes	female	male	no	no	yes	nil	6	3 weeks	3	intermittent awakening	
217	22	9	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	LBW	yes	yes	female	male	no	no	yes	nil	10	2 months	6	intermittent awakening	
218	25	12	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	female	n/a	no	yes	nil	5	1 month	3	intermittent awakening	
219	28	10	semiskilled	yes	term	normal vaginal	2	2	2	0	anemia	nil	nil	yes	male	female	no	no	yes	nil	2	2 weeks	4	intermittent awakening	
220	25	13	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	female	no	no	yes	nil	11	3 weeks	8	intermittent awakening, early awakening	2 months
221	31	19	skilled	yes	preterm	Csection	2	2	2	0	nil	nil	nil	yes	none	female	n/a	yes	no	nil	20	2 month	6	intermittent awakening	
222	24	12	semiskilled	yes	term	normal vaginal	1	1	1	0	Anemia	nil	nil	yes	none	female	n/a	no	yes	nil	8	3 weeks	7	intermittent awakening	3 months
223	29	17	skilled	yes	term	Csection	2	2	2	0	nil	nil	nil	yes	none	female	n/a	no	no	nil	19	3 months	4	intermittent awakening	
224	26	0	semiskilled	yes	term	normal vaginal	2	1	1	1	nil	cephalhaematoma	nil	yes	none	female	n/a	no	no	nil	17	1 month	11	intermittent awakening, early awakening	1 months
225	28	17	skilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	female	male	no	no	yes	nil	14	2 months	5	intermittent awakening, early awakening	
226	25	0	semiskilled	yes	term	normal vaginal	1	1	1	0	nil	nil	nil	no	none	male	n/a	no	yes	nil	10	1 month	8	intermittent awakening, early awakening	1 months
227	21	8	semiskilled	no	term	normal vaginal	1	1	1	0	Anemia	nil	nil	yes	none	female	n/a	no	yes	nil	11	2 weeks	7	intermittent awakening, early awakening	2 months
228	29	10	semiskilled	yes	preterm	normal vaginal	3	3	3	0	nil	nil	nil	yes	male	female	no	no	yes	nil	15	1 month	9	intermittent awakening, early awakening	3 months
229	28	14	semiskilled	yes	term	normal vaginal	2	2	2	0	anemia	nil	nil	yes	none	male	n/a	no	yes	nil	17	4 weeks	8	intermittent awakening, early awakening	1 months
230	26	9	semiskilled	yes	term	Csection	2	2	2	0	nil	neonatal jaundice	yes	no	none	male	n/a	no	no	nil	19	3 months	9	intermittent awakening, early awakening	3months
231	30	5	semiskilled	yes	term	Csection	3	2	2	1	PROM	nil	nil	yes	male	female	no	yes	no	nil	20	2 months	10	intermittent awakening, early awakening	4 months
232	29	4	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	no	none	male	n/a	no	yes	nil	5	1 month	3	intermittent awakening	
233	29	9	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	female	n/a	yes	yes	nil	6	1 month	5	intermittent awakening	
234	22	6	semiskilled	yes	term	normal vaginal	1	1	1	0	Anemia	nil	nil	yes	none	female	n/a	no	yes	nil	13	2 months	7	intermittent awakening	1 month
235	27	11	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	female	female	yes	no	yes	nil	14	2 weeks	9	intermittent awakening	2 months
236	25	0	semiskilled	yes	term	Csection	1	1	1	0	nil	LBW	nil	yes	male	female	no	no	no	nil	20	1 month	11	intermittent awakening, early awakening	3 months
237	28	0	semiskilled	yes	preterm	normal vaginal	3	3	3	0	nil	nil	nil	yes	male	male	yes	yes	yes	nil	12	2 month	7	intermittent awakening	2 months
238	26	19	skilled	yes	term	Csection	2	2	2	0	nil	neonatal jaundice	yes	yes	none	male	n/a	no	no	nil	19	1 month	13	intermittent awakening, early awakening	5 months
239	28	0	semiskilled	yes	term	normal vaginal	2	2	2	0	anemia	nil	nil	yes	male	female	no	no	yes	nil	6	3 weeks	5	intermittent awakening	
240	31	0	semiskilled	yes	term	normal vaginal	3	3	3	0	nil	nil	nil	yes	male	male	yes	no	yes	nil	7	1 month	4	intermittent awakening	
241	30	19	skilled	yes	term	Csection	1	1	1	0	nil	nil	nil	yes	male	female	no	no	no	nil	19	2 month	9	intermittent awakening	3 months
242	28	7	semiskilled	yes	postterm	c section	3	1	1	2	Delayed labour, oligoh	respiratory distress	yes	yes	male	male	yes	no	no	nil	21	4 months	10	intermittent awakening, early awakening	4 months
243	29	7	semiskilled	no	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	male	yes	no	yes	nil	10	1 month	7	intermittent awakening	2 months
244	22	5	semiskilled	yes	term	normal vaginal	1	1	1	0	Anemia	nil	nil	yes	none	male	n/a	no	yes	nil	12	2 month	8	intermittent awakening	1 months
245	27	11	semiskilled	yes	term	Csection	2	2	2	0	nil	nil	nil	yes	none	male	n/a	no	yes	nil	18	4 months	9	intermittent awakening	2 months
246	31	0	semiskilled	yes	term	Csection	3	2	2	1	IUGR	Neonatal jaundice,respiratory d	yes	yes	male	female	no	yes	no	nil	26	3 months	12	intermittent awakening, early awakening	3 months
247	28	14	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	none	male	n/a	no	yes	nil	11	2 months	6	intermittent awakening, early awakening	
248	25	7	semiskilled	yes	preterm	normal vaginal	1	1	1	0	nil	nil	nil	yes	male	female	no	no	yes	nil	10	1 month	5	intermittent awakening	
249	30	7	semiskilled	no	term	normal vaginal	3	1	1	2	nil	nil	nil	no	male	male	yes	no	yes	nil	7	1 month	4	intermittent awakening	
250	27	0	semiskilled	yes	term	Csection	2	2	2	0	IUGR	Neonatal jaundice,respiratory d	yes	yes	male	male	yes	yes	no	nil	25	4 months	13	intermittent awakening, early awakening	5 months
251	23	0	semiskilled	yes	term	normal vaginal	1	1	1	0	nil	nil	nil	yes	none	female	n/a	no	yes	nil	6	3 weeks	5	intermittent awakening	
252	26	8	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	cephalhaematoma	nil	yes	none	male	n/a	no	yes	nil	11	2 months	7	intermittent awakening	1 months
253	25	9	semiskilled	yes	term	normal vaginal	2	2	2	0	nil	nil	nil	yes	male	female	no	no	yes	nil	8	4 weeks	6	intermittent awakening	
254	21	0	semiskilled	no	preterm	normal vaginal	1	1	1	0	PROM	nil	nil	no	none	female	n/a	no	no	nil	5	1 month	4	intermittent awakening	
255	24	0	semiskilled	yes	term	c section	1	1	1	0	Malposition, IUGR	nil	yes	yes	none	female	n/a	yes	yes	nil	27	5 month	17	intermittent awakening, early awakening	7 months
256	23	7	semiskilled	yes	term	normal vaginal	1	1	1	0	Anemia	neonatal jaundice	yes	yes	male	male	yes	no	yes	nil	15	2 months	11	intermittent awakening	2 months