

NEONATAL INTENSIVE CARE UNIT ENVIRONMENTAL STRESSORS:  
TOWARDS DEVELOPING A STRESS ALLEVIATING MODEL FOR MOTHERS  
NURSING SICK NEONATES IN LUSAKA - ZAMBIA

PHD THESIS

By

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A Thesis Submitted to the University of Zambia in Partial Fulfilment of the  
Requirements of Doctor of Philosophy in Midwifery

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## DECLARATION

I, **Maureen Malumbe Masumo**, hereby declare that the work presented in this study for Doctor of Philosophy degree in Midwifery has not been presented either in wholly or part for any other degree and is not being submitted for any other degree.

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## **CERTIFICATE OF APPROVAL**

This Thesis of Maureen Malumbe Masumo has been approved as the requirement for the award of Doctor of Philosophy in Midwifery by the University of Zambia

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## **ABSTRACT**

**Background:** Admission of a new-born to the Neonatal Intensive Care Unit (NICU) is a stressful and unexpected event to most parents. This study aimed at developing a stress alleviation model after identifying stressors and their associated factors in mothers nursing babies in the Neonatal Intensive Care Unit at the Women and New Born Hospital in Zambia.

**Methods:** A two phased study approach was undertaken where phase one used a mixed method (convergent concurrent) study design. The quantitative component of the study facilitated identification of NICU environmental stressors and associated factors among mothers with neonates admitted to the NICU while the qualitative component focussed on nurses' perceptions of stressors and stress levels among mothers nursing babies in NICU. The two components formed phase one of the study and their data sets informed the development of a stress alleviation model. Stakeholder consultation and literature based interventions were used to develop a maternal stress alleviation model. From the identified stressors and literature review a model was developed.

The quantitative component was conducted among 280 mothers and their neonates who were randomly selected over a three-month period. This component was conducted to determine stress levels and NICU stressors using a 46 item Parental Stressor Scale: Neonatal Intensive Care Unit (PSS: NICU) questionnaire. Informed consent was obtained from the mothers. Further, the Qualitative component was

conducted among 15 nurses working in the unit who were purposefully sampled by maximum variation as it aimed at exploring nurses' perceptions of maternal stressors in NICU. In-depth interviews were conducted using structured interview guide to collect qualitative data. Hybrid approach of qualitative methods of thematic analysis was used to analyse data.

Stata software version 13 was used to analyse quantitative data. Chi square test of independence was used to determine if there is a relationship between the dependent variable (maternal stress) and independent variables (maternal and situational characteristics), and where it was not applicable Fishers Exact test was reported. The cut off point for statistical significance was set at five percent, P value less than 0.05 were considered statistically significant. Interquartile and median were calculated since the data was not normally distributed, while Kruskal-Wallis rank sum test was performed to assess if the medians of the items in each subscale and between subscales were statistically different. In addition, Post hoc Dunn's multiple comparison test was used to identify the items with different medians, and Ordinal Logistic Regression constructed to explain whether independent variables could predict stress among the mothers with neonates admitted to the Neonatal Intensive Care Unit. Predictive margins to predict the likely hood of the mother being stressed if she has a neonate admitted to NICU and a combination of levels of specified variables in the data.

**Findings:** The results from the quantitative component revealed that prevalence of stress among mothers with babies admitted to NICU was high with 262 (93.6%) respondents reporting that they were very stressed. The most stressful NICU environmental stressors measured by the PSS: NICU were Infant appearance and behaviour (median 3; IQR 3 -4) and Parent Infant relationship (median 4; IQR 3 – 4). The ordinal regression results showed that those mothers who breastfed their babies were 52% less likely to be in high stress category (COR= 0.487; 95% CI [0.278 – 0.854]; p= 0.012) versus the combined mild and moderate categories keeping all other variables constant. The women who were working and getting a monthly salary were 67% less likely to be in high stress category (COR= 0.435; 95% CI [0.244 – 0.773]; p= 0.005). The odds of being in the high stress category for those with tertiary education versus the mild and moderate categories of stress are 2.12 times greater (COR= 2.124; 95% CI [1.218 – 3.702]; p= 0.008.) given that the other variables in the model are held constant. Multivariable ordinal regression revealed that birth weight (0.008) and type of feeding (0.001) were statistically associated with maternal stress. The predictive margins revealed a probability of increased stress in a mother who stay in NICU for more than seven days regardless of whether the baby was born prematurely or at term. Additionally, results from the qualitative component showed that the major themes that emerged as stressors in NICU were NICU environment, standard operating procedures in NICU, maternal infant relationship, staff behaviour and communication.

A stress alleviation model was developed to be utilised by nurses to ensure that they identify mothers who are stressed and intervene appropriately. The model emphasizes the need to empower nurses with knowledge on family centred care, screening of mothers for depression on admission and subsequent days and offering counselling to help mothers cope with stressors. The need to include mental health nurses to work in NICU was also highlighted.

**Conclusion:** The study has developed a stress alleviation model based on the NICU environmental stressors and the associated factors identified in phase one. The nurses who work in the unit can support the mothers provided they are guided by the model and empowered with knowledge on FCC. The aim of supporting mothers is to ensure that once their emotional support needs are met, they will be able to attain their maternal role and consequently enhance recovery of the baby. Therefore, a recommendation has been given to Ministry of Health and management at Women and New-born Hospital to adopt the model in NICU. Further recommendations are to the trainers of nurses to include family centred care model in the nursing curriculum.

**Key words:** *Maternal stressors, neonatal intensive care, Parental Stressor Scale - Neonatal Intensive Care Unit, Maternal stress alleviation model*

## **DEDICATION**

I dedicate this thesis work to my Son, Chungu Makoleka, who has made me stronger, better and more fulfilled than I could have ever imagined. To my loving parents, Mr Malambo H. Masumo and Mrs Edina Judith Masumo whose words of encouragement and push for tenacity are still ringing in my ears. To all mothers who have and are nursing babies in the unfamiliar environment of the Neonatal Intensive Care Unit.

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## LIST OF ABBREVIATIONS

NICU	–	Neonatal Intensive Care Unit
FCC	–	Family Centred Care
CSO	–	Central Statistics Office
PSS	–	Parental Stress Scale
ZDHS	–	Zambia Demographic Health Survey
ZSA	–	Zambia Statistical Agency
UTH	–	University Teaching Hospital
WHO	-	World Health Organisation



## **CHAPTER ONE**

### **1.1 Introduction**

The birth of a child requires some adjustment to family life. This adjustment causes stress in every woman's life as they are expected to prepare for a new-born immediately the mother discovers she is expecting (Abdollahpour et al., 2019). To minimise stress during pregnancy, expectant mothers are encouraged to talk with the unborn child for bonding. Not only is pregnancy stressful, childbirth also is a stressful event in every woman's life (Abdollahpour et al., 2019). In addition, transitioning from childbirth to parenting is more stressful if a new-born fails to adapt to the extra uterine life and is admitted to the Neonatal Intensive Care Unit (NICU). A NICU is defined as a ward within a hospital, specialised in the care of ill or premature new-born infants (NICUs: definition, 2006). The NICU combines scientific knowledge and advanced technology to provide specialized care to neonates who might have serious and complex medical problems, congenital abnormalities and prematurity. According to Kerr et al., (2017) specialized care provided in the unit includes critical life support, physiological monitoring and medical attention. This care has improved survival rates even for the tiniest patients who were once considered unviable. However, although their survival rates have improved, the vulnerability of the patients in NICU to infection has led to implementation of rules and policies, some of which limit parents' access to the unit and their babies.

The limitation of parents' access to their babies, necessitated by the unanticipated NICU admission is usually filled with stress, emotional turmoil, and strains on relationships (Grosik et al., 2013; Obeidat et al., 2009). Mothers being the primary care givers to the new-born, suffer significantly high levels of stress during this period of hospitalisation. The need to assess the specific causes of stress for mothers in the NICU and develop interventions aimed at decreasing stress and promoting effective coping has been widely researched and documented (Foligno et al., 2020; Magliyah and Muhamamd, 2015; Montiroso et al., 2012; Abdeyazdan et al., 2014; Turner et al., 2015). Similarly, Trudi et al (2012) and Grosik et al (2013) indicated that to decrease stress and enhance parent's abilities to care for their infant, there is need to develop local interventions, which should target improving the family centred approach in the NICU care. In line with Grosik et al., (2013) there is growing recognition of the need to develop local interventions and parent support programmes that are context specific as NICUs usually have different rules and environmental layout. Therefore, effective development and implementation of local interventions may only be enhanced if factors that cause parental stress in NICU are identified in each context. In addition, the aspects of the infant and maternal characteristics that can cause stress for mothers need to be identified to enhance nurses' understanding of their role in stress alleviation and improvement of the quality of care.

Regarding the NICU stressors, these need to be addressed accurately by implementing interventional or support programme. If these stressors are left un

addressed, they may precipitate stress and lead to a crisis situation in mothers. Stress has been a subject of research for a long time and this is because of its consequences and different coping strategies adopted by individuals. Stress is defined as a situation where the organism's homeostasis is threatened or the organism perceives a situation as threatening and is re-established by complex repertoire of behavioural and physiologic adaptive responses of the organism (Magnussen, 2003; Varvogli & Darviri, 2011). Stress is described differently depending on the author's aspect of focus, it could either be physiological or psychological. According to Selye (1956), humans repeatedly work toward developing successful adaptation patterns in response to the ongoing stresses associated with daily activities and demands.

On the other hand, Lazarus a psychologist and one of the pioneers to study stress concentrated on psychological responses and coping strategies to stressful situations. His theory encompasses the individual's belief system and the available social support to the person experiencing stress. Lazarus' theory further suggests that coping with stress is dependent on the individual's appraisal of the stressful situation and the perceived harm it may cause or not (Lazarus & Folkman, 1984). It is recognised that stress has various psychological and physiological effects on a person. It causes devastating effects on individual, interpersonal, and societal levels. As such, it is important to understand its nature in order to develop interventions that are responsive to the needs of the affected population. The focus of the present study is one of the potentially stressful life event; the birth of an infant who is then

cared for in the NICU either due to prematurity, low birth weight or failure to adapt to extra uterine life.

With regard to low birth weight, it is estimated that about nine percent of babies in Zambia, every year are born with low birth weight (2.5 kg or less) due to prematurity or small for gestation age but born at term (ZSA et al., 2019). The small for gestation age babies but born at term may have suffered intrauterine growth retardation due to some maternal conditions or congenital abnormalities. Therefore, these babies require intensive medical attention in the NICU. However, as the number of intensive care unit admissions increase, similarly, the number of mothers exposed to NICU environment and hospitalization also increase. Due to hospitalisation, the mothers start their parenting journey in NICU's unfamiliar environment. Having a new-born admitted to the hospital interrupts maternal-infant interactions and bonding, especially in an event where infants are separated from their mothers. Previous research asserts that separating mothers from their infants have been associated with stress experienced by mothers nursing babies in NICU (Kegler et al., 2019; Turner, 2015; Aftyka et al., 2019; Palma et al., 2017). Furthermore, stress arising from hospitalisation has an eventual effect on the production of breast milk and establishment of successful breastfeeding, among others (Foligno et al., 2020).

In literature it has been reported that stress experienced by mothers in NICU need to be reduced to promote good parenting practices during and after hospital admission. In the same way, Turner et al., (2015) emphasised the critical need to

find and institute ways of decreasing stress experienced by the mothers during their neonate's hospitalization in the NICU for better maternal and neonatal outcomes. Family centred care (FCC) is one modality that may work to reduce stress among mothers nursing babies in NICU. It is increasingly becoming more prevalent in NICUs across the globe as a model of care because of substantial evidence that parental involvement in the NICU decreases maternal stress (Skene et al., 2012). The FCC model views the family as the child's primary source of strength and support and allows for collaboration, respect, and support of the parents during all levels of the service delivery (Cooper, et al., 2007). Although many countries have policies to encourage parents to participate in the care of their infants, there is variation within and between countries with regard to the intensity and means of involvement and role played by mothers (Pallas-Alonso et al., 2012). The variation in NICU policies could be attributed to differences in identified stress factors.

Therefore, this study sought to determine the occurrence of stress, the overall stress level and its associated factors experienced by mothers of infants in the NICU and to develop an innovative stress alleviation model, considering the scarcity of local research evidence on stress factors among mothers nursing their new born babies in NICU in Zambia.

## **1.2 Background Information**

### **1.2.1 New-born Care**

Childbirth is a powerful personal event in women's lives as well as a significant social experience although it differs according to culture and society (Callister & Khalaf, 2010; Etowa, 2012). In the Zambian set up, grandparents provide a wide range of care to the new-born and mothers are expected to co-sleep with their new-born. This is believed to strengthen the mother child relationship and a way of showing love to their child and to ensure the child's well-being (Sichimba, 2015). Culturally it is expected that all women breastfeed their new-born. However, breastfeeding in public, especially in presence of other breastfeeding mothers is discouraged as it is believed to cause child illness (Msoka & Mabuza, 2015). Similarly, Doglas and Antoniou's (2012) results indicated that a breast is incorporated in wider cultural context and one of those related to new-born care is that breast feeding must take place only in private spaces. Women and their families believe that adhering to sociocultural tradition is the best way to prevent childbirth related deaths (Kaphle et al., 2013). For example, Maimbolwa et al., (2003) asserted that complications occurring during labour are attributed to witchcraft or are seen as punishment for misdeeds committed by the pregnant woman or her husband. Contrary to cultural beliefs, the orthodox medicine has different explanations on the causes of complications of pregnancy and childbirth.

Research evidence indicates that there is often a conflict between the orthodox medicine and traditional beliefs and practices of women towards pregnancy and child birth (Harris et al., 2012; Koolenga & Stewart, 2011). In a health care system, exclusive breast feeding is a recommended method of feeding neonates and breastfeeding babies on demand is highly recommended, which could be contrary to the mother's traditional beliefs. The failure for medical interpretation of childbirth to acknowledge existence of traditional birthing practices subsequently influences health seeking behaviour and adherence to medical advice. Therefore, understanding women's pregnancy and childbirth experiences requires care givers to recognise and acknowledge the culture, traditional beliefs and societal values as these influence the choices women make during pregnancy and childbirth (Douglas, 2011). This would facilitate the provision of culturally sensitive health care and counselling especially where the baby requires intensive care treatment and interventions.

### **1.2.2 Neonatal Intensive Care**

Admission of a neonate in the Intensive Care Unit just after delivery has been found to be unexpected and overwhelming for parents in most cases (Palma et al., 2017). The NICU is a particularly challenging environment for mothers being exposed to the unit for the first time because of the disruption it causes to several natural processes (William et al., 2018). As a result, parents of admitted neonates report more stress and experience more maladaptation than parents of infants not requiring hospital admission at birth (Davis & Stein, 2013; Hynan et al., 2013; Lau & Morse, 2003 and

Rautava, et al., 2003). The distress that parents experience has been associated with multiple factors such as the NICU environment, and having a sick child, beside the normal stress of parenthood. The Intensive Care Unit has always been associated with restrictive care cultures that limit parental access to the infant, and contributes to stress arising from physical and emotional isolation from the baby (Raiskila, et al., 2017).

Parental distress and anxiety during the infant's admission in NICU may lead to poorer maternal and infant outcomes and ineffective parenting (Murphy et al., 2010; Santz et al., 2010; Zelkowitz, 2017). In addition, Turner et al., (2015), is in agreement with other authors that the experience of being a parent of a neonate admitted in NICU is stressful but added that the effects may continue beyond admission due to poor bonding. To mitigate these effects, Palma et al., (2017) suggested that parents need support during the first year after delivery thus during and after admission to NICU. However, appropriate support to parents should target the identified NICU stressors and associated factors.

Regarding NICU stressors, Chaudhari et al., (2011) and Peng et al., (2014) found that environmental factors in the NICU such as loud noise, and bright lights are stressors to both mother and baby. Not only are they stressors to the baby, the loud noise, and bright lights may have an effect on the baby's brain because they interrupt sleep at a critical stage of the baby's development. In addition, the mentioned stressors can further cause increased heart, and respiratory rates as well as reduced

oxygen saturation which increases the need for energy, consequently altering the baby's physiological functions and delayed healing (Peng et al., 2014). Pineda et al., (2018) and Skene et al., (2015) suggest that parental involvement in the care of infants in neonatal intensive care unit can improve neonatal outcomes, reduce parental stress and facilitate parental bonding with their new infants. Therefore, family centred policies that have expanded the role of the parent in the NICU have become the standard practice and are gaining momentum globally (Department of Health & Human services, 2012).

With regard to FCC implementation, in NICUs where it has not been introduced, the parents do not participate in care and the responsibility of taking care of the vulnerable new born babies is tasked to neonatal nurses. For the present study, participation denotes parents' involvement in clinical decision making and giving care (feeding, holding the baby). On the other hand, in NICUs where FCC has been introduced, nurses have a responsibility to take care of new born babies and also to create appropriate conditions for their mothers whose participation in child care is indispensable (Corlett, & Twycross, 2006), given that Nurses are on duty for 24 hours. This round the clock presence of nurses puts them at an advantage to identify the needs of the mothers and offer the required support to mitigate the stress. Parents of admitted neonates may have undergone socioeconomic and psychosocial stressors before and during childbirth. Taking into consideration that, these stressors remain unchanged after delivery of a baby that requires NICU admission it is reasonably presumed that maternal stress brought on by these factors

will be further intensified by concerns over the new-born baby's health. The predictors for parent infant interaction and bonding include nurses' caring attitude and open communication as perceived by parents (Guillaume et al., 2013, Vazquez and Cong, 2014). It is therefore, the nurse's responsibility to create a supportive atmosphere by involving mothers in the care, supporting them and sharing their doubts, fears and uncertainties.

As earlier highlighted, neonates admitted to the NICU are mostly either born prematurely or have failed to adapt to the extra uterine life at birth. When a mother has a high risk pregnancy, there are higher chances that the baby may be born prematurely, and may need to be admitted in the NICU. There are also chances that the baby may be delivered before 36 weeks' gestation even when the mother had a normal pregnancy. WHO (2018), defined preterm birth as babies born alive before 37 weeks of pregnancy are completed or fewer than 259 days since the first day of the woman's last menstrual period (LMP). There are sub-categories of preterm birth, based on gestational age; extremely preterm (less than 28 weeks), very preterm (28 to 32 weeks) and moderate to late preterm (32 to 37 weeks). It is further indicated that most of the premature babies fail to adapt to extra uterine life depending on the degree of prematurity. Fraser and Cooper (2014), documented that as the gestation age decreases the risk for complications in premature babies increase.

The other categories of babies that fail to adapt to extra uterine life include those born with birth deformities, asphyxiated and those born with low birth weight, all of

whom require admission to NICU. Ballot et al., (2012) has indicated that babies admitted in the NICU, especially the very low birth weighted are considered to be in a high risk category for developmental delays. Other researchers have also found that these children have greater chances of developing neurological disorders such as cerebral palsy, speech and language impairments and behavioural problems (Gladstone et al., 2015; Saldir et al., 2010; Zelkowitz et al., 2017). Trying to cope with the thought of fear of immediate as well as future complications indicated above can be an exhausting task for mothers.

Regardless of how the preterm delivery happens, many parents are faced with the reality of having a baby admitted to the NICU. The parents of the infants hospitalized find themselves in a situation of emotional strain and potential crisis (Wigert et al., 2013). They are also said to be faced with the hospital environment which is unfamiliar and intimidating (Heidari et al., 2017), which Bond et al., (2009) says gives rise to heightened distress, increasing anxiety, depression and trauma symptoms compared to those with healthy infants. During hospitalization of the infant, parents may spend much of their time in the NICU, suffering the strain of distance, travel, and separation from supportive family members. When they are at home, they worry about the unanticipated crises that may occur to their baby in their absence.

In the NICU, neonates are cared for in a clinical, intensive care environment with a lot of rules which most often exclude parents in the care of their babies. Consequently, parents feel their babies belong to the hospital and not to them

because health care providers are the ones providing almost all the care. This tendency that parents are often not involved in the care of their neonate can be traced back to the early 1900's (Cusson & Lee, 1994). Most units still adhere to the rules of separating babies from their parents, and the premise that only professionals can provide care while parents are relegated to supportive roles (Cockcroft, 2012, O'Brien et al., 2013). It can be assumed that the NICU environment probably developed as a result of the premature neonate's increased susceptibility to infection, clinical instability and dependency on modern high technology for the maintenance of life. As a result of the exclusion from care of the neonate, parents may feel incompetent to care for their baby (Wigert et al., 2013). It is, therefore, essential that the physical infrastructure of NICU is designed to accommodate both babies and mothers for better outcomes. In a study conducted by Shaheidari & Homer (2012) the physical environment has been shown to play a significant role in healing and contributes to clinical, operational and social dimensions of healing. Other researchers have also noted that a positive, physical healthcare environment is said to be a healing environment and has beneficial effects on the well-being of patients, the caregiving process and family comfort (Bazuin & Kerrie, 2011; Tanja-Dijkstra et al., 2011).

Other than stress due to separation from their babies, a study by Chourasia et al (2013) that measured stress using the Parental Stressor Scale (PSS): NICU, reported that the most common stressor of families with infants admitted is the physical appearance of the infant. On the contrary, the study by Heidari et al., (2017)

suggested that the amount of communication between parents and medical staff was the commonest stressor. As earlier indicated, separation of neonates from their parents during hospitalization has numerous long term effects on the babies and parents (Darling & Gallagner, 2004; Lau & Morse, 2003; Wigert, 2013). Early writings of Pierre Budin (1907) known as the father of neonatology documented the effects of separation of the infant from his family and encouraged mothers' /families' participation in the care of infants. Mother's participation in the care of the neonate can be achieved by FCC approach which results in optimal health outcomes. The presence of parents besides their infants has been reported by Niknadjad et al., (2012) as an effective factor on NICU stay duration reduction. In the NICU, FCC shifts the attention from the disease alone to the patient in the context of his or her family and community (Johnson, 2008). Trajkovski et al., (2015) indicated that a fundamental principle of FCC is developing a respectful partnership between health professionals and parents of infants requiring NICU care. Despite the documented benefits of partnership between parents and health care providers, most NICUs in developing countries have not implemented the FCC model.

### **1.2.3 Neonatal Intensive Care in Zambia**

Neonatal Intensive Care Units admit infants with prematurity, birth asphyxia, neonatal jaundice, sepsis, and congenital abnormalities. Neonates born with these conditions are classified as high risk neonates for they require highly technical and specialized care to survive. The high risk neonates born at the Women and New-born Hospital (WNH) of the University Teaching Hospital, are transferred to the NICU

immediately after birth. The Hospital's NICU also serves as a referral centre for the whole country. Neonates admitted to the NICU are referred from labour wards within hospital, obstetric operating theatre, postnatal wards, and maternity health centres within Lusaka as well as referrals from other parts of the country. The NICU at WNH of the University Teaching Hospitals is a multi-patient open bay ward with a few single rooms. The parents to the admitted babies are only allowed in the unit during visiting hours which is contrary to the principles of FCC. Family Centred Care shifts the focus from the neonate to the parent-child dyad and in response to this shift the designs of the NICU environments are trending away from multi patient open bay wards to single rooms (Domanico et al., 2011). Single room that accommodates both mothers and their babies as earlier on indicated improves the neonatal outcomes and reduces duration of stay in the hospital. The improved neonatal outcomes will consequently reduce neonatal and child morbidity and mortality that have continued to be a major challenge to the health sector in Zambia. Although many efforts have been put in place to address this public health concern, little success has been recorded. The neonatal mortality in the most recent period (2014-2018) has increased to 27 deaths per 1,000 live births from 24/1000 live births (ZSA et al., 2019). Mortality during the first month, is higher than post neonatal mortality (27 deaths per 1,000 births versus 14 deaths per 1,000 births) and accounts for 64 percent of the overall infant mortality (ZSA et al., 2019).

Regarding neonatal mortality, the WNH recorded high mortality in premature babies weighing less than one-kilogram during the years preceding 2010. This prompted

the hospital management to introduce kangaroo mother care for all premature babies weighing below two Kilograms. Kangaroo care, initiated in 2010, allows mothers to participate in providing care for their stable premature infants. An average of seven infants receive kangaroo care at any given time in a separate room though it is part of WNH NICU. Kangaroo care/holding of new-born babies brings some of the greatest comfort to families. NICU staff also recognize the importance of this activity, although more needs to be done to ensure that families have opportunities to hold their new-born babies as much as is safe and possible, as the benefits and value, both long- and short-term are powerful (Ferber et al., 2005). Similarly, Lau and Hurst et al., (2007) stated that maternal participation in infant care during NICU stay is so crucial that it can influence the lactation process by increasing the amount of mother's milk and her emotional wellbeing. Awareness of maternal emotional state is essential to breastfeeding mothers.

On the other hand, the main WNH NICU, admits approximately 250 neonates in a month on average. Nurse-midwives, a few critical care, and paediatric nurses provide the care in the NICU. They work in shifts, with between 3 and 6 nurses on duty at any given time translating to an average of one to ten, nurse patient ratio. The NICU is an open-bay ward with separate areas for general care, critically ill and single rooms for cases that require isolation. The NICU bed capacity is 45 cot beds and 11 incubators. The available equipment is limited to meeting basic care needs for all neonates that may need more than general care. It is not uncommon for two

or three infants to share an incubator or a bed, which may predispose the neonates to nosocomial infections.

Given the new-born babies' vulnerability to infection due to their partially developed immune system, measures have been put in place to reduce transmission of infection. These measures include administering of antibiotics for 5-7 days prior to discharge and reducing number of people in NICU by limiting the number of family members allowed to visit babies. The mothers are allowed to visit every two to three hours depending on the weight of the neonate, while fathers are only allowed during visiting hours in the morning and afternoon. Mothers are allowed to visit more frequently because they have to express breastmilk, feed, and check on their infants. For the infants who cannot breastfeed or feed by cup, among other nursing duties, nurses also initiate tube feeding with expressed breast or formula milk. Almost 90 percent of babies receive mothers' expressed breast milk. Nurses also conduct physical assessment on infants daily to evaluate their progress and identify which infants are ready for discharge.

It follows that those infants who meet the criteria for discharge which include a weight of at least 1.4 kg or more, steady weight gain, and ability to feed by both breast and cup are recommended for discharge (Wilson et al., 2011). Following discharge, the infants are seen at least weekly in the Outpatient Clinic until they reach a weight of 1.8 kg. Nurses provide discharge teaching to parents focusing on keeping the baby

warm, hygiene, cup and breast feeding, observing the infant for danger signs (such as failure to breastfeed, pyrexia, lethargy, convulsions, jaundice), and seeking medical care at the nearest health facility if such danger signs are observed. Since mothers are not actively involved in the care of their neonates during the time of hospitalisation, they are more likely to have difficulties caring for their babies at home. Parent participation in care provision for the baby from admission onwards has contributed to decreased stress and feelings of helplessness as well as easing the transition from hospital to home (Cooper et al., 2007). Through this approach, if and when the discharge day arrives, the parents will feel robustly prepared to take home the infant that they know best and have cared for since birth.

Despite the world wide FCC campaign to improve neonatal care in NICU by parental participation, the WNH, the largest tertiary hospital in Zambia has not yet implemented the Family Centred Care. This may be attributed to the lack of local information on stress experienced by mothers, and stressors in the NICU, which should inform management on changes required to be made to the care being offered. The other possible reason for the slow transition to implementation of the FCC may have to do with the requirement that mothers should spend time with their babies all the time, which may currently be constrained by inadequate and inappropriate infrastructure to meet the FCC requirements.

It is evident that having a new-born admitted to NICU is very stressful to the mothers as they are exposed to new ways of parenting in an unfamiliar environment. The stress experienced by mothers influences the lactation and bonding between mother and baby. Previous research has shown that different strategies have been implemented in different areas in the quest to reduce stress among parents. Most of the strategies are to encourage implementation of a family centred care model which is based on meeting the mother's needs during and after their neonate's hospitalization (Cooper et al., 2007; O'Brien et al., 2013). Similarly, Abdeyazdan et al., (2014) has shown that addressing these needs, reduces stress levels in mothers and improves neonatal outcomes. It is for these reasons that this study was conducted to assess the NICU environmental stressors and related factors among mothers with the neonates admitted in the intensive care unit and develop a stress alleviation model.

### **1.3 Statement of the Problem**

Parenting in the unfamiliar environment of the NICU is stressful to the mothers. Therefore, in most developed countries the focus of care in the NICU has changed from the biological, disease based aspect of care of the new-born to care that includes the social, emotional and psychological dimensions of the family. On the contrary the WNH of the UTH in Zambia has not fully incorporated the family in the care of admitted neonates. The Women and New-born Hospital NICU, admits neonates who are born from the delivery unit and those referred from other health institutions. New-born babies with complications are immediately referred or transferred for admission to the NICU. The Hospital Intensive Care Unit had a total

of 3682 admissions in 2013, of which the majority were premature babies while others had Septicaemia, Asphyxia Neonatorum, Respiratory Distress Syndrome and Jaundice. In the same year a high mortality especially among the premature babies was recorded (UTH, 2014). To address the gaps related to clinical neonatal care, Zambia launched a number of neonatal protocols such as Kangaroo mother care. This was also to accelerate the reduction of neonatal deaths. However, other than the Kangaroo mother care no protocols exist on integration of parents into the NICU.

Despite the mentioned high number of admission, the NICU has limited capacity and is unable to accommodate mothers of babies admitted to the unit. The postnatal mothers who are discharged from hospital but their babies are admitted to the NICU are accommodated at the mother's shelter situated outside the hospital wards. Among the discharged, the mothers who are able to visit their baby every three hours stay at their homes. Those who delivered through caesarean section are kept in the postnatal ward within the hospital till discharge. However, all the mothers are expected to go to the NICU to feed their babies at prescribed times. The visiting times are scheduled to avoid disruption of provision of care by health care providers. A scenario that excludes mothers from clinical decision making on their baby's care. In the absence of mothers, nurses are expected to meet the needs of all the neonates under their care, which may pose a challenge owing to the high nurse-patient ratio. This might leave the mothers with unfulfilled birth experience and compromise establishment of the mother-infant relationship. In addition, it is difficult for them to access the information they need on the progress of their sick neonate.

When they are away from their babies, mothers may worry about the unanticipated crises that may occur on the baby in their absence, resulting in maternal stress, anxiety and physical and emotional isolation.

Maternal stress due to NICU admission can be reduced by FCC model that advocates for family involvement and unbiased information sharing. This can only be achieved if the stress factors and related factors are identified. As earlier highlighted, little has been documented in Zambia on NICU environmental stressors and infant and maternal characteristics that may contribute to high levels of stress among mothers nursing their infants in NICU. Further, no care model exists to enhance nurses' role in assisting mothers to cope with, mothers' subjective parenting experiences and improving the quality of NICU care. There is documented evidence on mothers' stress and care models that nurses could use to design and guide nursing interventions. These models can only be implemented if the stressors are identified. It is not known whether the stressors experienced by mothers at WNH differ with those documented elsewhere and in relation to different parents and infant characteristics on admission and discharge. As documented by Hall et al., (2015) not all families require the same type or amount of support. With the various types of support available to families (e.g. emotional, information, financial), persons from the same group may or may not share similar needs, priorities, or sources of support (Darling & Gallagher, 2004). Callister and Khalaf, (2010) emphasised the importance for nurses to understand the parental experience when infants are

admitted to the NICU, in order to meet their needs and concerns and enhance their satisfaction.

Reducing parental stress during infant's hospitalisation in NICU should be a key nursing function because they have direct and frequent contact with mothers and their families. This function can adequately be performed if the stressors and stress experienced by mothers are investigated. Through investigating and identifying stressors the care modalities which may address them can be developed. Without formal care model accessible to nurses providing care, care provided may not be responsive to mothers' needs. Therefore, the stress experienced by mothers will not be addressed which consequently leads to poor bonding, parenting practices and neonatal outcomes in NICU.

#### **1.4 Delimitation of the study**

The focus of this study was stress alleviation model development based on the NICU stressors and associated factors identified among the mothers whose babies were admitted to WNH NICU. In addition, the perceived NICU stressors by the nurses working in NICU were also investigated and used as a basis for model development. The NICU environmental stressors in this case being; Sights and Sounds, Infant Appearance and Behaviour, Staff Behaviour and Communication and Parent-Infant Relationship. The associated factors included the situational and personal factors. The stressors investigated were based on the parental stress model NICU by

Weresczack et al., (1997) and Miles et al., (1993). In addition to investigating NICU environmental stressors and associated factors, a model was developed for use by nurses to assist reduce stress experienced by women nursing their babies in NICU.

## **1.5 Research Questions**

1.5.1 What are the levels of stress experienced by mothers of hospitalised neonates in the NICU?

1.5.2 What are the sources of stress experienced by mothers of hospitalised neonates in the NICU?

1.5.3 Is there a significant relationship between maternal characteristics and maternal stress?

1.5.4 Is there a significant relationship between infant characteristics and maternal stress levels?

1.5.5 What are the nurses' perceptions of stressors for mothers nursing their neonates in the NICU?

1.5.6 What interventions can be adapted in the parental support model to alleviate stress among mothers with neonates admitted in the NICU?

## **1.6 Research Hypothesis**

### **Null Hypothesis**

There is no relationship between stress levels of the mother and the following factors

- 1.6.1 Infant characteristics (Gestation age of the infant, birth weight, Diagnosis, type of feeding, Mode of treatment given to the infant and Length of stay in the NICU, ventilation need)
- 1.6.2 Maternal characteristics (age, marital status, educational level, mode of delivery, monthly income, social support and employment status)
- 1.6.3 NICU environment (sights and sounds, Infant appearance, parent infant relationship and staff behaviour)

## **1.7 Research Objectives**

### **1.7.1 General objective**

To develop a support model for stress alleviation in mothers with neonates admitted to NICU at Women and New-born hospital of University Teaching Hospitals

### **1.7.2 Specific objectives**

- 1.7.2.1 To determine the levels of stress experienced by mothers of hospitalised neonates in the NICU.
- 1.7.2.2 To determine the sources of stress experienced by mothers of hospitalised neonates in the NICU.
- 1.7.2.3 To determine mothers and infant's characteristics that influence maternal stress in the NICU
- 1.7.2.4 To explore the nurses' perception of stressors in mothers caring for their neonates in NICU

1.7.2.5 To design a maternal support model for stress alleviation in mothers of hospitalised neonates in Women and New-born Hospital

## **1.8 Definition of Terms**

### **1.8.1 Conceptual definitions**

**1.8.1.1** Family centred care – the philosophy that recognizes the family as one constant in a child’s life (Wong & Perry, 2006)

**1.8.1.2** Birth weight – The birth weight of an infant is the first weight recorded after birth, ideally measured within the first hour after birth, before significant postnatal weight loss has occurred (Cutland et al., 2017).

**1.8.1.3** Low birth weight (LBW) is defined as a birth weight of less than 2500 g (up to and including 2499 g), as per the World Health Organization (WHO, 2004)

**1.8.1.4** Gestation age – are weeks calculated from the first day of the last menstrual period and have no relevance to the baby’s weight (Fraser and Cooper, 2014).

**1.8.1.5** Diagnosis - is the process of finding out what is causing symptoms, a disease or injury in a patient and the opinion reached based on the process (Oxford English Dictionary, 2010).

**1.8.1.6** Stress is defined as ‘psychological and physical strain or tension generated by physical, emotional, social, economic, or

occupational circumstances, events, or experiences that are difficult to manage or endure' (Colman,2003).

1.8.1.7 A stressor is defined as physical, psychological or social force that puts real or perceived demands on the body, emotions, mind, or spirit of an individual (Colman,2003).

## 1.8.2 **Operational definitions**

**1.8.2.1.1** Birth weight – refers to weight at birth measured in grams categorised as low birth weight (below 2500g) and normal birth weight (above 2500g).

**1.8.2.1.2** Duration of stay – refers to the actual number of days a neonate spends in the WNH NICU not including those spent in other hospitals in case of the babies referred.

**1.8.2.1.3** Gestation age – the number of weeks and days that elapsed before delivery of the neonate calculated from the last day of the normal menstrual cycle as mentioned by the mother

**1.8.2.1.4** Diagnosis – refers to the condition present at birth or develops later in early neonatal period, identified as need for admission of the neonate to NICU categorised as either prematurity, asphyxia, neonatal jaundice, sepsis, congenital abnormalities or observations

**1.8.2.1.5** Maternal stress refers to perceived stress experienced by mothers whose infant has been admitted due to situational and maternal factors and NICU environmental stress

measured by the PSS: NICU tool (46 items), Metric one. Levels of stress occurrence measured as: Low stress scores of 0 -1, Moderate 2 – 3 and High stress levels 4 - 5.

**1.8.2.1.6** NICU environmental stressors refers to a representative list of potential stressors which include sights and sounds, infant appearance, parent infant relationship and staff behaviour.

**1.8.2.1.6.1** Sights and sounds (5items) measures stress related to equipment, noises and number of staff working in NICU.

**1.8.2.1.6.2** Infant behaviour and appearance (19 items) measures stress related to physical appearance of the infant due to physiological development and attached medical equipment for treatment purposes (respirator, tubes for oxygen administration and feeding)

**1.8.2.1.6.3** Parent Infant relationship (10 items) refers to stress due to parental role adjustment as mother and baby are separated during admission

**1.8.2.1.6.4** Staff behaviour (11 items) measures stress related to communication in NICU between mothers and health care providers.

**1.8.2.1.6.5** General stress (1 item) measures perceived stress experienced due to having an infant admitted to NICU.

**Table 1.1 Variable and Measurement for Quantitative data (Phase one)**

Variable	Variable Type	Indicators
<b>Dependent (Outcome) Variable</b> Maternal stress	Ordinal	Low (0 – 1) Medium (2 – 3) High (4 – 5)
<b>Independent (Predictor) Variable</b>		
Age	Ordinal	15 – 30 years 31 – 50 years
Marital status	Nominal	Married Unmarried
Educational level	Ordinal	Primary & secondary Tertiary
Monthly Salary income	Nominal	Yes No
Employment status	Nominal	Formal employment Self/un employed
Gestation age of the infant at birth	Nominal	28 – 36 weeks 37 – 42 weeks
Birth weight	Ordinal	Less than 2500g More than 2500g
Diagnosis	Nominal	Prematurity Asphyxia Neonatal Jaundice Neonatal sepsis Observation Congenital abnormality
Type of feeding	Nominal	Tube Feeding Nipple feeding Cup Feeding Parenteral
Respiratory status	Nominal	Room air Oxygen therapy
Length of stay in the NICU	Ordinal	Less than 7 days More than 7 days
Sights and sounds	Nominal	0 = not applicable
Infant appearance and behaviour	Nominal	1 = not at all stressful
Parent – Infant relationship	Nominal	2 = a little stressful
Staff behaviour	Nominal	3 = moderately stressful
General stress	Nominal	4 & 5= very stressful

## **1.9 Justification for the Study**

Developing a support model for stress alleviation among mothers with infants admitted in NICU emanated from the realisation of the stress mothers might have been experiencing while nursing their babies. While there is evidence to support the conclusion that the NICU can be a stressful and an overwhelming environment for families, little is known about the actual stressful factors mothers in Zambia might be experiencing while their infants are hospitalized in NICU and whether these differ in relation to parents and infant characteristics. Therefore, developing an evidence based support model required identification of NICU stressors and associated maternal and infant characteristics. Examination of NICU stressors stem from the emphasis in literature on parents' role in developing support programmes for mediating stress, and the benefits that might be associated with a reduction in maternal stress (Hall et al., 2015).

It follows that this study sought to explore the stressful situations experienced by mothers with infants admitted to WNH NICU and the nurses' perception of maternal stress and stressors in this regard. While ideally, every mother's needs should be thoroughly assessed during their infant's stay in the NICU, this may not be practical given the limited amount of time that mothers may spend with service providers. The NICU rules and regulations and the healthcare budget restrictions may limit the amount of support a hospital can provide. Studying stress among mothers nursing babies in NICU and identified stressors that surfaced from the data, providers will be

able to develop a better understanding of the stressors that may be most important to mothers.

This study results adds new knowledge on aspects of NICU environmental factors, infants and mothers Characteristics that cause stress. In addition, the model which has been developed will facilitate nurses' understanding of their role in stress alleviation and also facilitates active involvement of mothers in the care of their infant admitted to NICU. This is fundamental in the sense that identification of the NICU stressors and recognition of the need to support mothers of hospitalised infants are appropriate to inform future policy and practice. It will also enhance nursing communication and allow nurses to incorporate parents' needs into infant's plans of care. The results will also inform policy development and implementation of strategies that are responsive to needs of the neonate, the mother, and the nurses.

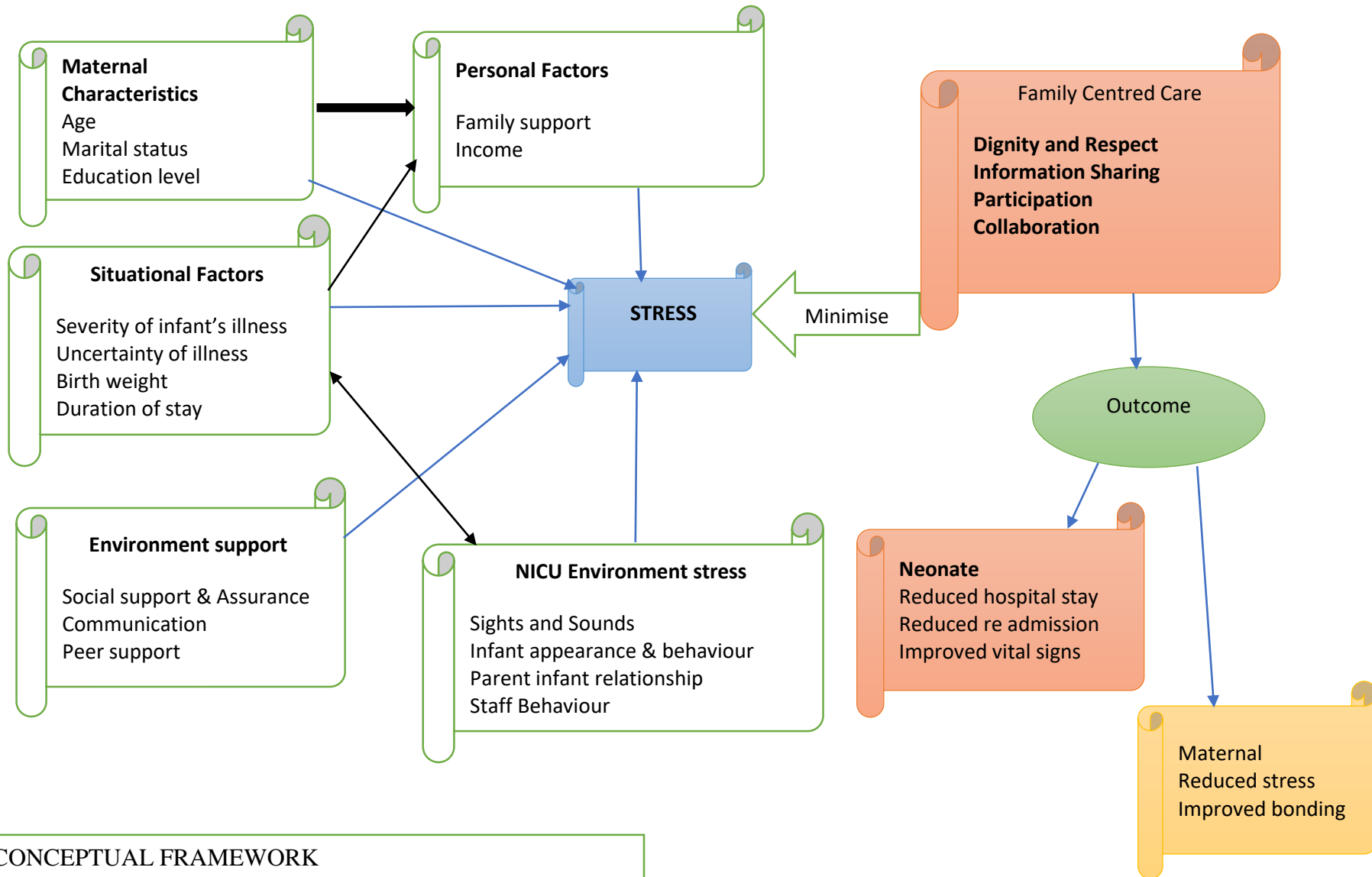


Figure 1.1: CONCEPTUAL FRAMEWORK  
 Source: Wereszczak et al., 1997 and Institute for Family-Centred Care (2008).

## **1.10 Theoretical Foundations**

The conceptual framework (figure 1.1) guiding this study was adapted from the Institute of Family-Centred Care (2008) and parental NICU stress model by Wereszczak et al., (1997). This framework directed the selection of the parental stressor scale interview schedule used in this study (PSS: NICU). According to the Institute of Family-Centred Care, FCC is an innovative approach to the planning, delivery, and evaluation of healthcare, and is grounded in the mutually beneficial partnership among healthcare providers, patients and families (The Institute for Family-Centred Care, 2008). The Institute for Family-Centred Care further indicate that the FCC framework consists of four core concepts; dignity and respect, information sharing, participation, and collaboration. The current study was therefore guided by the two theoretical foundations.

Regarding the theoretical foundations, the parental NICU stress model explains the stress families with a patient admitted in the Intensive Care Unit experience and how it influences the outcomes of the neonate and the parents. This model has been used as guide for this study regarding environmental and situational factors which might cause stress to mothers. The factors identified in figure 1.1 serve as variables in the current study. Further, those variables which were found to be statistically significant were used to formulate the model for alleviating stress among mothers with neonates born prematurely, any other conditions and those with congenital abnormalities admitted in the NICU.

### **1.10.1 Parental NICU stress model**

NICU stress can be conceptualized using the Parental NICU stress model which considers NICU environmental stressors and factors influencing parent's experience of NICU environment (Varma et al., 2019; Wereszckak, Miles & Holditch-Davis, 1997). Wereszckak et al., (1997) further explains that the factors influencing parental experience to NICU environment include their personal characteristics, personal resources and situational factors. However, other authors in previous studies have used other models to measure parental stress. The Parental Intensive care unit stress model is one of such models that have been previously used to measure parental stress (Miles & Carter, 1983).

The Parental Intensive Care Unit Stress model was designed in relation to the Paediatric Intensive Care Unit, as opposed to the NICU. Another comparable model is the Preterm Parental Distress model (Holditch-Davis & Miles, 2000) which was used on mothers with premature babies. In this regard, the Preterm Parental Distress model, could not be used in this study because it only considers pre-term infants in the NICU, excluding other types of infants in the NICU such as those with low birth weight or full term infants who were critically ill. Similarly, the Parental Intensive care unit stress model could not be used for this study as it focuses on paediatrics which includes older children and not only neonates. Therefore, the only suitable model that could be applied for the current study is the parental NICU stress model which is designed specifically for parents of NICU infants which is the focus of the study

(Wereszczak et al., 1997). In addition, this model was adapted from the Parental Intensive Care Unit Stress model which was developed from theories of stress and relevant research making it more appropriate to measure stress. The current study has included all infants who were admitted to NICU and only excluded those who had severe congenital abnormalities who could not survive extra uterine life.

According to Wereszczak et al., (1997) Parental NICU Stress model, the NICU environment stressors directly influence the stress parents experience in NICU. Four major NICU environment stressors were identified and described in detail by the originator, Miles et al., (1993). The physical environment that includes the machines, equipment, lights, noises, infants, and staff was described under the subscale “sights and sounds”. In addition, the subscale, ‘Infant appearance and behaviour’ was described as how a parent’s infant looked and behaved, usually quite different to a healthy new-born infant because of illness and being born before term. The alterations to the expected parent-infant relationship and parental role, due to nurses being the primary caregivers was described as parent-infant relationship subscale. The last subscale, “staff behaviour and communication” was described as information sharing between staff and parents about their infant’s condition or treatment.

Factors outlined in the Parental NICU Stress model adapted from Wereszczak et al., (1997) thought to influence a parent’s experience of NICU environment stressors include: (1) personal characteristics of the parent, such as age, marital status and education; (2) situational factors, such as severity of the infant’s illness and

uncertainty about the illness; (3) personal resources of the parent, such as family support, and financial resources; and (4) environmental support, such as support from staff or other parents in the NICU. Identification of NICU stressors is essential to guide nursing actions towards the family centred care that hinges on parental support and involvement in caring of their infants (figure 1).

### **1.10.2 Family Centred Care Model**

The movement for family and patient centred care stems from a large body of literature that dates back to the 19<sup>th</sup> century. In the 1800s, the birth and care of infants born in the United States encompassed FCC naturally although the term had not yet been coined. Most infants were born at home with little involvement of physicians, and care was provided almost exclusively by the mother and extended (usually female) family members (Gooding et al., 2011). Early work of the American Academy of Paediatrics (2003) documented the history of FCC as an important concept in health care that emerged in the second half of the 20<sup>th</sup> century. Further they indicated that FCC emerged at a time of increasing awareness of the importance of meeting the psychosocial and developmental needs of children and of the role the families play in promoting health and well-being of their infants. Based on this awareness, Trajkovski et al., (2015) indicated that a fundamental principle of FCC is the need to develop respectful partnership between health professionals and parents of infants requiring neonatal intensive care. Neonatal Intensive Care Units have therefore shifted from restrictive hospital environments that previously

excluded families, to policies that place parents and family at the centre of care. Increased emphasis has been placed on the need to recognise individual needs of families and position parents in the care of their neonates (Bernado et al., 2017). When parents feel involved, they gain confidence and competence in caring for the baby (Petersen et al., 2004). Ultimately, this strengthens their ability to make care and treatment decisions (Beck et al., 2009).

FCC is associated with theoretical models related to the influence of family and environmental factors on outcomes of the neonates admitted in the NICU, psychological wellbeing of the family, and social support on adaptation to stress. The FCC model has been emphasized as an important and necessary element of neonatal intensive care (Palma et al., 2017). It is conceptualized as a philosophy with a set of guiding principles, a cohort of programmes, services, and practices that many hospitals have embraced (Gooding et al., 2011). This philosophy of care helps families cope with the stress, fear and altered parenting roles that may accompany their infant's condition and hospitalization. It has been adopted by many hospitals because of several factors that drive the pressing need for family-centred care and support of families of infants in NICUs, including the increase in the number of infants in NICUs; growth in diversity of the population and their concurrent needs; identification of parental and familial stress and lack of parenting confidence; and gaps in support for families, as identified by parents and NICU staff (Gooding et al., 2011).

FCC has been found to be beneficial to parents and infants admitted in the NICU. Department of Health, (2009) indicates that the birth of a pre-term baby is a distressing event and can have long term consequences. Therefore, FCC aims at helping families cope with associated anxiety and as well as promoting maternal well-being. It is also associated with infant benefits (shorter lengths of stay, fewer readmissions and enhanced breastfeeding), increased staff satisfaction as well as a positive impact on stress levels, comfort level and parenting confidence of parents and families (Cooper et al., 2007).

Further Cooper et al, indicated that the FCC intervention approach views the family as the 'child's primary source of strength and support. The model recognizes the family as a constant in the child's life, while the time in the NICU is temporal. Family centred care model emphasizes on parent and professional collaboration in the care, development, implementation and evaluation of the programmes for the child and in the development of treatment policy (Cooper et al., 2007). It also affirms the need to share information on the child's condition and prognosis in unbiased supportive manner. As early as 1993, Harrison alluded to this fact that information for parents must have same facts and interpretation of those facts as possessed by medical staff. In addition to this, information must be complete, specific, detailed and meaningful. FCC also involves implementing policies and procedures that include emotional and financial services for families including child-directed services. It should recognize the individuality of families, their strengths and different patterns of coping.

As earlier stated, family centred care involves the concepts of dignity and respect, information sharing, family participation in the care of the infant, and family collaboration. These four factors foster the development of a partnership between the families and the hospital staff (Griffin, 2006). Dunst et al., (2002) also reveals the core beliefs of family centred practice that are similar to the earlier work of Brown et al., (1991). The core beliefs stated by previous authors include the aspect of resource mobilization but do not include the aspect of honouring racial, ethnic and cultural diversities (Dunst et al., 2002; Brown et al,1991).

Similarly, Ramazeni et al., (2013) states that family centred care is considered the gold standard medical concept in NICU. Parents with neonates admitted in the NICU and even professionals involved in high risk infants advocate a family centred approach to treatment with mutually beneficial and supportive partnership in the NICU and beyond. Bauer et al., (1995) emphasized that within the NICU itself, important clinical practice changes ought to be made to empower all parents with decision making abilities. The most important change that needs to be made is realizing that the neonate belongs to parents and not to the hospital. The parents of admitted infants should also not be taken as if they are inferior, but should be involved in making clinical decisions and care for their neonates. The change being advocated for in the NICU can only be achieved by parents and professionals working together in the development of the system, a change that takes into account the needs of the new born and their families.

Dignity and respect directs healthcare practitioners to listen to the family's choices and perspectives regarding their healthcare, and to act on them accordingly. Nurses also have an opportunity to share their observations and knowledge of the infant, provide information about the individual characteristics of the neonate to acquaint the mother with her infant and help diminish anxiety (Wong et al., 2015). Such information should be provided in a timely, complete and accurate manner so the patients' families can actively engage in care and decision-making. Participation includes encouraging mothers to engage in decision-making and to take care of their babies to an extent that they can manage while collaboration involves healthcare leaders consulting with patients and their families to develop policies and programmes, implementation and evaluation of care, and professional education.

### **1.11 Outline of the Thesis**

This thesis is organised into six main chapters. Chapter one is the introduction, two is literature review, methodology is in chapter three, four are results of the study, five discussions of findings and conclusion, implications and recommendations are in chapter six. Each of these chapters are divided in a number of sections which outline a concept that builds up to that specific chapter. For the purpose of this study the terms 'this study' and 'current study' are used interchangeably in reference to the work undertaken upon which the thesis is based, including outcomes, conclusion and limitations.

Chapter one sets out to provide the background to new-born care, neonatal intensive care and neonatal intensive care in Zambia at the Women and New-born Hospital. This chapter also provides information on the NICU stressors and associated factors that parents experience during NICU admission as documented by other authors. The chapter also presents the statement of the problem which brings out the gaps on care rendered in NICU in relation to stress, stressors and stress alleviation strategies. Since this thesis used a mixed method approach both research questions and hypothesis were outlined in chapter one. In addition, the theoretical foundations that guided this thesis have been discussed. The conceptual framework adapted from the theoretical foundations included the following concepts; NICU environmental stressors, situational and personal factors as causes of stress. It also includes the concept of FCC which is a gold standard in NICU care.

The third chapter outlines the methodology that was used to answer the research objectives. It sets out with some brief theoretical foundations that gives a basis for the pragmatism paradigm used in this thesis. This is followed by the presentation of the design for the study which was cross sectional descriptive study using a convergent concurrent design mixed method strategy. The study site, population, sample and sampling techniques are then outlined. Furthermore, the data collection, analysis is presented starting with quantitative data analysis procedures the qualitative data analysis methods. Finally, the chapter outlines how the threats to

validity and reliability were dealt with. It also shows how ethical issues were upheld throughout the process of this study.

Chapter four begins with a brief introduction outlining the research objectives which were investigated in this study. This chapter presents results starting with the results of the first phase of the study; the qualitative and quantitative results then the results of the phase two and the model development. Phase one results were presented starting with demographic characteristics followed by results on parental stress scale measurements in NICU. The findings of the qualitative component are also presented in this chapter. Alongside the presentation of quantitative and qualitative findings a model of stress alleviation was developed in phase two of the study using a stakeholder consultation approach is presented.

In chapter five a discussion with seven subsections is outlined. The first section is an introduction which is followed by summary of the overall findings of the study. The third, fourth and fifth sections are discussion of demographic characteristics of the study sample, NICU stressors and general stress experience in NICU. The sixth and seventh section discusses the nurses' perceptions of stress in NICU and the triangulation of the two data sets. The last chapter of the study, chapter six outlines the conclusions, implications and recommendations. The chapter also outlines the strength and limitations of the study. The implications are mainly in areas of policy, nursing practice, education and research. These include rendering support to

mothers nursing babies in NICU. Implementation of the FCC principles in NICU is seen as vital for stress alleviation among the parents.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter has been organised into five main sections, with each addressing or critiquing scholarly literature that are critical to the main subject of this study. The main objective of this study is to develop a model for stress alleviation in NICU after identifying the environmental stressors and associated factors. Therefore, the sections of literature review are in line with the specific objectives. The first section is the introduction of what is contained in this chapter. The subsequent sections address the specific objectives on NICU stressors and the associated factors. In addition, the last two sections address the literature related to nurses' support to mothers and the support and care programmes in NICU. Literature review accords the researcher an opportunity to understand what is already known and the gaps that exist about phenomenon under study. According to Polit and Beck (2010), literature review is a broad, comprehensive in-depth, systematic and critical review of scholarly publications, unpublished scholarly print materials, audio-visual materials and personal communications.

Therefore, this chapter presents a comprehensive review of relevant literature which facilitates an understanding of situations perceived as stressful by mothers with

babies in NICU, associated characteristics, and support programmes that have been implemented. The sources consulted include electronic databases, text books, and articles from peer reviewed journals among others. Search engines including Google scholar, Medline, PubMed, and BioMed were used to retrieve research articles that have been included in review. It should be noted that most of the literature reviewed have been conducted in developed countries due to limited amount of locally generated research on the phenomenon under study.

## **2.2 Overview of Stress and Childbirth**

Stress associated to the process of childbirth has been documented in literature. According to Ghorbani et al., (2014) pregnancy and delivery can induce large psychological and social changes for parents. In line with this finding, Misund et al., (2014) reported that signs of post-traumatic stress disorder after the birth of the infant among parents of full term neonates were identified among research participants. In addition, the stress experienced by parents due to the process of childbirth has been associated to many physical, emotional and social changes experienced in preparation for parenthood (Smithgal et al., 2010). The preparation for parenthood is a process which is undergone by all women, whether one has had a normal or complicated delivery. Therefore, it is most likely that most women could be experiencing some stress attributed to the process of pregnancy, labour and delivery at the time they are admitted to NICU. The stressors may include adjusting to care giving, coping with physical demands such as breast feeding and altered sleep

routines, and living with the ongoing financial obligations of having an additional family member.

Regarding childbirth stress, a mother who delivers unexpectedly early experiences more stress than one with a normal delivery. According to Naeem et al., (2019) a birth of a premature infant is unexpected, therefore it influences the parents' mental health negatively. In addition, the family takes on additional parental stressors that include maternal recovery from a high-risk pregnancy, uncertainty about the infant's survival and outcome, the constant worry during the NICU experience, and the challenges of assuming care giving responsibilities for a recovering infant at home (Jackson et al., 2003). Compatible with this finding, Turner et al., (2015) reported that the parents' responses are not limited to the period of hospitalization, the NICU experience is associated with disorders such as acute stress and post traumatic disorders. Busse et al., (2013) further revealed that stress emanating from the NICU environment influences parenting behaviour and also produces long term emotional problems. Therefore, Health care providers' understanding of each family's unique characteristics and needs in the NICU should be one of the essential components of care. Ward (2001) documented that inappropriately responding to a family's needs may lead to more anxiety, fear and confusion. In this case, a family need is defined by (Bond, 2003) as a requirement which if supplied relieves or diminishes distress or improves the sense of adequacy or well-being. Besides the family needs, it is acknowledged that unique characteristics such as personal demographics and

situational factors that are related to infant clinical characteristics can influence stress experienced by parents during admission (Bond 2003).

### **2.3 Situational Factors**

Situational factors defined as the infant clinical characteristics such as severity of the infant's illness in the Parental NICU stress model by Wereszczak et al., (1997) were also investigated in this study. According to Stacey et al., (2015) the birth of a new born baby that results in the admission to a NICU is the initial stressor for a family. Parents of admitted infants fear for their infant' survival and begin experiencing feelings of worry, depression, and anxiety (Obeidat et al., 2009). Although, admission of the infant is stressful for mothers, parents are also influenced by the specific situational conditions of their infant.

One of the situational factors investigated in the current study is the severity of infant's condition. Carter et al., (2007) and Dudek-Shriber (2004), reported that parental stress is influenced by the infant's condition at a moment. The medical condition of an infant and the required medical/surgical treatment might directly increase parental stress (Carter et al., 2007). Parents of infants with poor conditions were more likely to experience high levels of stress compared to those whose infants were improving. The other situational factors that may influence maternal stress include the severity of the infant's diagnosis, gestation age at birth, the infant's appearance and level of functioning, and the duration of their infant's stay in NICU.

The increase of stress based on the situational factors could be attributed to critical condition of the neonate and the consequent higher risk of dying or having life-long complications.

Studies suggest that parental stress levels in the NICU may be influenced also by several demographic factors and clinical variables related to the infant (Umasankar et al., 2016; Turner et al., 2015; Chourasia et al., 2013). The extent of prematurity and illness severity of the infant have been shown to be predictors of increased levels of maternal stress. At the time a premature baby is admitted to a NICU, there is often uncertainty about the baby's prognosis. The extent of prematurity has been associated with more or less complications (Mwanza and Vwalika, 2017). It is therefore assumed that premature babies born with a lower gestation age have less chance of survival compared to those born with a higher gestation age. Mothers' awareness of this may be the reason for increased stress levels. In addition, mothers of infants suffering from cardio respiratory instability have reported higher stress levels than mothers of otherwise healthy preterm infants (Dudek-Shriber, 2004, Singer, 1999). The increased stress levels in mothers with infants suffering from cardio respiratory instability may be attributed to uncertainty about child's survival compared to those with a healthy premature baby. Mothers with healthy premature infants may be assured of high likely hood of survival and reduced complications.

In addition to stress associated to premature delivery, Chourasia et al., (2013) reported an association between stress and duration of stay in NICU. Studies have

assessed the impact of the duration of stay in NICU on stress and reported different results. Varma et al., (2019) recruited mothers who had spent more than 48 hours in NICU and interviewed them on the six to eight days while Umusankar and Sathiadas (2016), went up to 60 days, Chourasia et al., (2013) interviewed mothers who had spent Six to Eight days in NICU. The results of these studies reported lower stress levels among the parents that had stayed longer in NICU. As parents stay longer in NICU, they tend to adapt to the environment and the routine of the unit. In this regard, parents that stay longer in NICU are likely to report reduced stress levels if other variables like condition of the infant remain constant. In agreement with other authors, a study conducted by Wigert et al., (2013) reported that parents in the first week of hospitalization, reported feelings of shock, apprehension, and uncertainty about the health of their child. In mothers, this may reveal itself as depression and anxiety possibly due to ambiguity of their parental role, an uncertain prognosis, and ineffective communication between parents and nursing personnel (Wigert, et al., 2013). The difference in duration of stay in NICU has brought out the trend of stress at different times of admission. Therefore, for the current study, duration of stay in the NICU was defined as those that had spent more than 24hrs to ensure that stress at different levels of admission is determined. However, the limitation of these studies is, stress was not compared at admission and at discharge to ascertain if one parent experienced different levels of stress.

## 2.4 Personal Characteristics

In addition to situational factors, the parental NICU stress model also conceptualises personal factors as an influence on experiences of mothers in NICU. The personal characteristics of interest in the current study include maternal demographics (age, education, personality), family factors (marital status, income, having other older children at home) and pregnancy factors (pregnancy abnormalities, previous admission to NICU). These are factors that influence the experience of mothers in NICU as documented by other previous studies (Varma et al., 2019; Umasankar and Sathiadas 2016; Stube et al., 2018). Studies examining the association between maternal demographics and stress levels have reported mixed results. Increased stress levels have been found in older women (Chourasia et al., 2013) while Woodward et al., (2014) and Carter et al., (2007) and Busse et al., (2013) reported stress in younger, unmarried, low-income and less-educated mothers. A study conducted by Dudek-Shriber (2004), reported stress in married mothers with high levels of education. Contrary to this finding Varma et al., (2019) reported that lower levels of education were protective against maternal stress.

Disagreeing with studies that reported an association between education level and stress, Abdeyazdan et al., (2014) and Foligno et al., (2020) documented that there was no association. Similarly, other studies reported no association between heightened levels of stress and maternal demographics (Alkozei et al., 2014; Franck, 2005). The different results reported by these studies could be explained by the

mitigating effect of factors like support from family members and staff during NICU admission. These studies were conducted in different areas where these other factors that could influence mother's experiences in NICU were also different. Furthermore, differences in the findings of the highlighted studies may be attributable to study settings and respondents' cultural beliefs. Different cultures attach different values to demographics characteristics that were of interest in these studies. In the Zambian setting where having a baby out of wedlock is not socially acceptable, women may be stressed even before the birth of a baby that may require intensive care. There also other cultural teachings stating that complications in labour could be due to infidelity or witchcraft from those around them could also be a source of stress and anxiety to the mothers (Maimbolwa et al., 2003). Therefore, complications in labour may be viewed as a failure on the woman's part to adhere to traditional norms.

Regarding personal characteristics of the parent, other factors that may influence parental stress are past experiences and personality. Literature in support of the link between parental stress and past experiences includes the developmental theory of continuity, whereby past experiences and an individual's adjustment to current experiences are thought to influence later psychological functioning (Obeida et al., 2009; Kaboni and Holditch-Davis, 2014). Therefore, it is argued that when past experiences are positive, they are more likely to promote healthy functioning later in life. Conversely, unpleasant past experiences are thought to increase an individual's vulnerability to stress (Steedman et al., 2007). Holditch-Davis and Miles, (2000) also

reveal that past experience is a contributing factor to the level of stress experienced in a NICU. In their study, Umasankar et al., (2016) reported a strong association between stress and having had a baby who was admitted in NICU and those whose babies died in NICU.

On the hand, a mother's personality has been reported to influence parental stress by Carter et al., (2007) and Mulder et al., (2006) whose studies conclude that personality dimensions are predictors of psychopathology, including neuroticism, anxiety, and depression. Therefore, based on the findings of these authors, mothers' predisposition to stress may differ because of their different personalities. The experiences of mothers in life may also influence their response to NICU admission so that mothers who have been exposed to harsh and neglecting parenting qualities of their parents, experience higher levels of stress and display lower levels of warmth towards their own children (Assel et al., 2002; Carter et al., 2007).

When considering the quality or style of parenting displayed by an individual's parents, two parental qualities that have been consistently identified in literature include care and over protection (Parker et al 1992; Parker, Tupling & Brown 1979; Steedman et al., 2007). Parker et al., (1979) define care as affection, emotional warmth, empathy, and closeness' and overprotection control as intrusion, excessive contact, infantilisation, and prevention of independent behaviour. The level of stress

an individual experience when they become parents is linked to either care or overprotection in an individual's childhood (Assel et al.,2002; Carter et al.,2007). In addition, Assel et al., (2000) emphasized that mothers who recalled harsh and neglecting memories of how they were parented were more likely to report higher levels of emotional stress. Therefore, the constructs of parents' warm responsiveness corresponded to care while restrictiveness corresponded to over protection. Most previous studies have not considered the personalities of parents when evaluating the response to NICU admission. More studies may be needed in this area.

Despite the effects of how one responds to NICU admission based on their personality and experiences, stress can also be compounded by the resources they have at hand. Having an added responsibility of nursing a baby in NICU demands that the family resources be shared to meet the financial demands in the hospital. Wereszczak et al., (1997) explain personal resources of the parent to include family support, cognitive, and financial resources. There is some indication in literature that parents of ill neonates, experience stress relating to matters such as family functioning, socio-economic status, and available sources of support (Carter et al., 2007; Martins & Gaffan 2000; Pinelli 2000 Martinez et al., 2012; Byiringon et al., 2020). At the same time that mothers are nursing their babies in NICU, they have to provide for the older children they have left home. The resources of the family will

have to be divided to meet the home and hospital needs. For parents who have limited resources, they become worried and anxious on how to meet these demands.

Similarly, Carter et al., (2007) conclude that the high levels of stress experienced by parents with infants admitted to a NICU may be associated with low household income and lack of family social support. In their study most of the mothers who had a lower income were single mothers. The single mothers also experienced higher stress levels which was associated to limited support to meet their basic needs. Mothers who have an infant admitted to NICU do not usually get adequate emotional support from the nurses. The lack of support by nurses could be explained by the high nurse patient ratios. The nurses concentrate much on their care giving roles to the neonate leaving them with limited time to engage parents. Therefore, mothers are more likely to cope with their situation if their family members are available to provide them with the support they may need. Abdeyazdan et al., (2014) conducted a study among parents whose preterm babies were admitted to NICU and provided emotional support to an experimental group. Parents were also allowed to share feelings and experiences with other parents in a similar situation. The results of their study showed a significant reduction on stress among these parents. This, therefore, shows that providing emotional support in NICU is of great importance and that personal characteristics of parents should not be ignored in the pursuit to reduce stress in mothers with babies in NICU.

With regard to Personal characteristics that influence stress, previous studies have reported contradicting results. In a study conducted by Varma et al., (2019), family support mitigated response to NICU admission regardless of the income and other personal influences. In addition, some characteristics included in previous studies were not measured in a similar way making results not comparable. For example, the categories of income were different in studies and the categorisation of age groups were also not uniform. The categorisation of these characteristics may affect the results of a study. However, not only those with different measurements could pose a question on comparability of results. Characteristics like education level could have had similar measurements (high school, tertiary education) but difference was noted in the distribution of participants. Most studies have reported more than half respondents having attained high school education and others with majority being university or college graduates rendering results biased towards one category (Busse et al., 2013; Wormald et al., 2015; Musabirema et al 2017). Education level could be a confounding variable to some variables that were being studied. Therefore, the literature on personal characteristics influencing stress should be compared with caution and in consideration of other personal characteristics.

## **2.5 NICU Environmental Stressors**

The major NICU environmental stressors identified by Miles (1993), were investigated in the current study. As indicated in the theoretical model guiding this study, the NICU environmental stressors include; sights and sounds, infant parental relationship, staff behaviour and infant appearance and behaviour. Upon admission

to NICU the mothers are faced with the stressors of the NICU. Admission to NICU is usually unplanned and the family is expected to adjust to the birth of a child and also to parenting in a strange environment. Therefore, a neonate with a condition that requires neonatal intensive care is more challenging in the sense that further adjustment is required to the NICU environment.

### **2.5.1 Sights and Sounds**

In a NICU, the parents and baby are exposed to movement of a large number of personnel, continuous noise, characteristic smells and instruments. The baby may be attached to many machines that measure heart rate and oxygen levels and these machines are beeping and buzzing around them. Obeidat et al., (2009) and Wigert et al., (2013) stated that the critical care environment is intimidating, unfriendly and associated with demands to parents of an infant admitted to the unit. Similar findings were reported by Musabirema et al., (2015) and Johnson, (2008) that the technological NICU environment with complex machinery, and sounds creates an intimidating and overwhelming atmosphere for mothers. Shahheidari and Homer, (2012) reported that the extremely premature infant born between 23 and 29 weeks' gestational age require to be nursed inside an incubator or on an open warmer bed. They often have difficulty breathing on their own because their lungs are not fully developed and therefore, breathing machines, such as ventilators, are often used to help the baby breath. Premature may also be connected to one or several lines and

tubes, and a monitor may also be close by to help monitor the baby's vital signs, including respiratory rates, and heart rates.

All of the mentioned equipment are critical for the care of the neonate and have been attributed to increased survival rates (Shahheidari and Homer, 2012). Despite the positive outcome that has been recorded in this care environment, it has also been found that the design of the NICU has implications on the health of the baby, parents and staff (Pineda et al., 2012). Previous authors have reported that parents perceived the sights and sounds in NICU as stress factors (O'Brien & Warren, 2014; Turan et al., 2008). Parents usually become anxious, worried and draught because the NICU environment is extraordinary and unfamiliar. In addition, parents perceive that their infant is in pain, critically ill and might die or face life long complications (Hall, 2015). Furthermore, Hall et al., (2015), reported that parents' lack of understanding of NICU procedures increases stress.

In addition, the technological environment of the intensive care unit presents a challenge for staff to facilitate a collaborative relationship with families whilst monitoring and caring for their critically ill infants (Johnson,2008). Lack of a collaborative relationship may lead to lack of trust between parents and staff especially that health professionals are usually strangers to mothers at the time of their infant's admission to NICU. Entrusting their baby's life in the hands of strangers increases parents' stress and emotional strain. The environment in a NICU could,

therefore, become very overwhelming to the baby, and also to the parents (Carter et al.,2007; Singer et al.,2010). The sights, sounds, and general environment of a NICU often cause stress and panic.

With regard to sights and sounds in NICU, Umasankar et al., (2016) highlighted that among the NICU environmental stressors the most stressful for mothers was the sights and sounds. Contrary to this findings, other authors who also used PSS: NICU have demonstrated that the primary sources of stress identified by NICU mothers were related to their parental role and their infant's behaviour and appearance (Busse, 2013, Chourasia et al., 2013, Dudek-Shriber, 2004, Mwanza, 2014). In these studies, the perception of stress due to sights and sounds in the NICU environment affected the mothers to a lesser degree. As earlier alluded to, stress due to equipment and noises in the NICU have been attributed to the duration at which data was collected. Those who stay longer in admission get to understand the machines in the unit and adapt to the noise. Therefore, results of studies would have different results based on how long the mother would have spent in NICU at data collection. In addition, in most parts of the world, the mothers are usually introduced to the NICU setup, encouraged to visit as much as they can and an explanation is given by the NICU staff about technology and equipment which is connected to their baby. Prior knowledge of what to expect enables parents to more effectively cope with the sights and sounds of the NICU (Melynk et al., 2006). This makes mothers more comfortable and may reduce stress caused by NICU environment in relation to sights and

sounds. The orientation to NICU and longer duration of stay in unit have been associated to low stress levels due to sights and sounds.

### **2.5.2 Parent-Infant Relationship**

Mother baby bonding starts in utero and is expected to continue after birth. Hospitalization of the new born in the NICU makes the mother's experience completely different from that anticipated when they discover they are pregnant and begin planning for the eventual birth (Pineli et al., 2008). The maternal role attainment is disrupted and mothers have to adjust to the unplanned new arrangement of care. In the NICU medical professionals care for the infant while the majority of families often have a no or limited role. Engaging mothers in giving care, shifts their role from passive to active, they also move from mere parenting to engaged parenting and from exclusion to participation in their infant's care. Where programs aimed at facilitating parents' interaction with their infants have been implemented, a lot of benefits were reported (Browne and Talmi, 2011). The benefits reported from integrating parents into the unit include; they feel safer, gain control over the situation, are involved in rapport developing, are more confident, and feel more connected to their infant (Turner et al., 2015, Broedsgaard & Wagner, 2005; Butler & Galvin, 2003; Heermann et al., 2005). Hall's, (2015) study revealed that mothers desire for closeness and proximity and belonging to their infant. Furthermore, cited that when mothers are involved in infant care, allowed proximity, communicated clearly and openly, and formed rapport with the nurses, they become

more satisfied and confident in their parenting roles. Nonetheless, most Intensive Care Units still adhere to the premise that only professionals can provide care while parents are relegated to supportive role (Bernardo et al., 2017).

As earlier alluded to, alterations of the parent-infant relationship dates back to the 1990s as explained by Griffin (1990): physical separation of the parent and infant, due to lack of space in the unit or hospital for parents; mechanical barriers between the parent and infant; parents' psychological barriers such as feelings of helplessness and guilt; and nurses providing expert care for the infant that parents are unable to provide. At the Women and New-born hospital where the current study was conducted, they still subscribe to health professionals providing care and mothers only allowed to visit and feed their babies. Meanwhile, alteration to the parent-infant relationship was shown by the majority of studies to be the greatest stressor for parents (Aftyka et al., 2019; Unesi et al., 2017; Musabirema et al., 2015; Ashwani et al., 2017; Tewodros & Ereki, 2015).

Miles et al., (1997) described altered parental role to include inability to breastfeed, carry the baby whenever they feel like, attend to their babies' needs on demand and inability to share the baby with the relatives among others. Musabirema et al., (2015) and Phillips and Tooley, (2005) indicated that parents report stress being related to their inability to help, hold, and care for their infant during hospitalization. Along with these issues, parents often experience difficulties with care giving competencies and communication concerns related to the care of the infant. Furthermore, care giving

concerns frequently relate to parents' apprehension upon discharge of their infants from a NICU. However, parents who are not separated from their babies throughout their infant's admission experience low levels of stress compared to those who are separated (Gondwe 2015, Ibe et al., 2004). The low levels of stress parents experience have been attributed to their active participation in the care and decision making regarding their neonate's care. These parents interact with the health care professionals more often and easily develop an interpersonal relationship. The parents who develop some therapeutic relationships with medical personnel who take care of their neonate during the admission period report low stress levels related to parental role.

The feeling of disruption of the parental role contributes significantly to the amount of stress of parents in a NICU (De Rouck & Leys, 2009). Studies using the PSS: NICU tool are consistent in their findings that reveal the change in parental roles as an important aspect behind parental stress in NICU settings (Carter et al., 2007; Busse et al., 2013; Chourisa et al., 2013; Wormald et al., 2015; Kegler 2019; Schenk 2010). Interaction between parents and their infants is regarded as a crucial activity that has a significant impact on the parental care of a child, as it directly relates to parental roles in NICU settings. Shaw et al., (2006) explored the influence of psychological distress amongst parents of infants in a NICU and reported a strong correlation between severe acute stress disorder and parental role alteration. Additional consequences of parental role alteration were documented by Feeley et al., (2011) who reported that these parents are under stress and less able to form

secure attachments with their infants. In addition, parents tend to feel they have failed to provide and protect their baby. Similarly, Lefkowitz et al., (2010), documented that admission of a new-born to NICU affects the long term relationship with their children and the parents' ability to take care of child.

In addition, stress due to the disruption of parental relationship during admission, has other effects on the mother's mental wellbeing, bonding and feeding of the baby. Maternal stress attributed to NICU admission impairs mother-baby bonding, plays a role in postnatal depression and decreases milk production (Foligno et al., 2020). It interferes with lactation by inhibiting prolactin and oxytocin or indirectly through activation of the sympathetic Central Nervous System. Activation of the sympatho-adreno-medullary system causes vaso constriction at the level of mammary glands stimulation of myoepithelial cells and increase in ductal tone leading to peripheral inhibition of milk ejection (Lau, 2001). Depending on the duration of the stress and site of action, suppression of lactation may result to decrease in milk synthesis or ejection. Similarly, Foligno et al., (2020) documented that most of the study respondents indicated that the hospital proved to be an uncomfortable environment for practising breastfeeding. Reducing maternal stress is most likely to facilitate bonding and breastfeeding consequently leading to improved neonatal outcome as the baby gets the required nutrients and acquired immunity (Lau, 2001). Therefore, understanding possible factors associated with parental stress is a fundamental

principle for providing quality care that responds to improving parenting behaviours in NICU and after discharge.

For Busse et al., (2013), parental stress emanating from the NICU experience influences parenting behaviour as well as producing long term emotional problems and health alteration. The premise that parental stress can affect infant development as revealed by Bronfenbrenner & Evans, (2000), who emphasised the importance of examining and understanding parental stress because of its effect on infant development. In the same vein, Huhtala et al., (2016), study found that parental stress influences social, behavioural and functional development on the preterm baby while Assel et al., (2002) concluded that parental stress, even at low levels, disturbs the relationships of parents with their healthy infants. Promoting development is particularly pertinent for infants admitted to the NICU who have a higher risk of being born with physical (Bregman & Kimberlin, 1993; Theunissen et al., 2001) and psychological difficulties (Sameroff & Chandeler, 1964; Theunissen et al., 2001), compared to other infants.

Furthermore, stress has been recognised as one of the most common barriers to effective parenting, and yet one of the most important predictors of the developmental outcome of the infant (Umasankar et al., 2016, Micelli et al., 2000 & Shaw et al., 2006). To achieve normal development and growth, the new-born requires adequate nutrition. The recommended feed for a new-born is to exclusively breast feed for the first six months (UNICEF, 2019). Separation of the mother and

baby at birth due to admission in NICU makes it difficult to establish and sustain exclusive breastfeeding. WHO recommends that initiation of breastfeeding should be within the first hour of life, and mother should breastfeed on demand. Breastfeeding is considered a natural act but it is also a learned behaviour especially for first time mothers and those with premature babies. Mothers nursing babies in NICU require active support for establishing and sustaining appropriate breastfeeding practices. Where other family members are not allowed in NICU, it leaves the nurses who are 24 hours available to provide this support. An act which is only possible if the nurses understand the stress mothers undergo in NICU.

Regarding parent infant relationship, from reviewed literature it can be deduced that parents experience stress when they are unable to play their role in caring for their admitted infants. Despite a difference in study population sampled in the studies, results still remained consistent on stress due to parent infant relationship. Some of the studies had study population that included both the mothers and fathers (Musabirema et al 2017; Dubek-shriber, 2004; Wormald et al 2015) while some studies sampled mothers only (Montirosso et al 2012; Sikorova 2012; Chourasia et al 2013). However, the limitation of the studies that included both mothers and fathers could have been the results obtained were biased towards mothers' responses as they were the majority respondents. A study by Busse et al., (2013) sampled 30 parents (22 mothers, 8 Fathers) and Turner et al., sampled 73 parents (61 mothers and 12 fathers). Therefore, the samples in those studies were not representative enough to bring out differences between groups. Another limitation

was, these studies used the PSS: NICU tool which has items that assess breastfeeding which is not among the fathers' roles. Therefore, having a higher number of mothers as respondents could have influenced the results.

The use of the PSS: NICU to evaluate stress on this construct could get more reliable results when used on mothers because they are able to complete all questions asked while fathers could only answer some questions. A Study that had a representative sample for mothers and fathers (Aftyka et al., 2019), found that stress due to parent infant relationship was higher in mothers than fathers. On the other hand, Umasankar et al., (2016) reported an association between alteration of the parental role and physical appearance of a very premature baby and is nursed in an incubator with higher stress among parents.

### **2.5.3 Infant Appearance and Behaviour**

The behaviour and appearance of new-born infant, can be affected by the gestational age at birth and the severity of illness. Therefore, the current study measured stress due to infant appearance and behaviour subscale of NICU environmental stressor in relation to physical appearance. The physical appearance of interest in the current study also included tubes and machines connected to the infant for the purpose of treatment. Most studies that used the PSS: NICU to assess stress due to this construct either sampled premature babies only or they included all infants admitted to NICU but still reported results with majority being premature babies. The premature babies have a unique appearance, with a translucent skin,

very large head in proportion to the body and they do not usually adopt flexed posture (WHO, 2012). Mothers in first contact with their babies mainly focus on appearance and if the baby was small they were frightened and avoided to touch (Moghaddam et al., 2017).

In a study conducted by Montiroso et al., (2012) only mothers of very premature babies, gestation age of 30 weeks and below, were recruited in the study. The results of their study indicated that the parents rated infant appearance and behaviour as a second most stressful aspect among other NICU environmental stressors. Similar results were reported by Turner et al., (2015), despite having included premature babies with a higher gestational age between 30 – 36 weeks. Wormald et al., (2015), documented higher stress levels compared to the above mentioned studies despite using similar sample of premature babies. The difference in this later study is that most of the premature babies who were sampled weighed between 500g and 1500g were on respiratory support. Similar results were reported by Dudek-Shriber (2004), that parents of infants who suffer from heart disease score highest stress. This may imply that stress in the parents, increase if the baby is very small in appearance and not necessarily having a low gestation age but when they are on respiratory support or have other conditions.

Similarly, Chourasia et al., (2013) and Heidari et al., (2017) also reported high stress levels due to physical appearance of the baby and attributed it to inadequate communication between the parents and the medical staff. Compatible with these

findings, Stube et al., (2018), reported that parents who are unfamiliar with how to care for the premature infants become distraught, worried, and anxious. These babies are more likely to have different machines and equipment connected to the baby for monitoring purposes. Therefore, if these are not explained to the mothers, it would be a source of worry unlike when they understand the purpose. In addition to explanations, the mothers need support in terms of reassurance, help in terms of care and sharing medical information from the nursing staff. The lack of emotional support and physical preparation for NICU admission combined with overwhelming concern on safety and comfort of their babies increase the stress levels in mothers. This conclusion is in line with Harvey (2010) who reported that ineffective staff communication is identified as a source of the highest level of parental stress.

Effective communication between parents and nurses may enhance parental understanding of the physical appearance of their baby and coping with a variety of equipment attached to their babies. The therapeutic relationship between staff and parents should be maintained for better NICU outcomes. It should also be noted that the NICU environment affects the baby's physiological function which manifests in infant behaviour. The environmental stress due to equipment causes physiologic changes such as increased heart rate, blood pressure, respiratory rate, as well as reduced oxygen saturation levels (Peng et al., 2013). These effects may slow the healing of the infant. Additionally, the stress affects the motor function of the infant. The motor signs of stress include generalised hypotonia, hyperextension of extremities and finger splaying. The motor signs of stress can easily be identified by

mothers and can cause worry and anxiety. Therefore, it should be acknowledged that for better neonatal outcomes the biological and environmental risk factors should be minimised in NICU.

#### **2.5.4 Staff Behaviour and Communication**

Staff behaviour is one of the environmental stressors investigated in the current study. For the current study the focus is on the nursing staff who are primary care givers in NICU. The nurses working in NICU are expected to possess knowledge and skill to effectively engage parents as active participants across the continuum of care. A study conducted by Sikorova and Kucova, (2012) documented that medical personnel caring for such new-borns in NICU, are exposed to contact with parents and so face different reactions from them which they have to manage effectively. The parents have a lot of questions about the NICU environment and their baby's condition which members of staff should answer adequately. Wigert et al., (2013) indicated that parents are dependent on doctors and nurses to be able to cope with the unfamiliar hospital environment and their situation. Ability by members of staff to adequately provide answers to parents' questions has been found to lessen parents' uncertainty and stress levels. On the other hand, inability by nurses to recognise the needs of the parents may often lead to making decisions based on assumptions about what the families need, which may result in unsatisfactory outcomes (Mundy, 2010).

Similarly, Davidson et al., (2012) reveals that the anxiety and distress families experience may be influenced by the process by which information is shared and interpersonal relationships developed with health care providers. Information sharing could alleviate anxiety and fears in parents, but the quality, amount and way information is shared may also contribute to the stress (Hollywood & Hollywood, 2011, William et al., 2018). FCC model entails that information shared with parents should not differ in any way with what the health care providers know as it is the only way to empower mothers to make sound clinical decisions. This underscores the importance of clear and appropriate communication between nurses and mothers during the period of admission. Through effective communication, mothers establish therapeutic relationships with staff, learn new terminologies and adapt to their role in an unfamiliar intimidating environment as occurs in NICUs.

Beside communication, language barriers prevent mothers from accessing pertinent information about their infants, and contributing to high stress levels for parents (Turner et al., 2015). Language and cultural barriers that forbid women to seek information have also been found to play a role in the amount of stress a mother might experience whilst having an infant in the Unit. Heidari et al., (2017) emphasise that improper communication with parents, increases the stress levels however, regular updates on condition of the infant could reduce stress. They further indicate that nurses can be of great help to facilitate a healthy transition to parents who are experiencing emotional and psychological upheavals.

It is recognised that the NICU environment can also be highly stressful for healthcare staff because they have to deal with parents and infants. Their stress may even be increased if they are not skilled on how to handle and communicate to the parents in NICU. Wong et al., (2015) indicated that families prefer to seek information from nurses, making them a communication channel between the family and other health workers especially that parents are not present during doctor's rounds. Trajkovski et al., (2012) asserted that although nurses' main concern is neonate's health, taking care of families is also very important. Therefore, the need for nurses to increase their knowledge on potential parental stressors in NICU cannot be overemphasized. A knowledgeable and skilful nurse is more likely to support parents along their journey of caring for their babies in NICU.

Based on the literature reviewed, it can conclusively be said that most studies did not include staff behaviour in their investigations despite having used the PSS: NICU tool. Reason given for non-inclusion was that previous studies have not reported it to be associated with stress. Studies by (Aftyka et al., 2019; Montirosso et al., 2012; Wormald et al., 2015) only used 26 items of the questionnaire while the others (Busse et al., 2013; Turner et al., 2015) used 34 items and all these did not include the Staff behaviour subscale. Nonetheless studies conducted by (Dubek-shriber, 2004; Musabirema et al., 2017; Carter et al., 2007; Umasankar et al., 2016; Varma et al., 2019) assessed staff behaviour and also reported low levels of stress. However, the low stress levels being reported can be associated to early works of Alfonso et al., (1992) who was of the view that parents found it difficult to honestly

appraise staff at the time their infant is sick and under their care. Similarly, recent research by Varma et al., (2019) also attributed the low levels of stress to parents giving a socially desirable response on the questions that assessed staff behaviour if they were interviewed by a staff nurse. Nonetheless the demand for information depends on the value parents attach to the information they are given and on their ability to understand and make informed choices. A study conducted by Byiringiro et al., (2020), found that parents did not complain about not being involved in decision making for their new-born's care because they believed that the staff were professionals and knew better than them.

## **2.6 Nurses' Support to Mothers**

Nurses are primary care providers in NICU and have critical role in providing support to parents (Masumo et al., 2019). The support that is required by parents in NICU include assigning, monitoring care to the mother, sharing medical information, reassuring the mother and assisting those mothers that have reduced functional capacity (Negarandeh et al., 2020). In the current study those mothers with reduced functional capacity are those who delivered by caesarean section. The mothers need support as NICU experience so complex that strong emotions are evoked from families (Wigert et al., 2013). Additionally, Turner et al., (2015) reported that parents feel they are entrusting the lives of their babies in the hands of medical personnel who have to take care of more than one infant. To cope with these mentioned issues parents must depend on professionals they are not familiar with prior to the infant's

admission. Since nurses are constantly present in NICU and across the continuum of care are best positioned to support the mothers. Therefore, implementation of interventions or educational programmes with support from nurses can help parents cope with pain, procedures, and care for the infants. It should, therefore, be acknowledged that nursing support for families with hospitalized infants is very essential (Goldstein et al., 2013, Wilson et al., 2011).

Nurses are present in NICU 24 hours a day, which puts them in a unique position to help parents deal with their needs and to facilitate relationships with their children. They take care of neonates' other needs like hygiene and feeding. Constant and honest communication with the parents of the neonates would help nurses gain the confidence of parents. Perry and Wong, (2006) recognise that nurses play an important role in ensuring that the needs of families are met during discussions related to the diagnosis of the infant, condition and treatment. This requires nurses to make an assessment on how much information the family is comfortable with, what they understand about the information already given to them and how they are cognitively and emotionally coping with the information.

Nurses can also help the family cope with stress by assessing social support systems, coping strategies, family cohesiveness and resources. Actively involving the family in all aspects of care may improve their self-esteem and promote further development (Shepard & Mahon, 2000). The nurses should conduct a holistic family

assessment, looking at the strengths and needs of each family. To achieve this, implementation of assessment tools that identify NICU stressors among mothers during admission is recommended. To further ensure that support needs are met in NICU, implementation of FCC principles is recommended.

However, if nursing care does not meet individual needs of mothers, it can be detrimental to the formation of attachment (Fenwick et al., 2001). These needs can only be addressed when the care givers are aware of them. Making assumptions of stressors has been shown that most times the assumptions are not correct and nurses' help to the mother tend to be misdirected. When parents have an infant in a NICU, they have certain expectations (Heidari et al., 2013) of excellent medical and nursing care and accurate and timely information throughout the infant's illness. However, it is important to realise that what healthcare professionals think is important may not necessarily be what parents perceive as important. It is, therefore, important for nurses to be aware of parents needs in order of priority and at different stages as needs tend to change. This may help nurses render support to mothers to cope with the anxiety associated with the NICU environment.

In addition, Hummel, (2003) emphasized that parents can feel helpless, excluded and powerless, and in the neonatal period it is not uncommon for mothers of preterm babies to experience more severe levels of psychological distress than mothers of term babies. With the appropriate support and education, neonatal nurses are able to play a role in effectively strengthening the bond between neonates and their

parents, thereby contributing to the well-being of the child and cohering with the empowerment of family-centred care philosophy (Smith et al., 2002). Nurses can help facilitate bond between neonate and parents by positive touch, in the form of skin-to-skin contact, use of therapeutic communication achieved by formation of a symmetrical relationship with parents and a consistent flow of accurate information (Ferber et al, 2005; Hopwood, 2010).

Denney et al., (2006) and Gale et al., (2003) found inconsistencies among staff and parents, as well as a lack of regard. Overall, parents felt concerned regarding the needs of their infants and inconsistencies among the staff (Gale et al., 2003). The inconsistencies among staff reported by the families included staff disregarding the infants' pain and being unresponsive to the comfort needs of the baby. The mothers also felt dependent on the NICU staff to learn about caring for their infants but felt insecure about their abilities to do so due to the lack of nursing support. Provision of both formal and informal support for parents is a key premise of FCC (Hockenberry and Wilson, 2014).

Paredes and Frank (2000), in their study which compared parent and nurse perceptions of the nurses' roles regarding care of infants in the Neonatal Intensive Care Unit. It also examined the attitudes of nurses and parents regarding the extent to which parents should participate in the care of their infants in the NICU. The study concluded that parents and nurses have different perceptions about role expectations and that nurses perceive themselves to lack knowledge in providing

support to parents, and that when nurses and parents have different expectations, it increases the stress in the mothers as they feel their needs are not met.

## **2.7 Support and Care Programmes for Parents with Babies in the NICU**

Support and care programmes for the current study have been described as interventions implemented to enhance coping in parents with neonates admitted in NICU. Provision of interventions to support and engage parents in the care of their infants may improve outcomes for both parents and the infants. Parents are natural advocates for the neonatal patient for whom the emotional, social and developmental needs are serious and urgent. Family support programmes are operated with the intention of helping families cope with the stress of having an infant in Intensive Care and supporting the family as they join in the care of their infant (Gooding et al., 2011). Brett, et al., (2010) assert that parents with preterm babies feel supported through individualized developmental and behavioural care programmes. Brett, et al., further stated that parental stress may be reduced through individual developmental care programmes, psychotherapy, interventions that teach emotional coping skills and active problem-solving. It is evident from Brett, et al (2010), that there are different types of programmes that can be implemented to support mothers of neonates admitted in the NICU. Some of the mentioned programmes were targeting individual parents while others involved group support programmes. Despite these programmes being different, they all had a similar outcome where most parents reported reduced stress after having their needs addressed.

Davidson et al., (2006) developed clinical guidelines to support the family in the patient centred Intensive Care Unit. They recruited a multi-disciplinary task force of experts in Critical care practice. The task force reviewed published literature and used a consensus process to arrive at forty-three recommendations. The recommendations included were but not limited to share decision making model, early and repeated care conferencing to reduce family stress and improve consistency in communication, open flexible visitation and family presence during rounds. Similarly, Hall et al., (2015) were transforming NICU care to provide comprehensive family support. They convened a national interdisciplinary taskforce. The work group focussed attention on the pressing issue of expanding psychosocial support of NICU parents. They developed programme standards for psychosocial support of parents of infants admitted to NICU. The task force was also using consensus building which takes longer to finalise, therefore, the recommendations were still being finalised at the time of publication (Hall et al., 2015).

In addition, Lubbe et al., (2005) conducted a multi-phased study, using qualitative methodologies to determine the needs of South African parents with neonates in level III NICU's. The aim of their study was to develop an intervention care programme for parents with neonates in level III NICU. In phase I, the needs of parents with neonates in NICU were elicited qualitatively. In phase II new data was collected and Phase III validated the data derived from phases I and II. The data was then categorised in different need categories and these categories were used to plan

an intervention care programme for parents with neonates in NICU. The programme provided information to address needs as identified by parents in the research study and as derived from the literature. The “Early intervention care programme for parents of neonates” was developed to empower parents to manage their own needs and the needs of their neonates.

In study by Neoergaard et al., (2016), with the aim to develop an intervention to meet the fathers’ needs in neonatal intensive care a different method was used. A participatory Action Research method was used in which they engaged stakeholders in the process. This method was used to ensure that they produce practical knowledge, useful to parents and NICU staff. The participants in their study included 12 fathers and 11 mothers whose infants were admitted to NICU, 46 nursing staff, doctors and managers who worked in the NICU. A series of activities were conducted which included interviews with fathers and focus group discussions with nursing staff and workshops with both parents and staff. The study concluded that the use of PAR in clinical practice is very important though it requires more time. Employing PAR ensured that changes developed were more father friendly and were based on participants’ experiences and were feasible and sustainable. The method used to develop an intervention is equally important in respect to how it responds to the needs of the parents. From the authors indicated earlier it is evident that most of the programmes are developed to target identified parental needs and in consultations with the stakeholders. Most of the developed support programmes that

have been implemented has documented benefits both to parents with babies admitted to NICU and staff.

A study by Shaheidari & Homer, (2012) documented that positive physical environment and social support have a role to play in healing, mediating stress in parents and enhancing neurodevelopment in neonates. For example, by providing an informational video presentation on the NICU environment and educating parents on what support programmes are available within the care unit, medical staff can contribute to decreasing stress and improving interactions between parents and infants in the Unit (Johnson, 2008). Increasing the amount of educational interventions allow for stress to be drastically reduced, while also allowing the parents to acquire essential care giving information about their infants.

Melnyk et al., (2006) conducted a randomised controlled trial on reducing premature infant's length of stay and improving parent's mental health outcomes. In their study, random allocation of mothers to either the intervention or control group was done. The intervention group was allocated to Creating Opportunities for Parent Empowerment (COPE) programme which was designed to enhance parent infant interactions. The ultimate goal of this program was to improve behaviour outcomes for both parents and neonates. The results of Melnyk et al., (2006) study revealed that mothers who were enrolled in the support programme reported significantly less stress in the NICU and less anxiety and depression at two months' corrected infant's age than the control group. Infants in the COPE programme were also reported to

have had a 3.8 day shorter NICU length of stay than did the comparison infants. Furthermore, the study has provided evidence that the intervention programmes for mothers with infants in the NICU have positive outcomes both to the mother and the infant.

In Zambia little has been documented on the nurse's perception of stress factors of mothers with neonates admitted in the NICU. This, therefore, means that the NICU environmental stressors and associated factors among mothers with infants admitted to Neonatal Intensive Unit are not known. To cope with admission of an infant in NICU, parents require emotional support. Darling and Gallagher (2004), asserted that with so many possible types of support available to families, mothers from the same social group may or may not share similar needs, priorities or sources of support. With the push for family centred care in modern hospitals, many NICUs are organizing and providing parent support programmes for families of their infants. However, for these programmes to be effectively developed and implemented, NICU stressors must first be identified.

Cooper et al., (2007) conducted a study with a purpose to evaluate the impact of a national programme designed to promote FCC in NICUs and to provide information and comfort to families during the NICU hospitalization of their new borns. The findings showed that the programme enhanced the overall quality of NICU care resulting in less stressed, more informed and confident parents. It further showed

that families with infants admitted to the NICU had reduced levels of stress and were feeling more confident as parent.

## **2.8 Conclusion**

Literature has revealed that stress experienced by mothers of neonates admitted in NICU measured by PSS: NICU has been investigated before. Most studies reviewed have indicated that parents with neonates admitted to the NICU find themselves in a situation of emotional strain and potential crisis. It is, also, evident in literature that for mothers to cope with stress they need to be supported by health care providers particularly nurses who are primary care givers. While a large body of literature regarding NICU environmental stressors and associated factors in developed countries was found very little literature was found in sub Saharan Africa. From the Zambian perspective apart from related literature no study was found that measured NICU environmental stressors. The findings and recommendations from developed countries cannot be transferred to our situation. This demonstrates a gap of information regarding NICU stressors and recommendations to address them.

In measuring stress among parents, previous studies have reported varying degrees of agreement on the most stressful items in NICU. Therefore, this study also assessed the NICU stressors among mothers with babies admitted to WNH in Zambia. However, the departure point of the current study is the investigation of perception of stressors in NICU from the mothers and nurses' perspectives. The

study goes further to develop a stress alleviation model to address stress from identified stressors.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

A research methodology is an application of steps and procedures for collecting, analysing and interpreting data in a research conducted in a logical and systematic way (Creswell, 2014). The main aim of this study was to develop a maternal stress alleviating model based on identified stressors and associated factors. This chapter outlines the methods that were employed to investigate NICU environmental stressors and associated factors from the mothers and nurses' perspective. This chapter further details the research design used to measure the study objectives, methods used to analyse and interpret the data that was collected. Ethical considerations of the study, validity and reliability are also discussed in this chapter.

#### **3.2 Philosophical Underpinnings**

Meaningful and appropriate interpretation of Social research is based on clear understanding of the philosophical foundations. This argument is based on the observation that each discipline has principles and assumptions that are used to design, conduct, analyse and interpret research findings (Moon and Blackman, 2014). Therefore, the three fundamental element principles of research that need clear understanding are Ontology, Epistemology and Philosophical perspectives.

### **3.2.1 Ontological Foundations**

Ontology as defined by Saunders et al., (2012) is a branch of philosophy that studies the nature of reality and social entities which includes both objectivism and subjectivism. Bryman (2012), defines objectivism as an ontological perspective that asserts that social phenomena and their meanings have an existence that is independent of social actors while subjectivism is of the view that social phenomena is created from reality and socially constructed. Many ontological positions exist but the dichotomy between realism and relativism can be used to demonstrate ontology to conservation science (Moon and Blackman, 2014). Relativists ontology hold that reality is constructed within the human mind. Therefore, no one true reality exists as each individual creates their own version in their mind. Reality is relative according to each individual who experiences it at a given place. The critical realists assume that one reality exists but can never be understood perfectly because of basically flawed human intellectual mechanisms and fundamentally intractable nature of phenomena (Guba and Lincoln, 1994). Ontology helps researches to understand how certain they can be about the nature and existence of objects being researched.

### **3.2.2 Epistemological Foundations**

Cohen et al., (2007) asserts that epistemological assumptions are concerned with how knowledge can be created, acquired and communicated. Crotty (1998), explained epistemological position with a focus on relationship between the subject and object. Objectivists epistemology assumes that reality exists independent or

outside the individual mind. These contend that an objective truth exist and is waiting to be discovered. The truth that exists is empirically verifiable, valid, generalizable and independent of social thought and conditions (Crotty, 1998). In this kind of research, the values, interests and interpretation of the researcher do not bias the generation of knowledge. Constructionists epistemology are of the view that human beings construct knowledge as they engage with and interpret the world. On the other hand, the subjectivists epistemology holds that what constitutes knowledge depends on how people perceive and understand reality (Moon and Blackman, 2014). Crotty (1998) indicated that people impose meaning and value on the world and interpret it in a way that make sense. Therefore, in a research, epistemology is concerned with aspects of validity, scope and methods of acquiring knowledge and extent of applicability.

### **3.2.3 Philosophical Perspectives**

Philosophical perspectives also called paradigms and worldviews are a set of assumptions that structure the approach of research (Creswell, 2014). The American philosopher Thomas Kuhn (1962) first used the word paradigm to mean a philosophical way of thinking. Guba and Lincoln, (1994) define paradigm as a basic set of beliefs or world view that guides research action. A further description of the word paradigm was made by Mackenzie and Knipe, (2006) who described it as a researcher's worldview or set of shared beliefs that informs the interpretation of research data. Different research paradigms contain different methodological,

ontological and epistemological views based on assumptions of reality and knowledge.

Based on the philosophical perspectives (subjectivism and objectivism) a researcher can adopt either the scientific, interpretive, critical or pragmatism paradigm. According to Creswell, (2014) the scientific paradigm is of the positivists view that attempts to identify causes which influence outcomes. Crotty (1998), documented that the positivists epistemology is one of objectivism which assumes that the researcher and the researched are independent entities. Interpretive paradigm is of the view that reality is subjective and differs from person to person (Guba and Lincoln, 1994). The ontological perspective of critical paradigm is not different from the epistemology perspective which states that knowledge is determined by the social and positional power of advocates of knowledge (Cohen et al., 2009). Unlike objectivism, subjectivism is of the view that the world does not exist independently of our knowledge. Pragmatism is unlike both objectivism and subjectivism as it is not committed to any one system of philosophy and reality. The pragmatist paradigm believes philosophically in using multiple procedures. Creswell, (2014) documented that based on these philosophical perspectives, researchers often embrace either a quantitative, qualitative or mixed methods approach in research.

The current research adopted the pragmatic paradigm which states that, it is not possible to access the truth about the real world solely by virtue of single scientific method nor by interpretivists paradigm (Alise & Teddie, 2010). The current study

was riding on supposition that the quality of research is defined by the integrity and transparency of the research process and its method rather than on the superiority of any one paradigm (Bunnis and Kelly, 2010). Therefore, Pragmatism paradigm which allows a combination of methods was the most appropriate. This study does not only seek to objectively understand the stressors among mothers in NICU but also to subjectively investigate the perceptions of nurses on NICU stressors and using participatory approach develop a stress alleviation model. Creswell (2014), indicated that different world views provide us with different opportunities and possibilities for action. Therefore, to gain different perspectives on the problem and arrive at well informed and logical conclusions, the pragmatism theoretical perspective influenced the methodology of research adopted for the current study. Methodology is the plan of action which lies behind the choice and use of particular methods to desired outcomes (Crotty, 2003). Methodology is concerned with answering the following questions; why, what, from where, when and specific techniques and procedures used to collect and analyse data (Guba and Lincoln, 1994; Crotty 1998).

### **3.3 Methods and Materials**

The current study was conducted in two phases. Phase one used a mixed-methods design which is an approach to inquiry involving collecting both qualitative and quantitative data. Among the mixed methods, the current study used a convergent concurrent design in which qualitative and quantitative data was collected

concurrently. According to Creswell, (2014) this design is used in studies where two different methods (quantitative and qualitative) are required to corroborate and triangulate the findings of that study. The current study sought to corroborate and triangulate the identified perceived NICU environmental stressors and associated factors from nurses and mothers nursing babies in NICU. Therefore, to achieve the aim of the study in phase one the convergent concurrent mixed design was appropriate. Quantitative and qualitative methods have been combined to provide a comprehensive understanding of NICU stressors from the mothers and the nurses' perspective. Creswell, (2014) indicated that convergent concurrent design generally use separate quantitative and qualitative methods as mechanism to allow the strength of the two methods to complement each other. The quantitative and qualitative methods have been discussed separately.

### **3.3.1 Quantitative Research Methods**

#### **3.3.1.1 Research Design**

A descriptive cross sectional study design to test the hypothesis that predicts that maternal stress in NICU is associated with environmental stressors, situational factors and personal factors. A descriptive cross sectional design was appropriate as it gives a view of the study population at single point in time and measurement of stress in relation to having a baby admitted in NICU. In addition, a descriptive design is recommended when literature search reveals little documentation locally on the

study problem (Creswell, 2014). Furthermore, in a descriptive study design, data is collected at one point in time as was assessed the occurrence and stress levels in the current study.

### **3.3.1.2 Research Setting**

The present study was conducted in the NICU within the Women and New-born Hospital of the University Teaching Hospitals in Lusaka, Zambia. The hospital is a tertiary referral hospital and offers specialized neonatal care. Over 3,000 new-borns referred from delivery units within the hospital and transferred from regional hospitals are treated in the hospital per year. The study took place in the Department of Neonatology with 45 baby cots and 8 incubators. The ward had 43 nursing staff in total during the time of the study. Nursing staff are responsible for comprehensive evaluation and treatment of critically ill neonates, preterm and low birth-weight infants, those with surgical operations, genetic and congenital abnormalities.

The ward consists of two sections: Intensive Care side and the general ward. The intensive care has three rooms, with room one serving babies delivered from Theatre and labour ward within the hospital while room two admits babies referred from the postnatal ward within the Women and New-born Hospital. On the other hand, room three is saved for babies referred from outside the Women and New-born Hospital (clinics and hospitals within Lusaka and from other provinces). When the babies' condition is stable, they are transferred to the general ward (D12 & D14) for

observations and completion of antibiotic courses before discharge. The two sections do not have room for the mothers to stay with their babies, mothers are, therefore, only allowed during the stipulated visiting time. The current study was, therefore conducted in this ward and both sections were included.

### **3.3.1.3 Study Population**

A study population as defined by Burns and Groves (2017) is a particular group of people who are a focus of the research. The study population for this study was defined by the purpose of the study in terms of location and restriction to a particular group. Mothers, and their infants who were hospitalized in the WNB NICU during the study period formed the study population. Additionally, a target population had to be identified from the study population. According to Burns and Groove (2017), a target population is a group of interest that meets the selection criteria to which the results of the study will be generalised. In the current study, the target population for the mothers and infants pair sample was drawn from those who were hospitalised in NICU within the Ethics Board approval of the study period and were eligible to participate in the study. Each mother with an infant admitted to the NICU between July and October 2017 was screened for inclusion criteria. The accessible sample was drawn from the target population after systematic sampling was applied. The accessible population included 900 mothers and their neonates admitted to NICU who were screened during the study. Of these mothers who were screened, 300 met the sampling criteria but 20 were not included in the study after applying the exclusion criteria and consent process.

#### **3.3.1.4 Sample Selection**

A sampling method is a process of selecting a group of people that represent the population being studied (Burns and Groves, 2017). The sampling criteria was applied in the current study to reduce the effect of possible extraneous variables that might have an impact on the measurement of the dependent variable (Maternal stress) (Creswell, 2014). Probability sampling was employed to increase the extent to which the sample selected in the current study is representative of the target population. Probability sampling entails that each person in the target population has an opportunity to be selected in the sample (Burns and Groves, 2017). Systematic sampling, which involves selecting a kth member of the population using a starting point selected randomly was used (Burns and Groves, 2017). This sampling technique was appropriate because it required an approximated frame for a priori but not a full list (Creswell, 2014). Therefore, from an approximated number of mothers and infants admitted in a period of three months in NICU, a calculation of the sampling fraction was done by dividing the sample size to the total number of the population.

The sampling fraction for this study was  $3/1$  therefore, every third case from the sampling frame which was made on each day of data collection was chosen to participate. However, the first number was chosen by simple random using fish bowl method, where a number was picked from the sampling frame. This was done to ensure everyone had an equal chance to participate in the study. After identification

of a first number then every third case that followed were asked to participate. The sampling was conducted on each day of the visit at the study sites beginning with compilation of the sampling frame to ensure the selection was objective and free from personal prejudice. Every third person was then approached and requested to participate. The infants were included on the basis that the mother was randomly selected to be part of the study. Systematic sampling was chosen for this study because it gives results that are highly representative of the target population (Burns and Groves, 2017). In addition, it also allows for inferential statistics analysis (Burns and Groves, 2017).

### **3.3.1.5 Inclusion and Exclusion criteria**

Burns and Groves (2017) define inclusion criteria as characteristics that a subject of the target population must possess while exclusion criteria was defined as characteristics that cause one to be eliminated from the study. Based on previous studies that investigated maternal stress among mothers whose babies were admitted in NICU, an inclusion and exclusion criteria for this study was drawn. Chourasia et al., (2013), Aftyka et al., (2019), Umasankar et al., (2016), and Busse et al., (2013) in their studies included infants with specifically defined gestational age ranges, duration of stay in hospital and excluded those babies determined to be in medical crisis by medical personnel. Therefore, the current study included 280 mother baby pairs who were randomly sampled and included based on the following: biological mothers of neonates and were primary care givers, admitted in the NICU for at least 24 hours. For those infants who would have been transferred from

another hospital, time spent in another hospital's NICU did not count toward the 24hours post-admission criteria. In addition, mothers had to consent to participate in the study and their babies should have been classified as stable by the neonatologist to be included in the study. Though Medical stability is a subjective classification defined differently by individual attending neonatologist. In this study to establish stability of an infant; respiratory strength, tolerance to feeds, and response to treatment were used.

The exclusion criteria included mothers with infants who had severe congenital abnormalities with minimal chances of survival. These were defined as babies whose condition had less chance of survival, for example, encephaly or conjoined twins. They were excluded because their conditions were considered as confounding factors to the dependent variable (maternal stress). In the sense that having a baby whose survival is not guaranteed may influence the emotional well-being of the mother and it could, therefore, increase stress towards one aspect of the constructs that were being studied. Mothers with neonates that were discharged within 24hours of admission and those who had prior NICU exposure with another child were also excluded from the study. These mothers were excluded as they would not have had enough experience of NICU admission and would not give enough information.

### 3.3.1.6 Sample Size

According to Burns and Groves (2017), sample size is determined by sampling error that can be tolerated, population size, variation of the characteristics of interest in the population and the subgroup with the sample for which estimates are required. The current study therefore, used the Cohen's (1998) statistical power analysis as a guideline for estimating the desired sample size. As per calculation of the total sample from the population of 900 mothers is found to be 280 after adjusting for non-completion.

Sample size for the mothers to be interviewed (quantitative part) was calculated using the statistical formula for a finite population as explained;

$$s = \frac{X^2 NP (1 - P)}{d^2 (N - 1) + X^2 P (1 - P)}$$

- s will represent the desired sample size after calculation
- $X^2$  is the standard normal variate at 5% type 1 error ( $P < 0.05$ ), it is 1.96. The P value that will be considered significant is below 0.05 hence 1.96 is used in the formula.
- N is the population size
- P is the expected proportion in population based on previous study. For this study  $P = 52\%$  as indicated in a study by Alkozei et al., 2014 where 52% of the parents experienced high level of stress.
- d is absolute error or precision set at 5%

therefore, the calculated sample size is 269, adjusted for non-completion by 0.958 the total sample size will be 280.

$$\begin{aligned}
 s &= \frac{1.96^2 \times 750 \times 0.52 (1 - 0.52)}{0.05^2(750 - 1) + 1.96^2 P (1 - 0.52)} \\
 &= \frac{3.84 \times 900 \times 0.52 (0.48)}{0.0025 (899) + 3.84 \times 0.52 (0.48)} \\
 &= \frac{1.797.1 \times 0.48}{2.2475 + 0.958464} \\
 &= \frac{862.6176}{3.205964} \\
 &= 269.066527 \\
 S &= 269
 \end{aligned}$$

Adjusting the sample size upwards for assuming non-response rate ( $r$ ), the sample size was adjusted as follows:

- $n_f = nr$
- Where  $n_f$  is the final sample size and  $r$  is the response rate in decimals which is 95.8% (0.958) for urban women in the ZDHS of 2013–2014 (CSO et al., 2015).
- $n_f = 269.06 \approx 280$  (total sample size)

### **3.3.1.7 Data Collection**

Data collection is a process of collecting information from relevant sources to answer research questions, test hypothesis and evaluate outcomes (Burns and Groves, 2017). To ensure that all quantitative information was collected from relevant sources the current study used four different data collection tools (maternal characteristics form, Infant health information form, and PSS: NICU tool). The PSS: NICU was used to collect quantitative data regarding the NICU environmental stressors. This tool was preferred because it systematically measures environmental stressors for parents with admitted infants in the NICU, and the level of stress each engenders. It is also the only situation specific scale in current use that measures NICU environmental stress. In addition, it has been found to be valid and reliable by all the other authors who have used it in assessment of stress in NICU, although its properties had not been assessed in Zambia.

Parental Stressor Scale-NICU (PSS-NICU): The Parental Stressor Scale-NICU includes the first part that examined the maternal characteristics, second part assessed the infant characteristics and the third part had 46 descriptions of NICU related stressors and 1 item concerning the overall stress of parents. The first and second part of the tool were not originally part of the PSS: NICU tool adopted from Miles et al., (1993) which just assesses NICU environmental stressors. The questions included in the first two parts were developed specifically for the present study based on factors reported to be associated with stress in previous studies and

predicted to influence maternal stress in this study. The infant characteristics measured the situation factors which were described as birth weight, gestational age, diagnosis, respiration and type of feeding among others.

The third part that measured the NICU environmental stress had 46 descriptions that were measured on a 5-point Likert scale ranging from 1 (not stressful) to 5 (very stressful). There is an extra answer possibility for parents to indicate that they did not experience the stressor (not applicable), which is assigned a score of 0 (not stressful). The 44 descriptions of the PSS: NICU are divided into four subscales measuring parental stress on: infant's appearance, parent role alterations, sights and sounds, staff behaviour and communication. The infant's appearance scale includes stressors such as; "tubes and equipment on or near my baby" and "when my baby seemed to be in pain". In addition, the parent role alterations scale includes stressors such as; "being separated from my baby", "not being able to hold my baby when I want" and "feeling helpless about how to help my baby". On the other hand, the sights and sounds scale measures stress due to the physical setup of the NICU which includes the machine, equipment and staff working in NICU. The last subscale on staff behaviour mainly measures the communication between the staff and parents in NICU. The staff behaviour is one subscale which in other studies was not assessed as the researchers felt it did not contribute much to parental stress in most studies (Aftyka et al., 2019; Kegler et al., 2019). However, for the current study a 46 item tool was used which included assessing staff behaviour as this study was

conducted for the first time in Zambia using the PSS: NICU tool. It was therefore, necessary to assess if the staff behaviour subscale contributed to maternal stress.

### **3.3.1.8 Validity**

According to Heale and Twycross, (2015), Validity is defined as the extent to which a concept is accurately measured in a quantitative study. There are different types of validity that should be upheld for the outcome of the study to be valid and these include content, face and construct validity (Heale and Twycross, 2015). In this regard, different types of validity were considered in this study to ensure that the approach of measurement applied were actually measuring what it was intended to measure. To ensure validity, in the current study the research procedures were upheld constant and standardised. In addition, the inclusion criteria were followed in recruitment and assessment so that only appropriate participants were included in the study. Content validity determines the extent the instrument covers adequately the content that it should with respect to the variable (Heale and Twycross, 2015). To ensure content validity, extensive literature review was conducted on measuring stressors in NICU and the study adopted a tool that has been validated and used by other researchers to study a similar research problem. Construct validity refers to whether inferences can be drawn about test scores related to the concept being studied. This was demonstrated by the coefficient of consistency which is measured by Cronbach's alpha. The Cronbach's alpha for the current tool was 0.93 which shows that the instrument had a high construct validity.

To ensure face validity the tool was assessed by allowing specialised supervisors scrutinise the data collection tool. Face validity is a weak measure of validity as it uses people's intuition, therefore the current study had to use specialised supervisors to look at the questions (Heale and Twycross, 2015). In addition, validity of the instrument that was guaranteed by making questions simple, concise, to the point and brief in order to give respondents chance to give clear and precise answers which brought out stressors among mothers. The instrument was translated in a local language for easy interpretation and understanding by the respondents. A poorly designed tool is a threat to validity while a more reliable instrument is more likely to have accuracy of measurement. A pilot study was also conducted to check if it would produce valid conclusions.

### **3. 3.1.9 Reliability**

Reliability is the extent to which a research instrument consistently generates the same results if it is used in the same situation repeatedly (Haele and Twycross, 2015). To measure reliability, according to Hilton et al., (2015) a Pretest is a method of checking that questions work as intended and are understood by the individuals who are likely to respond to them. In this regard, a Pretest was conducted for the current study to identify any threats to reliability before the main study. In addition, Burns and Groove (2017) indicate that Cronbach's alpha coefficient is the statistical procedure used for calculating internal consistency which determines the extent to

which all items in the instrument consistently measure a concept. Cronbach's alpha range from 0.00 (indicating no reliability) to 1.00 and the closer it gets to 1 it indicates perfect internal reliability without measurement error (Burns and Groove, 2017). To ensure reliability of the PSS: NICU for use with Zambian parents, a pilot study with 25 parents of infants admitted to a NICU was conducted. No gaps in the data collection instrument were revealed by results of that pilot study. Internal consistency was measured using alpha Cronbach and for each item the value was above 0.90 and internal consistency for the total instrument, values ranged from 0.91 to 0.93. Therefore, these values indicate a good internal consistency (>.70) of the data obtained in the present study.

#### **3.3.1.10 Data Collection Technique**

Data collection techniques refers to a systematic way of collecting information from study objects (Burns and Groove, 2017). These techniques include interviewing, administering written questionnaire and observations. In the current study an interview which involves oral questioning of respondents was used. Interviews were conducted using a semi structured interview guide to obtain qualitative data and an interview schedule was used to collect quantitative data. The interview technique was applied in this study in the quantitative component because respondents were both literate and illiterate and it permitted clarification of questions and has a high response rate (Burns and Groove, 2017). To reduce the possibility of Hawthorne effect in which participants change their behaviour to be helpful to the researcher, the interviewers for both components of the study were not working from NICU.

Data was collected concurrently for both qualitative and quantitative part using different interviewers between July and October, 2017. Quantitative data was collected from 280 mothers with babies admitted in NICU, information about their babies was further verified from the hospital records. Sampling was conducted and eligible mothers were given information on the study and were asked for consent before proceedings with the interview. Self-introduction and brief explanation of the study was made by the interviewer to each participant before starting each interview to create rapport and make participants relax. An interview time was then organised with mothers who consented to participate. Interviews were then conducted in a private office in the NICU using a PSS NICU tool. This was done to ensure privacy and confidentiality was ensured by not sharing information with anyone outside the study. Each study participant was interviewed for 20 to 30 minutes between 08:00 and 16:00 hours. Five (5) to (10) ten interviews were conducted per day to leave time for sorting out and checking for completeness of questionnaires before participants leave the NICU.

During the interviews the interviewers were expected to ask the questions the way they were written, without influencing the answers. Questions not understood by the interviewee were merely repeated without paraphrasing them or indicating the direction of the answer. This was adhered to in this study to minimise the interviewer influencing the participants' responses. The respondents' comfort was at all times considered a priority, the respondents who felt need to change the interview site for

their comfort were allowed. Respondents were given adequate time to think through the question and respond and were politely asked to repeat answers not understood by the interviewers. All responses were recorded on the interview schedule on site to avoid missing any of them. At the end of each interview, respondents were given time to ask questions. Interviewers clarified what was recorded with the interviewee and thanked respondents before ending each interview.

### **3.3.1.11 Pilot Study**

The pilot study is conducted to validate the feasibility of the study by assessing the inclusion and exclusion criteria of participants and respondents, sampling methods and testing the instruments (Creswell, 2014). The purpose of the pilot study is to reduce measurement error on a larger scale later and it improves the validity, reliability, accuracy and efficiency of the study (Burns and Groove, 2017). To reduce measurement error and contamination of data in final study a pilot study in the current study was conducted independent of the main study. A pilot study was conducted at Levy Mwanawasa University Teaching Hospital which is situated within the town where the main study was conducted. This site was chosen because it has similar characteristics with the site for the main study. To obtain a sample for pilot study, Lackey and Wingate's (1998) recommendation of a 10 percent of the final study sample was applied. Therefore, for the quantitative part, 28 mothers and their admitted infant who met the inclusion criteria were systematically sampled to participate in the pilot study.

The pilot study was conducted to Pretest the translated PSS: NICU and ensure that the questions were clearly articulated and response options were relevant, comprehensive and mutually exclusive from the respondents' point of view. It also helped in assessing the amount of time it would take to complete individual items. In addition, it also brought out the research assistants' objectivity, biasness, knowledge of survey items and competence in clarifying points. Based on the results of the pilot study, no major flaws and administration of the survey was changed in quantitative part of this study.

#### **3.3.1.12 Data Processing and Analysis of Quantitative Data**

Creswell, (2014) defined data analysis as the process of bringing order, structure and meaning to the mass of collected data. Data analysis is performed to obtain answers to questions that led to the development of the study (Burns and Grooves, 2017). In this regard, data had to be processed before data analysis. Throughout the processing and analysis period, data was protected by storing questionnaire in a locked cabinet. All questionnaires were assigned codes and checked for completeness and were edited for internal consistency, legibility and accuracy (Burns and Groove, 2017). In addition, numerical codes were assigned to all questions in the interview schedule for easy entry in excel before exporting it to Stata version 14 for analysis. The data were subjected to descriptive and inferential

analysis to determine the characteristics of the sample and later to draw conclusions and make inferences about the population (Creswell, 2014).

The Shapiro wilk test for normality confirmed that data was not normally distributed hence non parametric statistical tests were employed. Likert scale data obtained using the PSS: NICU were summed and presented as median (M) and interquartile range (IQR). Chi square was used to test for association between the dependent and independent variables. Chi square was appropriate for this study because it is a test of independence which assess whether an association exist between two variables by comparing the observed pattern of responses in the cells to the pattern that would be expected if the variables were truly independent of each other (Burns and Grooves, 2017). The cut off point for statistical significance was set at five percent. Therefore, p value less or equal to 0.05 were considered statistically significant.

Kruskal-Wallis equality of population rank test followed by post hoc test were performed to compare medians of ranked sums stress categories and determine whether the differences between the stress subscale were statistically different, respectively. The Kruskal-wallis test was appropriate for this as it is a rank based non parametric test used to determine statistical significance between groups of independent variables on continuous or ordinal dependent variable (Burns and Groove, 2017). In addition, Ordinal regression model was carried out with and

without adjusting for other confounding variables respectively. This was conducted to ensure that the variables that were found to be significant by the chi square test were not by chance or due to confounding variables.

The Parental Stress Scale: Neonatal Intensive Care Unit (PSS: NICU) has three scoring methods: Metric 1, Metric 2, and Frequency (Miles & Funk, 1998). To measure the level of stress experienced when a situation occurs, Metric 1 is used. Metric 2 measures the overall stress experienced from the NICU environment while the Frequency method counts the number of items experienced by a parent. Metric 1 scores were reported because the focus in the present study was on the level of stress experienced by a parent from the NICU when the situation occurs. The scoring is as follows: 0= not applicable, 1 = not at all stressful, 2 = a little stressful, 3 = moderately stressful, 4 = very stressful, 5 = extremely stressful. For the purpose of reporting, scores of 4 and 5 were reported together as very stressful.

The possible range of total scores that were calculated after summing up the score according to Metric 1 were: Sights and Sounds (0-25); Infant Appearance (0-95); Parent-Infant Relationship (0-50); Staff (0- 55); General Stress (0-5); and the whole scale ranges from Zero to 230 (0-230). Therefore, the high scores denote high levels of stress while the low scores denote low stress levels. For the sights and sounds subscale, stress was measured by asking mothers to rate how stressful each of the five items was; a score of 0 meant none of the items of five questions were experienced by the mother, score between 1 to 5 meant the mother was not stressed

by the items 6 to 10 score meant the items were a little stressful, scores between 11 to 15 meant moderate stress, 16 to 20 scores meant very stressful and 21 – 25 score meant the items in this subscale were extremely stressful to the mother. This was applied for all subscales depending on the total score obtained from the number of questions that measured stress on the subscale. Lastly, the Frequency scoring method which was also used in this study simply counts the number of situations experienced by a parent, according to each subscale or the total scale.

### **3.3.2 Qualitative Research Methods**

#### **3.3.2.1 Research Design**

The qualitative component employed a case study design that was guided by Yin, (2012). Case studies are a form of inquiry in which an in depth analysis of a programme, event, activity, process or one or more individuals is developed by a researcher (Yin, 2012). The study utilised this design to elucidate the nurses' perceptions on stressors in NICU and other policy issues regarding care of mothers and babies in the Unit. The case study approach was thought to be appropriate because it would help gain a better understanding of the NICU environmental stressors from the health care providers' view. In this study it was important to capture each methodological approach in order to cross validate the findings for the development of a model in phase two of the study.

### **3.3.2.2 Study Population**

The qualitative study population included the nurses who were working in the NICU at the time of data collection. The target population for the nurses' sample after applying the eligibility criteria was 30. Therefore, accessible sample was drawn from the target population after purposive sampling was applied.

### **3.3.2.3 Sample Selection**

Non probability sampling method was used to select a sample for the qualitative part of this study. According to Miles et al. (2014), purposive sampling method focuses on insight, description and understanding of the phenomenon, cultural element, situation or process in a limited population. The purposive sampling method was appropriate for the study because the researcher was able to select a heterogeneous sample and only those nurses perceived to have rich information on the issues of NICU environmental stressors were approached and included in the study. In addition, purposive sampling is appropriate in studies where scanty information exist locally on the area of study and is used in qualitative research to gain insight into a new area of study (Munhall (2012)). Therefore, in the current study participants were purposively selected using maximum variation sampling strategy (Creswell, 2003). To achieve maximum variation, the selected participants were according to a common characteristic: nurses providing care in the NICU and the variation was in the different professional qualification and roles and functions within the nursing

profession. The number of participants was determined following the criterion of data saturation (Creswell, 2003).

#### **3.3.2.4 Inclusion and Exclusion**

Inclusion of nurses in the qualitative part was based on work experience and professional qualification. Regarding work experience, only nurses who should have worked in the NICU for more than one month at the time of the study were included in the study. In addition, professional qualification of the nurses was considered to achieve a heterogeneity sample for maximum variation of views and experiences. Therefore, nurses were drawn from all different qualifications and positions (Enrolled Nurses, Registered nurses, Critical Care Nurses, Midwives) until thematic saturation was reached at 15. Those nurses who were on leave during the study were excluded from the study.

#### **3.3.2.5 Sample Size**

In qualitative research the focus is on quality of information obtained from the person thus the sample size varies with the depth of information needed (Munhall, 2012). Therefore, the sample size can be determined by data saturation. Burns and Groves (2017) define saturation of data as occurring when additional sampling provides no new information but only redundancy of previously collected data. At the beginning of data collection, it was assumed that thematic saturation will be reached after interviewing a sample of three nurses from each category to achieve a heterogeneous sample of 20 (Critical care nurses, Registered, Certified and Enrolled

Midwives, Registered nurses and the NICU in-charge). Nonetheless during data collection, thematic saturation was reached at 15 and heterogeneous sample with maximum variation was sampled to represent all professional qualification of nurses working in NICU.

#### **3.3.2.6 Data Collection**

Qualitative data was collected through in depth interviews using a semi structured interview guide. Semi structured interview guide was used in this study since it was unlikely that the interviewees would be interviewed more than once (Benard, 1998). The semi-structured interview guide was composed of open ended questions in accordance with the qualitative nature of the study. Using a semi structured interview guide in-depth interviews were conducted to obtain information from the nurses. This strategy was appropriate as it allows the interviewer and respondents to engage in a formal interview while using a list of questions in a particular order. The interview guide was structured to begin with less sensitive questions such as "How long have you worked in this unit?". Despite following the interview guide the interviewer was able to follow trails in the conversations. The interview guide included topics related to the perceptions of stressors in the NICU derived from the theoretical frame work guiding the study. The frame work identifies the following as major stressors in the NICU; the NICU environment, staff behaviour, Infant appearance and parent infant relationship. Nurses were asked using these broad areas what they perceived stressful to the mothers. They were also asked on the challenges and recommendations that could improve their service delivery to the

mothers and other family members. All interviews were tape recorded, and notes were made concerning actions and body language of the nurses during the interview.

### **3.3.2.7 Validity, Dependability and Trustworthiness of Qualitative Data**

Validity and reliability does not carry the same connotations in qualitative research as it does in quantitative research described above (Creswell, 2014). Gibbs, (2007) documents that qualitative validity is based on determining whether the findings are accurate from the stand point of the investigator, participants or reader. Qualitative reliability indicates consistency of the research approach across different researchers and different projects (Gibbs, 2007). Guba and Lincoln (1985) proposed four criteria for judging the internal and external validity and reliability. The criteria measure the credibility, transferability, conformability and dependability of the results.

Credibility involves establishing that the results are credible from the perspective of participants in research (Trochim, 2020). Three main approaches were used to assure credibility of the present study process. Firstly, appropriate data collection method befitting the study design established credibility. In-depth one to one interviews were conducted as they have an advantage of obtaining rich qualitative data over other methods. During data collection, meticulous recording of discussion sessions, decision trails, transparency of interpretation in the data and participants' checking was applied. Other methods such as prolonged engagement, sufficient

time allocation and good communication were ensured. Trochim, (2020) describes Transferability as the degree to which results can be generalised to other concepts or setting which is enhanced by thorough description of research context. For data transferability, detailed and thick data description has been applied in this study to enable other researchers have a full understanding of research steps and the NICU stressors which is the central assumption of the research (Graneheim & Lundman, 2004).

Confirmability refers to the degree to which the results could be confirmed by others (Trochim, 2020). To achieve conformability, two experts in the field of qualitative research reviewers were consulted to cross check the data coding framework and consistency of the derived themes from the analysis. Dependability which refers to whether same results could be obtained if the same thing is observed twice was ensured in this study by presenting data to an external researcher to check if the conclusions are the same (Trochim, 2020). External validity of data was facilitated through the purposively selected sample of nurses who had worked in NICU long enough to be able to give rich qualitative data.

### **3.3.2.8 Data Collection Technique**

A semi structured interview guide was used to collect data among nurses working in NICU. A semi structured guide consisted of open ended questions developed by the researcher with assistance from local expert in qualitative research. The

respondents were asked the same set of questions as indicated in the interview guide (Appendix II). The interview guide included the following questions: the stressors experienced by mothers of neonates admitted to the NICU concerning parental care (physical contact, baby appearance and behaviour, feeding and NICU environmental), treatment options; mothers' understanding of medical facts, and technologies applied to intensive care; information and communication needs of parents; and their wider awareness of social and ethical issues in this area. It also included information on the current situation in NICU regarding involvement of mothers in the care of their children. To obtain detailed information on the mentioned concepts, purposive sampling with maximum variation was applied for this study. Maximum variation enabled the researcher to sample five Registered nurses, four Critical care nurses, one Paediatric nurse, one Midwife and four Enrolled nurses. At the time of the study the unit only had one nurse specialised in midwifery and critical care while the majority of nurses were registered and enrolled nurses hence more were interviewed. This was done with an assumption that nurses of different qualifications had different knowledge and competences based on their initial or post basic training. Nonetheless only nurses who met the sampling criteria from different qualifications were approached to participate and only those who consented were interviewed.

The interviews were conducted in the office within the NICU. To avoid distracting the development of rapport between the interviewer and interviewee an explanation of the process and importance of note taking and recording was done at the beginning

of an interview. With the interviewee's consent the interviewer recorded all the interviews through handwritten notes and tape recordings. Of the 30 nurses who were eligible to participate in the study, 15 were interviewed. This number was determined in consonant with suggestions by Saunders et al., (2018) on criterion of discontinuing data collection based on data saturation was applied in this study. No more interviews were conducted after a point of informational redundancy in a way that is consistent with the research was reached.

#### **3.3.2.9 Pilot Study**

The interview guide for the qualitative part was tested by interviewing five nurses working in NICU at the site chosen for pilot study. This was conducted to identify any ambiguity in the interview guide and assess if the questions were clearly articulated to obtain relevant and comprehensive responses. The unclear questions are identified by asking the interviewee to identify those questions at the end of the interview (Burns and Groove, 2017). In the current study the unclear questions identified by respondents were refined based on the results of the pilot study before conducting the main study.

#### **3.3.2.10 Data Analysis and Processing of Qualitative Data**

Qualitative data analysis is a process of making sense from research participants' views and opinion of situations, themes, categories and regular similarities (Cohen et al., 2007). The method of analysis chosen for this study was a hybrid approach of

qualitative methods of thematic analysis which incorporated both the data-driven inductive approach of Boyatzis (1998). In addition, the deductive a priori template of codes approach was also used as outlined by Crabtree and Miller, (1999). Thematic analysis involves searching for themes that emerge as being important to the description of the phenomenon (Creswell, 2003). The process involves the identification of themes through “careful reading and re-reading of the data” (Creswell, 2003). It involves a pattern recognition within the data, where emerging themes become the categories for analysis. The hybrid approach complemented the research questions by allowing the process of deductive thematic analysis while allowing for themes to emerge direct from the data using inductive coding. In this regard, a structure or predetermined framework is used to analyse data in a deductive thematic analysis. This approach is appropriate for this study which compares the identified stressors on part of mothers and what is perceived by the nurses who are care givers and key persons in helping the mothers to cope with the stressful events. Nonetheless a hybrid has been used so that any differences or emerging themes should not be missed out.

For this study, based on the research questions and theoretical concepts, the template was developed a priori. Four broad code categories formed the code manual (NICU Physical Environment, Rules and Regulations, Staff behaviour, Parent Infant relationship). To obtain the themes in this study the audio taped interviews were listened to over and over again to get adequate immersion into the data, which helped in identifying recurring terms. Thereafter, Tape recorded

interviews were transcribed verbatim. The verbatim were then compared with the data contained in the field notes as a way of checking for errors. Similar terms were then grouped into themes to further reduce the data. Once concepts were identified literature was consulted to determine similar associations (Glaser & Strauss, 1967). Transcripts were reviewed with the aim of validating the pre-determined themes, identifying additional themes and sub themes.

### **3.4 Phase Two**

Phase two of the current study was aimed at developing a stress alleviation model from the stressors identified from the phase one data. Therefore, phase two was informed by the data obtained in phase one and literature review. Stakeholder consultation method was used to develop a stress alleviation model. The stakeholders included the nurse leaders working in the Unit and the senior nurses who have worked in the Unit for more than five years and had gained experience. The team was asked to deliberate on the stressors identified from both the qualitative and quantitative part of phase I. Following the deliberations, they team was asked to suggest the possible and feasible solutions to the identified stressors. Literature was also reviewed to identify the methods that have been implemented in other NICU settings and have documented positive results in stress alleviation. Therefore, this method was thought to be appropriate for this study that required practical knowledge for solving stress among mothers from nurses working in NICU.

### **3.5 Ethical Issues**

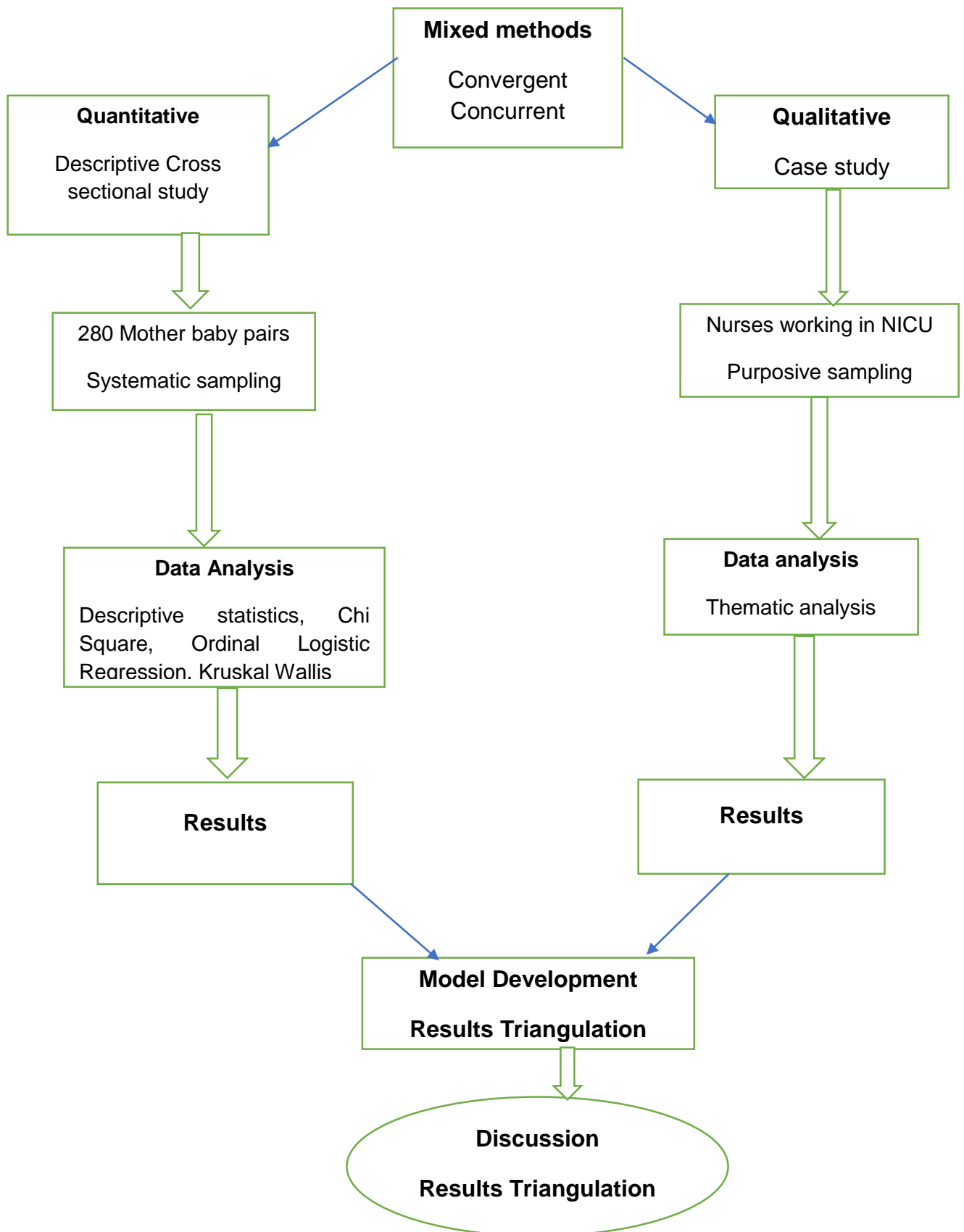
Principles relating to ethical conduct of research and the protection of human participants including respect for participant autonomy, justice, beneficence and non-maleficence were strictly adhered to during the conduct of this study. Ethical approval was obtained from the University of Zambia Biomedical Research Ethics Committee (No. IBR00001131) and National Health Research Authority (MH/101/23/10/1). Permission to access the study site was obtained from the Women and New-born hospital and pilot site from Levy Mwanawasa University Teaching hospital. After obtaining permission to conduct the study, the participants' rights were also taken into consideration during the process of the study.

Respect for persons requires a commitment to ensuring the autonomy of research participants, and, where autonomy may be diminished, to protect people from exploitation of their vulnerability (Creswell, 2014). The dignity of all research participants was respected. Adherence to this principle ensures that people are not used simply as a means to achieve research objectives. Adequate participant information was provided and written informed consent (Appendix III) obtained from each participant prior to enrolment into any of the two parts of the study. A separate consent was obtained to have their infant's characteristics obtained from them and the records prior to participation in the study. Participation in the study was purely on voluntary basis and no coercion was used at any time. Participants were informed of the right to decline and withdraw participation at any time without any

consequences and withdraw would in no way affect the care that their child was receiving.

Confidentiality was ensured as participants were not identified by name, codes were used and access to data was restricted to the principal investigator and supervisors only. Beneficence requires a commitment to minimizing the risks associated with research, including psychological and social risks, and maximizing the benefits that accrue to research participants (Burns and Groove, 2017). This study had no physical risks but had a risk of psychological trauma for those women who had a bad obstetric history. To protect the respondents, each mother was carefully observed during the interview to ensure each one of them was not stressed by completing the questionnaire; as a precautionary measure, psychological support was made available. The study did not interfere with clinical work and visiting time for mothers. Participants were requested as guided the information sheet provided to utilise time between visiting times.

### 3.6 Diagrammatic illustration of the convergent of Methods



## CHAPTER FOUR: RESULTS

### 4.1 Introduction

This chapter presents findings obtained from the quantitative and qualitative parts of this study. The quantitative data facilitated identification of NICU environmental stressors and associated factors among mothers with neonates admitted to the NICU. The qualitative data brought out nurses' perceptions of stressors and stress levels among mothers nursing babies in NICU. The two sets of data informed the development of a stress alleviation model. Presented data was collected from 280 mothers and their 280 neonates admitted to NICU as guided by the calculated sample size, giving a 100 percent response rate. An interview schedule was used to collect socio-demographic information from mothers and their admitted neonates while the data to determine stress levels were collected using a PSS: NICU tool.

Respondents rated each item of the PSS NICU tool according to how stressful the situation described in each item was for them: 1=not at all stressful, 2=a little stressful, 3=moderately stressful, 4=very stressful, and 5=extremely stressful. Those who had not experienced a particular situation indicated "not applicable" which had a score of zero. If a participant had multiple infants in the unit, only one twin was eligible. The outcome variable, maternal stress levels were classified according to points on likert scale as follows Low (1-2.9) medium (3-3.9) and high (4 -5).

In addition, qualitative data was collected from 15 nurses working in the NICU. In depth interviews were conducted using an interview guide with the sample size determined by data saturation. The said data were collected between August and October 2017 at the Women and New-born Hospital NICU of the University Teaching Hospitals.

## **4.2 Demographic Characteristics of the Participants**

Descriptive analysis of continuous and categorical variables with asymmetric distribution was performed by absolute frequencies. The absolute frequency distributions of the respondents' demographic characteristics are presented in tables below, beginning with infant characteristics.

### **4.2.1 Infants' Characteristics**

The infants whose mothers participated in the study were also recruited in the study through a written consent from their mothers. The mothers provided some of the information on their babies while the clinical information was obtained from the medical records. Frequency distribution of their responses is given in table 4.1.

**Table 4.1: Frequency distribution of Infants' Characteristics (n = 280)**

Variable	Category	Frequency	Percentage
Birth weight (grams)	< 2500	189	67.5
	≥ 2500	91	32.5
Gestation age (weeks)	28 – 36	145	51.8
	37 - 42	135	48.2
Birth type	Single	260	92.9
	Multiple	20	7.1
Place of birth	Home	26	9.3
	W NH	150	53.6
	Referred from another Hospital	104	37.1
Length of stay (days)	1 - 7	194	69.3
	≥ 7	86	30.7
Diagnosis	Prematurity	130	46.4
	Asphyxia & Difficulty in breathing	59	21.1
	Neonatal jaundice	30	10.7
	Neonatal sepsis	33	11.8
	Observations born from Diabetic mother & post LSCS	10	3.6
	Congenital abnormality	18	6.4

**LSCS = lower segment caesarean section, WNH = Women and New-born Hospital**

The frequency of respondents with babies weighing less than 2500 grams were 189 (67.5%) and those who had babies born between 28 and 36 weeks' gestation age (prematurely) were 145 (51.8%). The birth weights ranged from 700g to 4600g with 1800g as the median. Majority (260, 92.9%) were singleton birth with 20 (7.1%) being twin deliveries. About 86 (30%) of them had spent more than seven days in the NICU. The range of length of stay in the NICU was between one and 90 days with the median being four days. Majority of the babies were born at the health facility, 150 (53.6%) were delivered at the Women and New-born Hospital of UTH

while 26 (9.3%) were born at home. The babies were admitted with different diagnoses, 130 (46.4%) were admitted for prematurity while 10 (3.6%) were admitted only for observation because they were either born from a diabetic mother or by Lower Segment Caesarean Section (LSCS). On the other hand, 30 (10.7%) were admitted for neonatal jaundice, 33 (11.8%) for neonatal sepsis and 18 (6.4%) for congenital abnormalities. The frequencies on the clinical characteristics for the infants are presented in Table 4.2 below.

**Table 4.2 Frequency distribution of Infant’s clinical characteristics (n=280)**

Variable	Category	Frequency	Percentage
Child once on a ventilator	Yes	172	61.4
	No	108	38.6
Respiratory status	Room air	202	72.1
	Oxygen Therapy	78	27.9
Current bedding	Open crib	204	72.9
	Incubator care	76	27.1
Type of feeding	Nipple feeding	106	37.9
	Tube feeding	82	29.3
	Cup feeding	84	30.0
	Parenteral	8	2.9

According to table 4.2 above, 172 (61.4%) of the respondents indicated that their babies were once put on a ventilator while 108 (38.6%) responded that their babies were never put on ventilator. Of the 280 babies 202 (72.1%) were being nursed in an open crib and 78 (27.9%) were either on nasal oxygen or oxygen by hood. It is

also worth noting that two of the babies were on Continuous Positive Airway Pressure (CPAP) at the time of data collection. On the other hand, 106 (37.9%) of the babies were breastfeeding while the rest were either on nasogastric tube feeding or cup feeding.

#### 4.2.2 Maternal characteristics

The respondents were drawn from the women in the child bearing age which is between 15 and 49 years. The respondents aged between 15 and 45 years were 274 (98%) and those above 45 years were 5.6 (2%). The mean age was 26 years and the age range was 15 to 47 years.

**Table 4.3: Frequency distribution of Maternal demographic characteristics (n=280)**

Variable	Category	Frequency	Percentage
Age	15 - 30yrs	220	78.6
	31 - 50yrs	60	21.4
Marital status	Married	211	75.4
	Not Married	79	24.6
Education level	Primary and Secondary	219	78.2
	Tertiary	61	21.8
Previous pregnancies	≤ 2 children	96	34.3
	≥ 3 children	184	65.3
Occupation	Professional	33	11.8
	Self employed & housewives	247	88.2
Had a medical or obstetric condition during pregnancy	Obstetric problems	48	17.1
	Medical problems	19	6.8
	No	213	76.1
Communicated to on child's prognosis by	Doctors	50	17.9
	Nurses	32	11.4
	Nurses and Doctors	13	4.6
	No	185	66.1

Of the 280 respondents, 220 (78.6%) were aged between 15 and 30 years. On the other hand, 211 (75.4%) respondents were married while 79 (24.6%) were either

single, divorced or widowed. Additionally, 219 (78.2%) respondents went up to primary and secondary education while only 61 (21.8%) went up to tertiary education level. The 247 (88.2%) respondents were either self-employed or housewives while 33 (11.8%) were on paid employment and were to report back for work within four weeks of delivery. When asked if the respondents had any medical conditions or obstetric conditions during pregnancy, 213 (76%) were not diagnosed with any medical or obstetric conditions during pregnancy, while 67 (24%) reported history of medical or obstetric conditions. About 137 (66%) of the respondents reported having not been given any information on the prognosis of their hospitalised child. Among these, 50 (17.9%) indicated that they were informed by Doctors while 32 (11.4%) were informed by nurses. The occurrence of maternal stress as measured by the PSS: NICU is reported below.

#### **4.3 Parental Stress Scale measurement in NICU**

The average occurrence of maternal stress for each item of the scale was calculated according to recommendation of metric 1, the responses marked Not applicable received a value of zero. Frequencies of responses given on each item of the PSS: NICU are presented according to the four sub-scales designed to measure parents' perception of stressors within the NICU related to: Sights and Sounds, Appearance and behaviour of the infant, the impact on parents' role and their relationship with their baby, and the parents' relationship and communication with the staff. The

frequency distribution of respondents' reporting the presence of stress due to sights and sounds are reported below.

#### 4.3.1 Sights and Sounds subscale

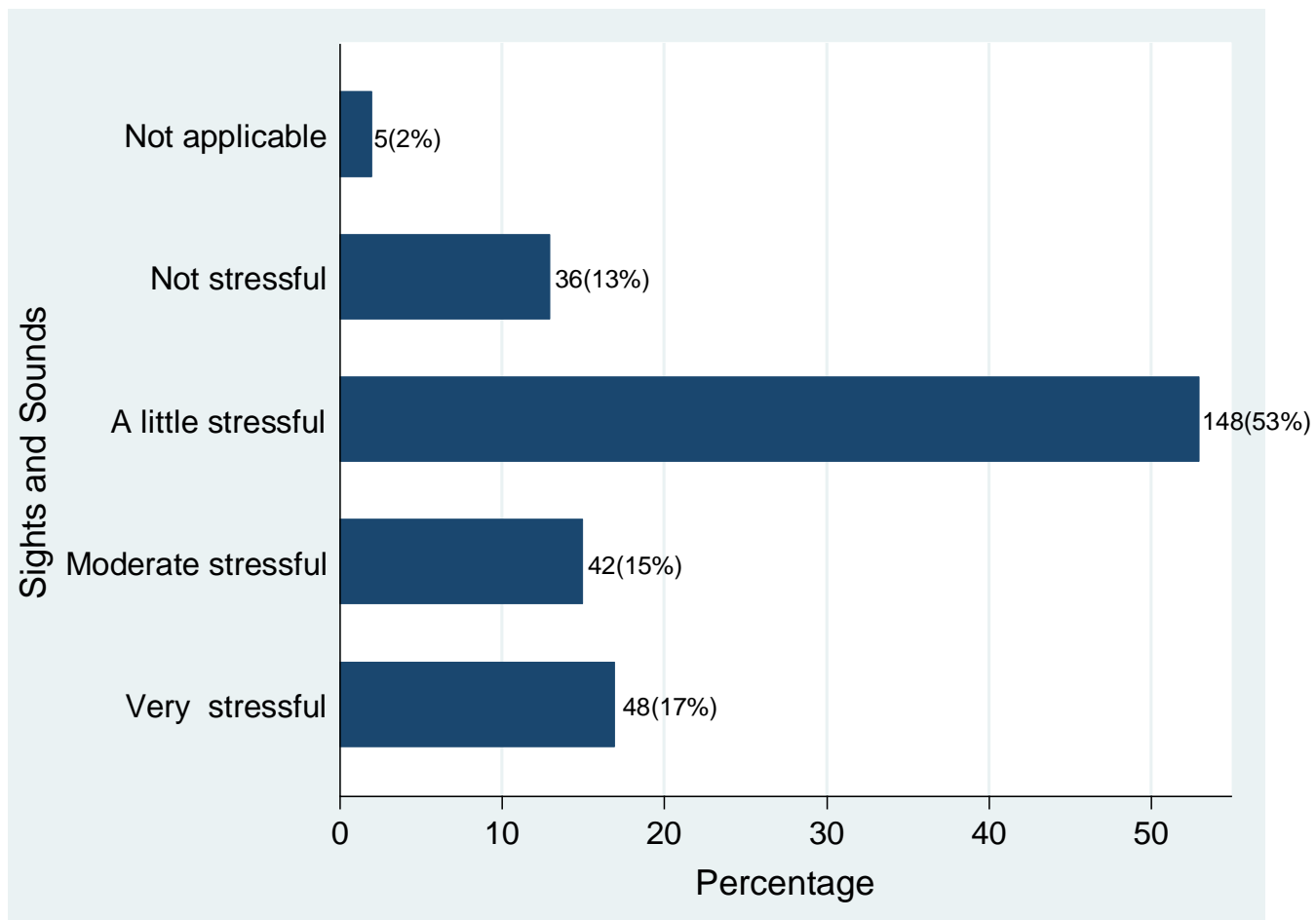
The category of sounds and sights in the NICU of the PSS: NICU tool examined five elements, including; presence of monitors and equipment, constant sounds, sudden sounds, other sick babies and larger number of people working in the NICU.

**Table 4.4: Mother's perception of Sights and Sounds in NICU (n =280)**

Sights and sounds characteristics	Stress levels n = 280 (%)				
	Not applicable	Not stressful	A little stressful	Moderately stressful	Very stressful
Presence of Monitors & Equipment	9 (3.2%)	113 (40.4%)	78(27.8%)	37(13.2%)	43(15.4%)
Presence of constant noises	9 (3.2%)	150 (53.6%)	49(17.5%)	27 (9.6%)	45 (16 .1%)
Sudden noises	12 (4.3%)	145(51.8%)	45 (16.1%)	31 (11%)	47(16.8%)
Other sick babies	10 (3.6%)	45 (16.1%)	69 (24.6%)	94 (33.6%)	62 (22%)
Large number of people working in unit	11 (3.9%)	151 (53.9%)	55 (19.6%)	34 (12.1%)	29(10.4%)

Table 4.4, shows that respondents were not stressed by the presence of monitors and equipment 113 (40.4%), sudden noises 145 (51.8%) and constant noises 150 (53.6%) in the NICU while about 45 (16%) responded that these elements were very stressful. On the other hand, 151 (53.9%) respondents indicated that a large number of people working in the NICU was not stressful and 62 (22%) reported that other

sick babies in the unit made them very or extremely stressed. The frequency distribution of respondents' reporting the presence of stress due to the sights and sounds subscale are reported in figure 4.1.



**Figure 4.1: Stress levels due to Sights and Sounds in NICU (n = 280)**

Figure 4.1 shows that regarding mothers' perception of stress due to sights and sound, 148 (53%) of respondents reported a little stressful while 36 (13%) responded that it was not stressful at all.

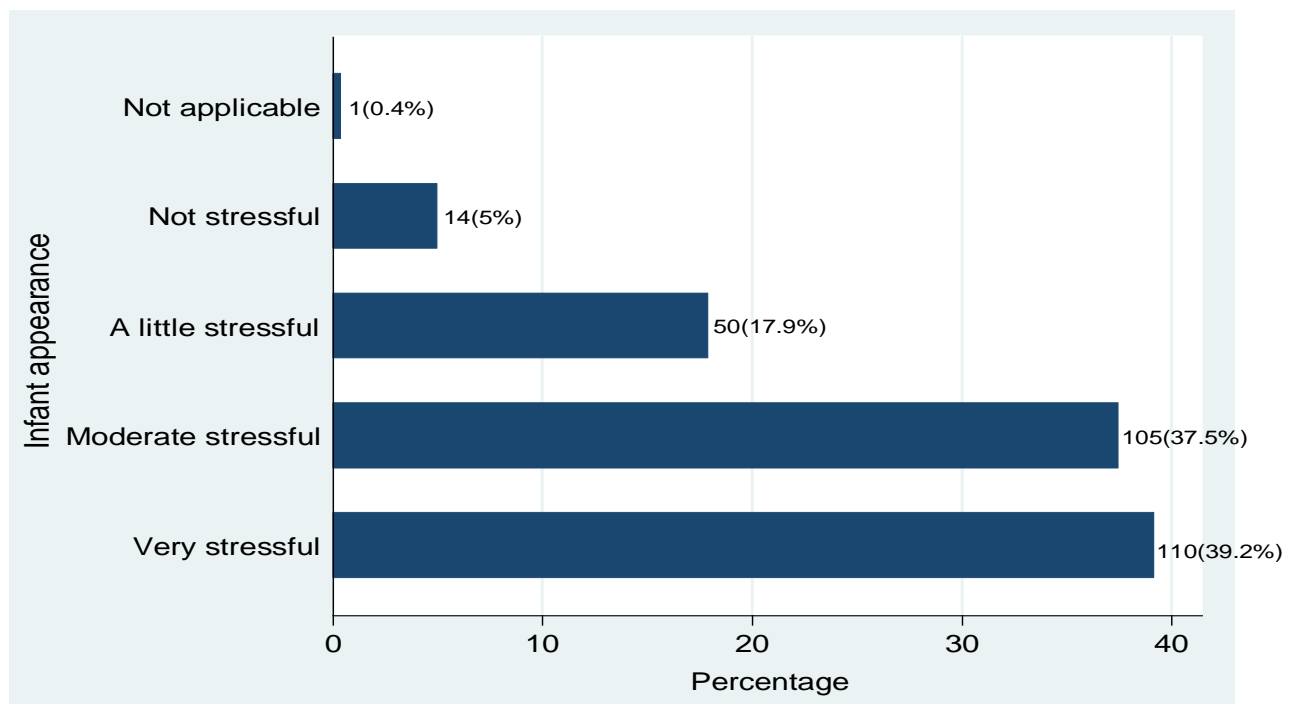
### **4.3.2 Infant Appearance and Behaviour**

The infant appearance and behaviour measured 14 items which includes among others bruises on the baby, abnormal colour, size of the baby, abnormal breathing, restless and baby not able to cry like other babies. The perception of how stressful each item that measured stress due to infant appearance and behaviour were to the mothers nursing babies in NICU are reported in table 4.5.

**Table 4.5: Mother's perceptions on Infant appearance and behaviour (n = 280)**

Infant appearance Characteristics	Stress levels n = 280 (%)				
	Not applicable	Not Stressful	A little stressful	Moderately stressful	Very stressful
Tubes & equipment	8 (2.9%)	58(20.7%)	76 (27.1%)	66 (23.6%)	72 (25.7%)
Bruises, cuts or incisions	22 (7.9%)	66(23.6%)	65 (23.2%)	61 (21.8%)	66 (23.6%)
Unusual colour of my baby(pale & jaundice)	34 (12.1%)	35(12.5%)	63 (22.5%)	81 (28.9%)	67 (23.9%)
Seeing my baby suddenly change colour (pale & blue)	30 (10.7%)	24(8.6%)	48 (17.1%)	91 (32.5%)	87 (31.1%)
Seeing baby stop breathing	73 (26.1%)	19 (6.8%)	30 (10.7%)	44 (15.7%)	114(40.7%)
Small size of my baby	42 (15%)	31(11.1%)	37 (13.2%)	85 (30.4%)	85 (30.4%)
Wrinkled appearance of my baby	46 (16.4%)	25 (8.9%)	39 (13.9%)	95 (33.9%)	75 (26.8%)
Having a machine (respirator) breathe for my baby	30 (10.7%)	19 (6.8%)	35 (12.5%)	59 (21.1%)	137(48.9%)
Seeing needles and tubes put in my baby	5 (1.8%)	22 (7.9%)	43 (15.4%)	82 (29.3%)	128(45.7%)
When my baby seemed to be in pain	15 (5.4%)	16 (5.7%)	51 (18.2%)	85 (30.4%)	113(40.4%)
My baby crying for long periods	26 (9.3%)	21 (7.5%)	50 (17.9%)	96 (34.3%)	87 (31.1%)
When my baby looked afraid	30 (10.7%)	24 (8.6%)	63(22.5%)	85 (30.4%)	78 (27.9%)
When my baby looked sad	30 (10.7%)	19 (6.8%)	56 (20%)	88 (31.4%)	87 (31.1%)
The Limp and weak appearance of my baby	25 (8.9)	17 (6.1%)	38 (13.6%)	94 (33.6%)	106(37.9%)
Jerky or restless movements of my baby	45 (16.1%)	30 (10.7%)	46 (16.4%)	94 (33.6%)	65 (23.2%)
My baby not being able to cry like other babies	29 (10.4%)	29 (10.4%)	75 (26.8%)	80 (28.6%)	67 (23.9%)
Clapping on baby's chest for drainage	55 (19.6%)	35 (12.5%)	57 (20.4%)	73 (26.1%)	60 (21.4%)

Table 4.5 shows that, of the 280 respondents reported that it was stressful for them when they saw their babies change colour 87 (31.1%), seeing them temporarily stop breathing 114 (40.7%) and the small size of the babies 85 (30.5%). Sixty-seven (23.9%) respondents indicated that it was very stressful to notice that their babies were not able to cry like other babies, while 94 (33.6%) were moderately stressed by the Jerky or restless movements of their baby. On the other hand, about 57 (20.4%) of the respondents did experience clapping on baby's chest for drainage at all and were a little stressed. The respondents were very stressed with having a machine (respirator) breathe for their baby were 137 (48.9%). Regarding stress experienced by mothers due to the appearance and behaviour of their infant, frequency distributions are presented in figure 4.2 below.



**Figure 4.2: Maternal stress due to Infant Appearance and Behaviour (n = 280)**

The figure 4.2, shows that 110 (39.2%) of the respondents reported that the Infant appearance and behaviour subscale was very stressful and 50 (17.9%) reported having experienced a little stress.

### **4.3.3 Parent-Infant relationship**

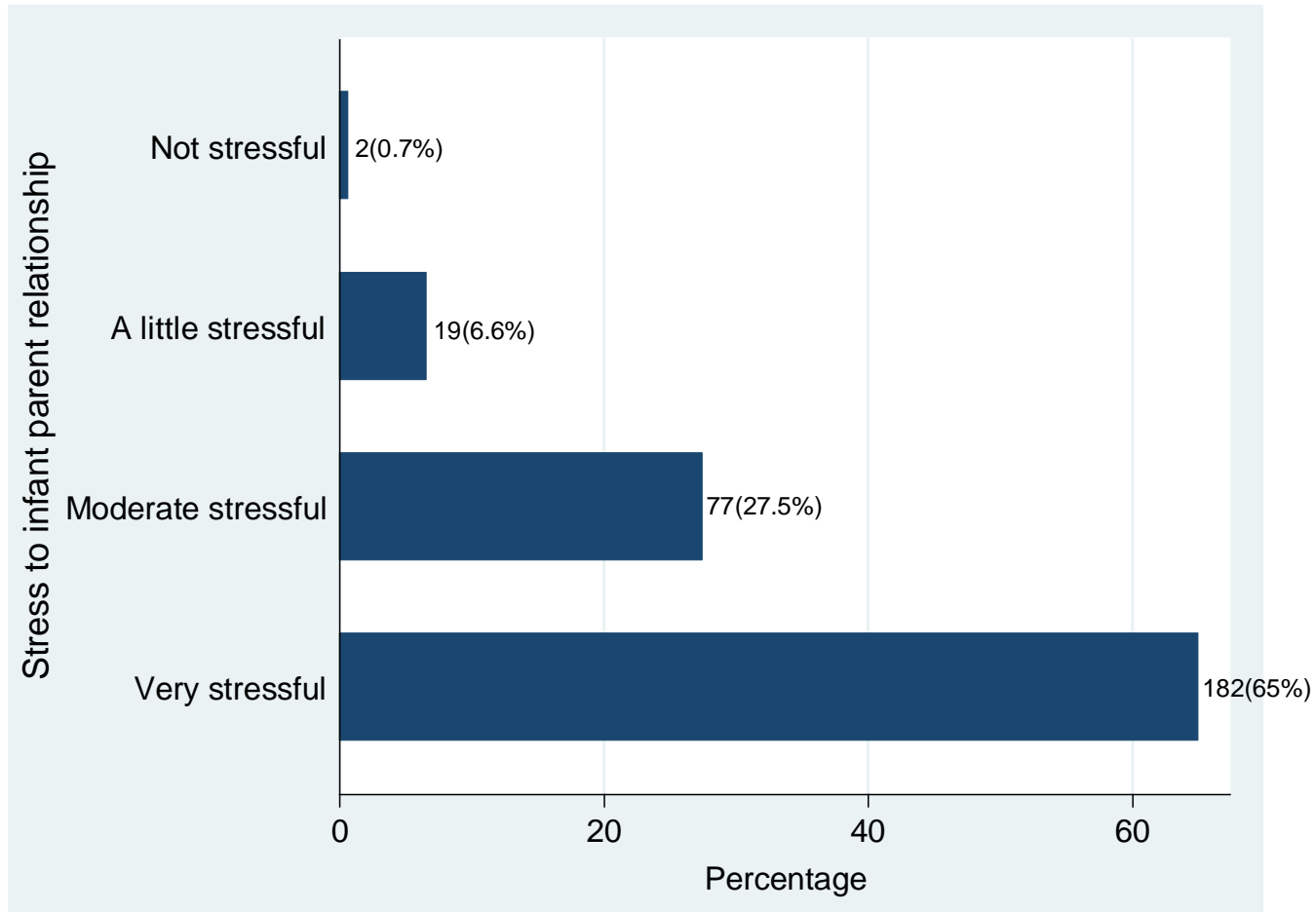
The Parent-infant relationship examined elements to do with how much the mother was involved in taking care of her hospitalised baby. The examined elements included; separation of the mother from the baby, not being able to feed her baby, changing nappies, bathing and holding the baby when they felt like. The worries of not being able to recognise her baby, not being there to protect the baby, not being able to share the baby with other family members and being afraid to hold her own baby. The maternal perceptions of role adjustment stress are illustrated in table 4.6 below.

**Table 4.6: Perceptions of parental role adjustment stress (n = 280)**

Parent-infant relationship Characteristic	Stress levels n = 280 (%)				
	Not applicable	Not stressful	A little stressful	Moderately stressful	Very stressful
Being separated from my baby	0	3 (1.1%)	14 (5%)	41(14.6%)	222 (79.2%)
Not feeding my baby myself	14 (5%)	12 (4.3%)	13 (4.6%)	36 (12.9%)	205 (73.2%)
Not being able to care for my baby myself	0	15 (5.4%)	10 (3.6%)	53 (18.9%)	202 (72.1%)
Not being able to hold my baby when I want	0	9 (3.2%)	12 (4.3%)	71 (25.4%)	188 (67.1%)
Sometimes forgetting what my baby looks like	39 (13.9%)	66 (23.6%)	50 (17.9%)	31 (11.1%)	94 (33.6%)
Not being able to share my baby with family	0	9 (3.2%)	11 (3.9%)	83 (29.6%)	177(63.2%)
Feeling helpless and unable to protect baby from pain and painful procedures	12 (4.3%)	5 (1.8%)	20 (7.1%)	46 (16.4%)	197(70.4%)
Being afraid of touching and holding my baby	25 (8.9%)	63 (22.5%)	65 (23.2%)	45 (16.1%)	82 (29.3%)
Feeling staff are closer to my baby than I am	23 (8.2%)	72 (25.7%)	59 (21.1%)	49 (17.5%)	77 (27.5%)
Feeling helpless about how to help my baby during this time	5 (1.8%)	30 (10.7%)	35 (12.5%)	67 (23.9%)	143(51.1%)

Table 4.6 above shows that 222 (79.2%) of the respondents reported that they were very stressed because of the separation from their babies, 205 (73.2%) were very stressed because they were unable to feed the baby themselves. The respondents who were very stressed by not being able to care for the baby themselves were 202 (72.1%) and 143 (51.1%) were stressed by the feeling of helpless about how to help their baby during the time of admission. Sixty-three (22.5%) respondents indicated that being afraid to touch and hold the baby did not stress them at all. The frequency

distributions of stress experienced by mothers due infant parent relationship subscale are reported in figure 4.3 below.



**Figure 4.3: Stress levels due to Parent - Infant relationship (n = 280)**

The parent-infant relationship subscale was very stressful to 182 (65%) respondents while only 19 (6.8%) indicated that they were not stressed by the parent infant relationship in the NICU as shown in figure 4.3 above. The mothers also rated how stressful each item that measured stress due to staff behaviour in NICU was and the responses are reported under the results of staff behaviour subscale below.

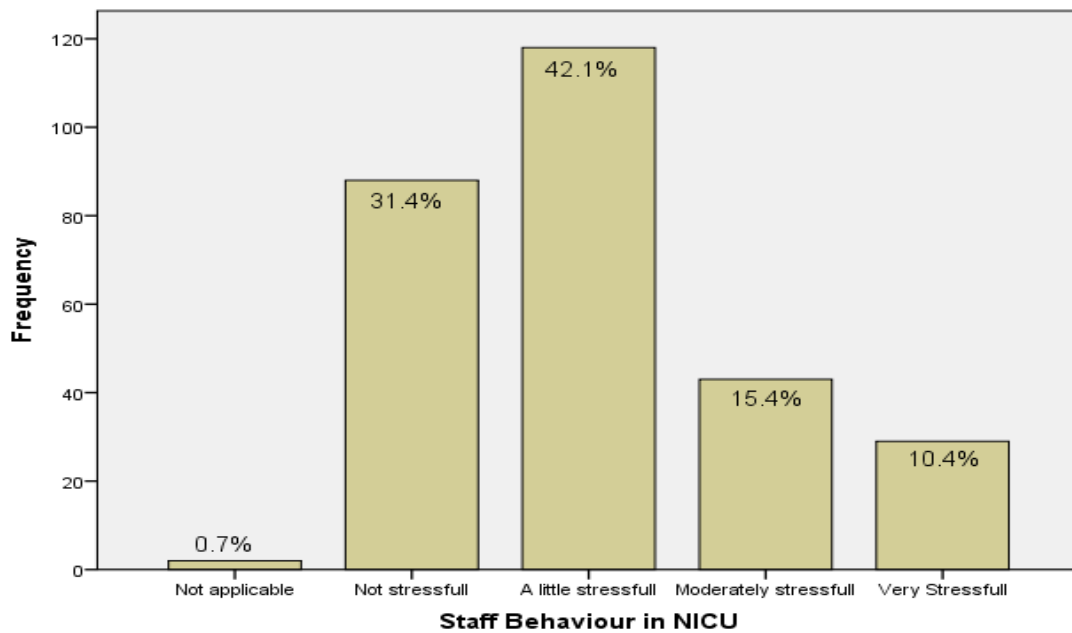
#### 4.3.4 Staff Behaviour and Communication

The Staff behaviour category examined the elements that may cause stress to mothers in terms of how staff communicate with them. This category includes; explaining things too fast, using words mothers do not understand and not telling mothers enough about the tests and treatments done on the baby. It also includes giving conflicting information about the baby's condition, not talking to them enough or too many different people (Doctors, Nurses) talking to them as well as difficulties in getting information or help from the unit. The findings are illustrated in table 4.7.

**Table 4.7: Perceptions of staff behaviour in NICU causing stress (n = 280)**

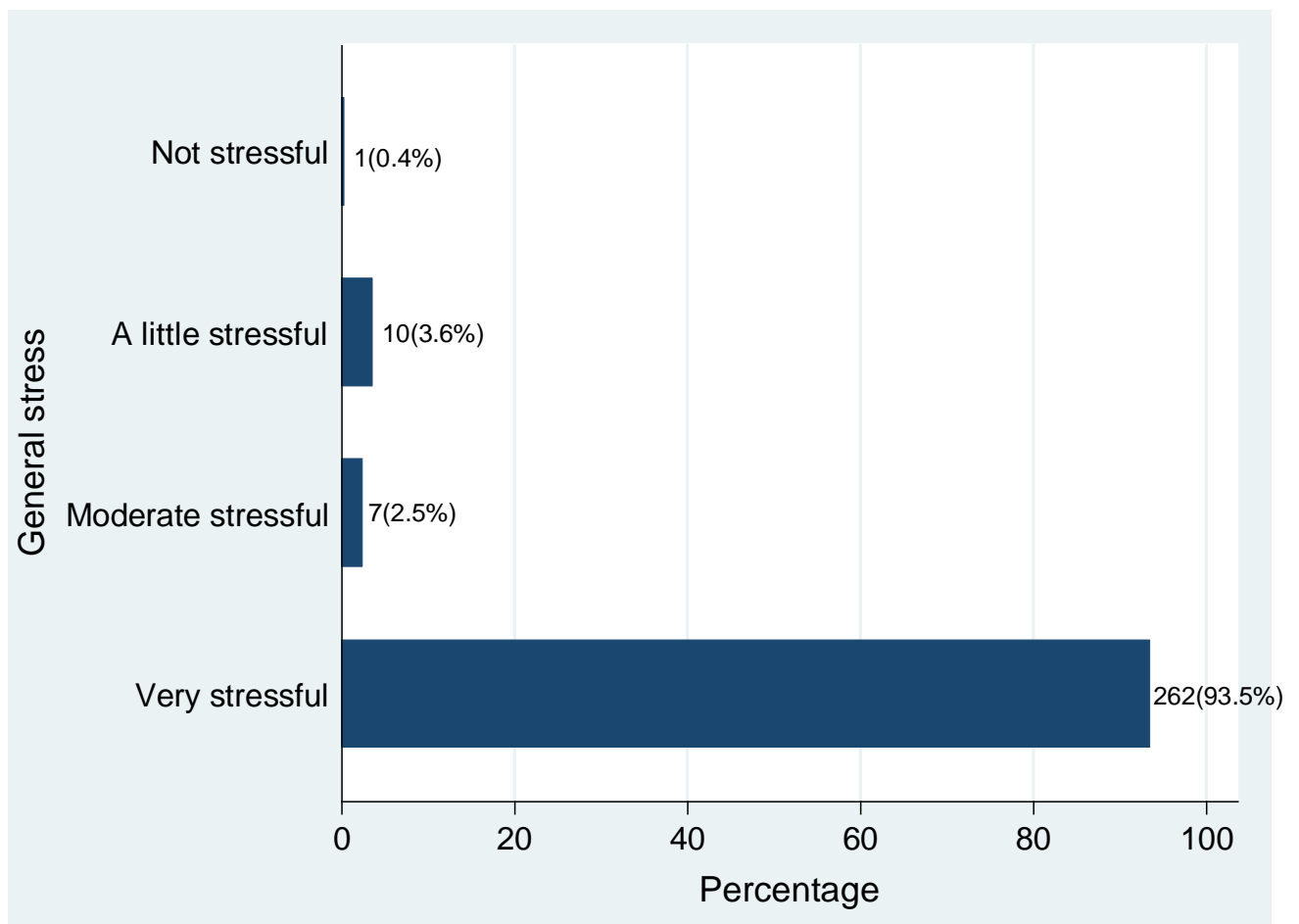
Staff behaviour Characteristic	Stress levels n=280 (%)				
	Not applicable	Not stressful	A little stressful	Moderately stressful	Very stressful
Staff explaining things too fast	30 (10.7%)	170 (60.7%)	31 (11.1%)	20 (7.1%)	29 (10.4%)
Staff using words I don't understand	28 (10%)	164 (58.6%)	27 (9.6%)	30 (10.7%)	45 (16.1%)
Not telling me enough about tests and treatment done to my baby	14 (5%)	164 (58.6%)	27 (9.6%)	30 (10.7%)	45 (16.1%)
Telling me different (conflicting) things about baby's condition	38 (13.6%)	162(57.9%)	31 (11.1%)	24 (8.6%)	25 (8.9%)
Not feeling sure I will be called about changes in baby's condition	0	121(43.2%)	40 (14.3%)	43 (15.4%)	76 (27.1%)
Not talking to me enough	17 (6.1%)	154 (55%)	46 (16.4%)	31 (11.1%)	32 (11.4%)
Too many different people (doctors & nurses) talking to me	9 (3.2%)	191 (68.2%)	32 (11.4%)	21 (7.5%)	27 (9.6%)
Difficulty in getting information or help when I visit or phone the unit	0	133 (47.5%)	33 (11.8%)	24 (8.6%)	90 (32.1%)
Staff looking worried about baby	11 (3.9%)	144 (51.4%)	31 (11.1%)	39 (13.9%)	55 (19.6%)
Staff acting as if they did not want parents around	30 (10.7%)	153 (54.6%)	36 (12.9%)	25 (8.9%)	36 (12.8%)
Staff acting as if they did not understand my baby's behaviour or special needs	24 (8.6)	140 (50%)	39 (13.9%)	38 (13.6%)	39 (13.9%)

Table 4.7 indicates that 162 (57.9%) respondents were not stressed by being given conflicting information about their baby’s condition, 76 (27.1%) were stressed by a feeling that they may not be informed about changes in the baby’s condition during their absence. In addition, 154 (55%) responded that they were not stressed by staff not talking to them enough, and 191 (68%) reported that having too many staff talking to them was not stressful. All respondents indicated that it was difficult for them to get information or help when visiting the unit, but only about 90 (32%) were very stressed about it while 133 (47.5%) were not stressed. Perceived stress due to staff behaviour in NICU is reported in figure 4.4 below.



**Figure 4.4: Stress levels according to Staff Behaviour in NICU (n= 280)**

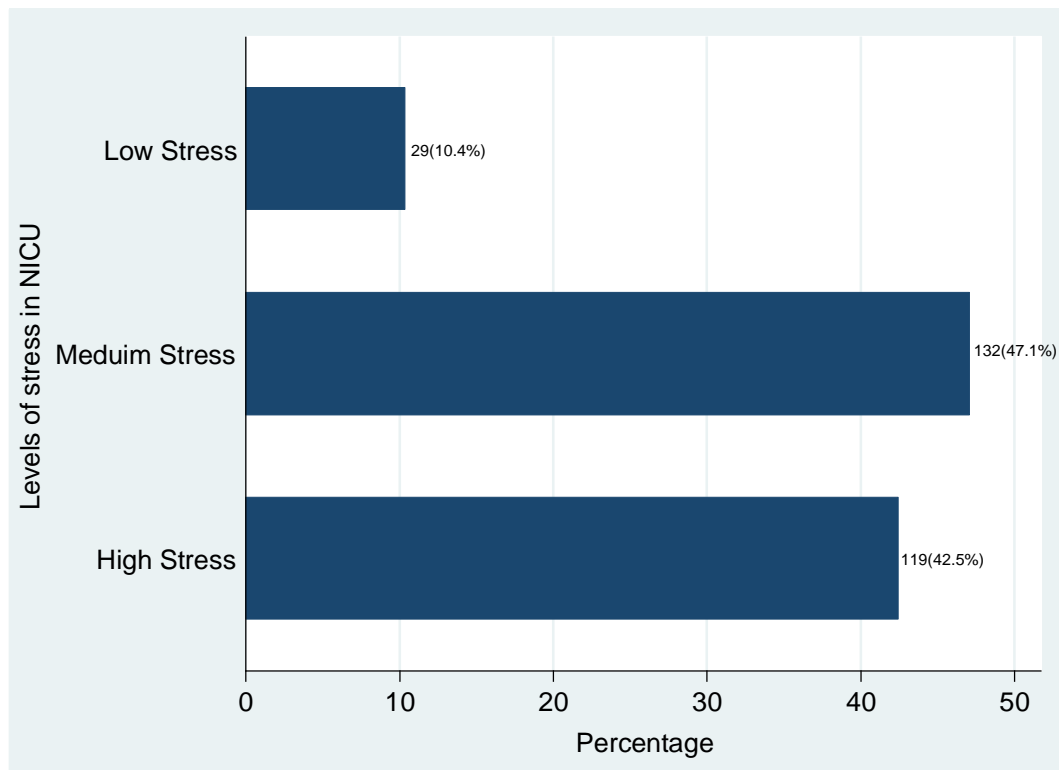
The figure 4.4 above illustrates that 88 (31.4%) of the respondents were not stressed by the behaviour of staff, 118 (42.1%) reported a little stress while 29 (10.4%) were very stressed. The respondents were asked to generally rate how stressful the experience of having a hospitalised baby in the NICU and responses are reported in figure 4.5.



**Figure 4.5: General Stress perception (n = 280)**

It was found that the prevalence of stress among mothers with babies admitted to NICU was high with 262 (93.6%) respondents reporting that they were very stressed. On the other hand, only 7 (2.5%) reported moderate stress and 10 (3.6%) reported

just a little stress as indicated in Figure 4.5 above. All the 46 elements measured in the PSS: NICU tool were computed to determine general level of environmental stress experienced by the mothers from affirmative answers found in all the four subscales as reported in figure 4.6.



**Figure 4.6: Stress experienced by mothers in the NICU (n = 280)**

Figure 4.6 above, shows that all 280 (100%) of the respondents experienced stress at different levels; 132 (47.1%) experienced medium levels of stress, 119 (42.5%) reported to have experienced high levels of stress, and 29 (10.4%) had low levels of stress due to admission to NICU.

#### **4.4 Test of Independence**

Inferential statistic test was used to assess for independence of the variables. since the data was not normally distributed a non-parametric test was appropriate for this study. Chi square test of independence was used to determine if there is a relationship between the dependent variable (maternal stress) and independent variables (maternal and infant characteristics) and where it was not applicable fishers exact test was reported. The cut off point for statistical significance was set at five percent, P value less than 0.05 were considered statistically significant.

**Table 4.8: Chi-square test for Association between Maternal Stress and Infant Characteristics (n = 280)**

Characteristics	Stress levels n (%)				X=P Value
	Low Stress	Medium stress	High stress	Total	
<b>Birth Weight (grams)</b>					
< 2500	21(11.1%)	94 (49.7%)	74 (39.2%)	189(67.5%)	$\chi = 7.055$ $p = 0.32$
≥ 2500	8 (8.8%)	38 (41.7%)	45 (49.5%)	91 (32.5%)	
<b>Total</b>	29 (10.4%)	132 (47.1%)	119 (42.5%)	280 (100%)	
<b>Gestation age (weeks)</b>					
28 – 36	15 (10.3%)	67 (46.2%)	63 (43.5%)	145 (51.8%)	$\chi = 0.120$ $p = 0.989$
37- 42	14 (10.4%)	65 (48.1%)	56 (41.5%)	135 (48.2%)	
<b>Total</b>	29 (10.4%)	132 (47.1%)	119 (42.5%)	280 (100%)	
<b>Length of stay (days)</b>					
1 – 7	13 (6.7%)	96 (49.5%)	85 (43.8%)	194 (69.3%)	$\chi = 9.143$ $p = 0.01$
> 7	16 (18.6%)	36 (41.9%)	34 (39.5%)	86 (30.7%)	
<b>Total</b>	29 (10.4%)	132 (47.1%)	119 (42.5%)	280 (100%)	

**NICU = Neonatal Intensive Care Unit; g - grams**

Of the 189 (67.5%) mothers whose babies' birth weight was below 2500grams, 94 (49.7%) had medium stress while 21 (11%) had low stress. Therefore, the association between birth weight and stress in the NICU was not statistically significant ( $p = 0.324$ ). In addition, out of the 145 (51.8%) of mothers who had babies born prematurely, 63 (43.5%) found the experience very stressful and only 15 (10.3%) experienced low levels of stress. As such, the relationship between

gestational age and maternal stress was found not to be statistically significant ( $p = 0.989$ ). Out of the respondents 194 (69.3%) who had spent a week or less in NICU, 96 (49.5%) were moderately stressed while 86 (30.7%) who had their babies admitted for more than one week, 36 (41.9%) were also moderately stressed. Therefore, the association between duration of stay in the NICU and stress experienced by mothers was statistically significant ( $p = 0.01$ ).

#### 4.4.1 Association between Stress and Maternal Characteristics

**Table 4.9: Chi-square test for Association between Maternal Stress and Maternal Characteristics (n = 280)**

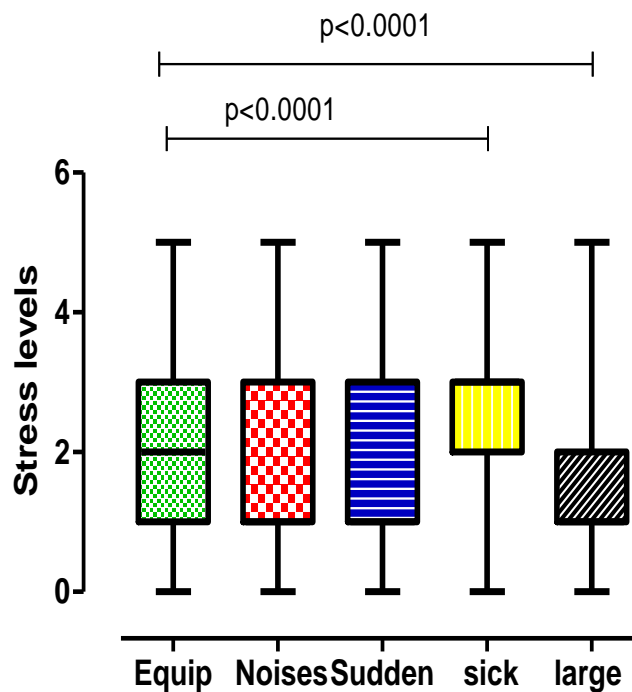
Variable	Stress levels n (%)				X P Value
	Low Stress	Medium Stress	High Stress	Total	
<b>Age in years</b>					
15 – 30	22 (10%)	107 (48.6%)	91 (41.4%)	220 (78.6%)	$\chi=0.924$ $p = 0.77$
31 – 50	7 (11.6%)	25 (41.7%)	28 (46.7%)	60 (21.4%)	
<b>Education* level</b>					
Primary & Secondary level	25 (11.5%)	109 (50.2%)	83 (38.3%)	217 (77.5%)	$P = 0.04$
Tertiary	4 (6.4%)	23 (36.5%)	36 (57.1%)	63 (22.5%)	
<b>Marital Status</b>					
Married	23 (10.9%)	103 (48.8%)	85 (40.3%)	211 (75.4%)	$\chi=1.741$
Not Married	6 (8.7%)	29 (42%)	34 (49.3%)	69 (24.6%)	$P = 0.29$

\*Fisher's exact test was reported otherwise Chi-square test

Table 4.9 above shows that there is no statistically significant relationship between the categorised age of the mother, marital status with stress that they experience when nursing their infant in NICU while there is an association between educational level and maternal stress ( $p = 0.04$ ). Of the 217 (77.5%) respondents who had

primary and secondary education, about 109 (50.2%) respondents experienced medium stress. Those who had tertiary education were 63 (22.5%) of which 27 (42.9%) of them experienced high levels of stress.

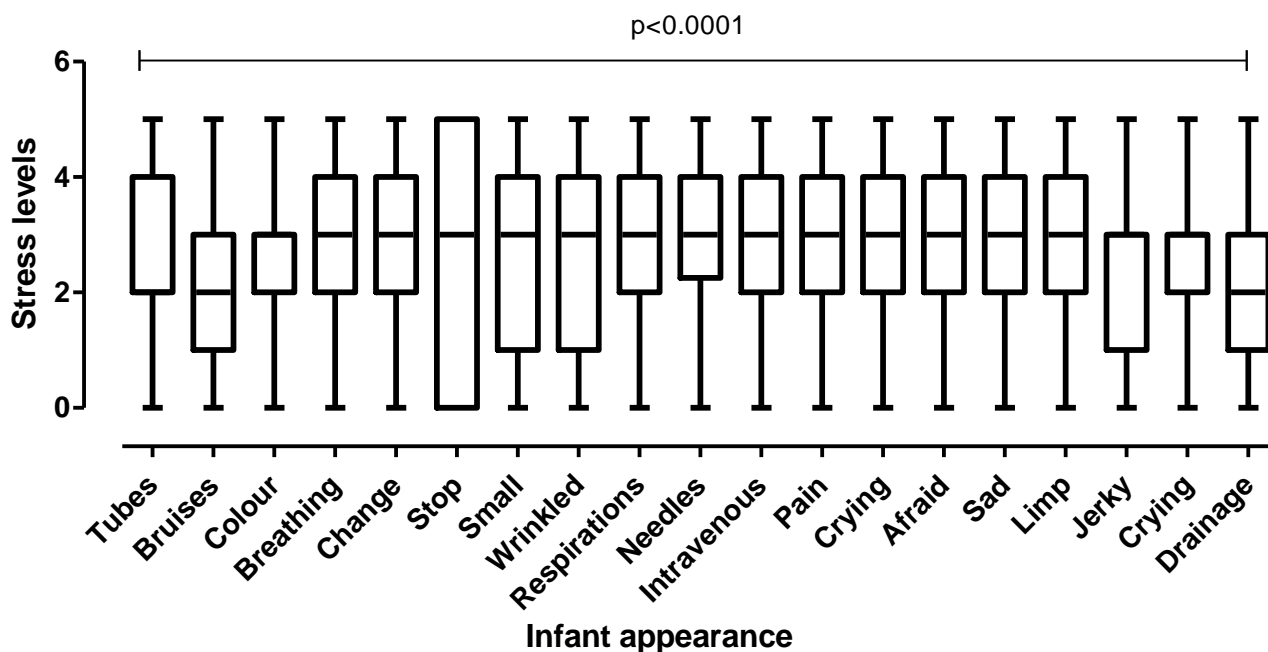
Kruskal-Wallis rank sum test was performed to assess if the medians of the items in each subscale and between subscales were statistically different. Post hoc Dunn's multiple comparison test was used to identify the items with different medians. The results of the sights and sounds subscale are given in figure below.



**Figure 4.7: Comparison of medians of Sounds and Sights items by stress levels**

Figure 4.7 above shows that the medians of the elements that measured stress due to sights and sounds were statistically different ( $t = 100.3$   $p\text{-value}=0.001$ ). Dunn's

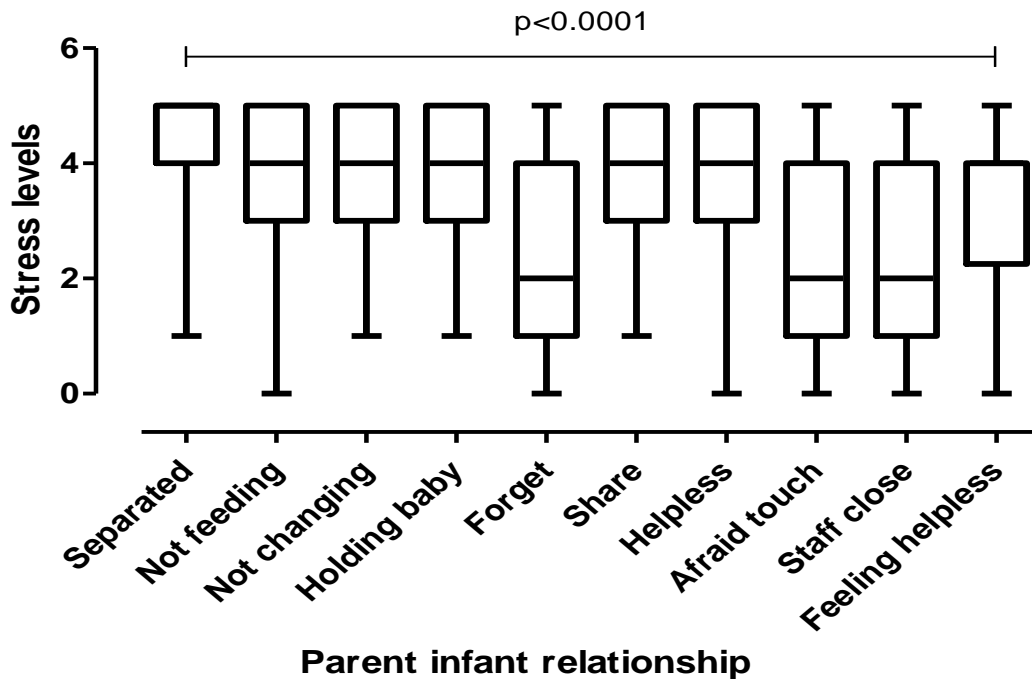
multiple comparison test has shown a statistical difference between the medians of the items: equipment and machines found in NICU (median 2.00, IQR 1 - 3), noises and sudden noises (median 1.00, IQR 1 - 3) with seeing other sick babies admitted (median 3.00, IQR 2 - 3) in NICU. Equipment and machines, noises, sudden noises and large number of people working in the NICU had medians that were not significantly different. Figure 4.8 assessed the differences among the Infant appearance subscale items.



**Figure 4.8 Comparison of Infant Appearance subscale items by stress levels**

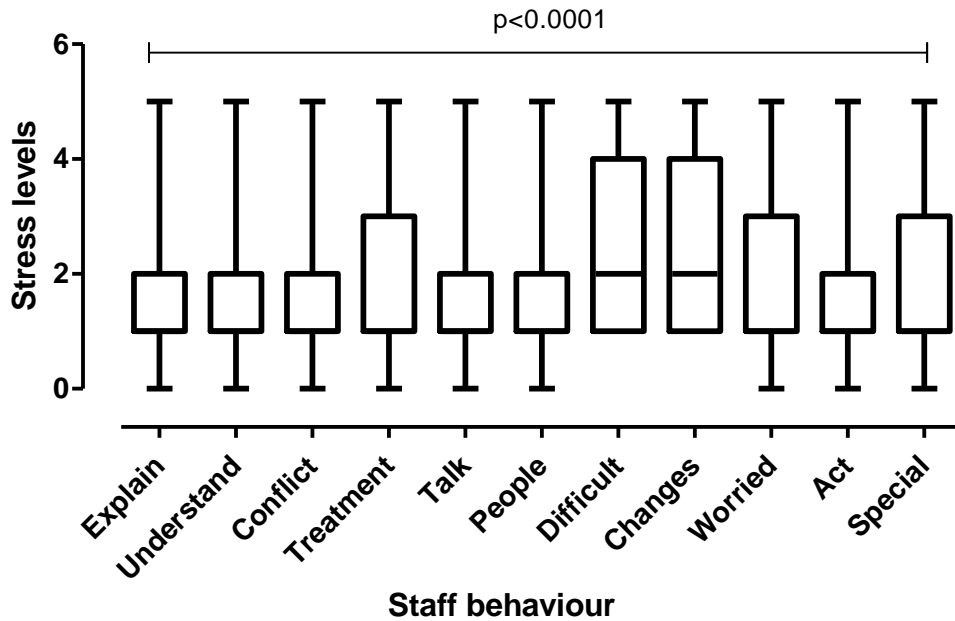
Figure 4.8 above shows that of all the 19 items that measure stress due to the appearance of the infant, the medians vary significantly ( $p = 0.0001$ ). A statistically significant difference between medians of the infant having bruises (median 2.00;

IQR 1 -3) and the colour of the baby (Median 3; IQR 2 – 4) and those tubes inserted (median 3; IQR 2 – 4). The Kruskal-Wallis test for the items measuring stress on the parent infant relationship is presented in figure 4.9.



**Figure 4.9: Comparison of Parent Infant relationship items by stress levels**

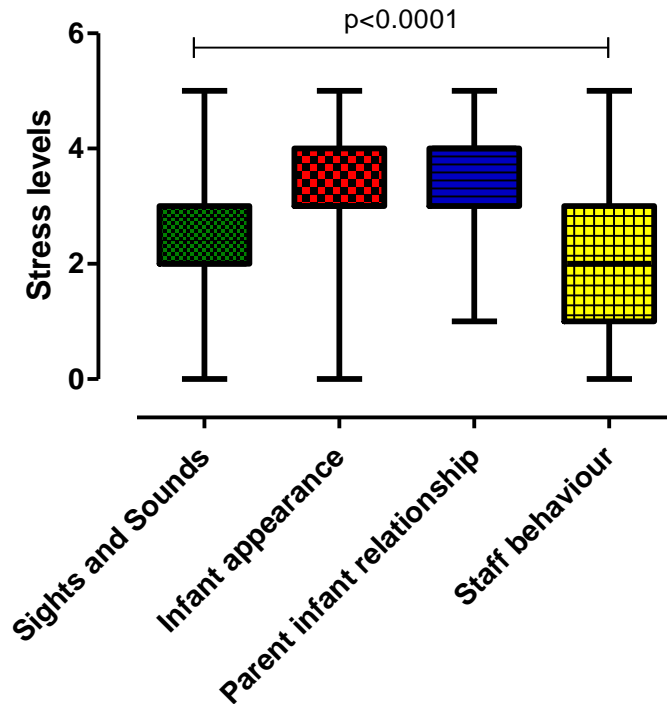
Kruskal-Wallis test of the items that measure parent infant relationship in NICU (figure 4.9) show that the medians were all statistically different ( $p = 0.0001$ ). Dunn's multiple comparison test has shown that the items that are statistically different are; being separated from the baby and forgetting how the baby looks like ( $p = 0.0001$ ) while being separated from the baby and not being able to hold the baby when the mother wants ( $p = 0.001$ ).



**Figure 4.10: Comparison of Staff Behaviour Subscale items with Stress Levels**

The figure 4.10 above, shows a statistically significant difference in medians of the items that measured stress due to staff behaviour in NICU (P-Value 0.0001). Dunn's Multiple comparison test showed that for some items, the medians that were statistically different include staff explaining things too fast and difficulties in getting information or help when the mother visits NICU (P-Value 0.0001), staff looking worried about the baby (P-Value 0.0001) and not feeling sure if the mother will be called when their baby changes condition (P-Value 0.0001). The statistical difference between the median scores in the four subscale measuring NICU environmental stress.

#### 4.4.2 Association between Stress and Subscales measuring stress in NICU



**Figure 4.11: Comparison of subscales scores for stress in NICU**

The figure 4.11 above shows that the medians of the subscales that measure the levels of stress in the NICU environment are statistically different (P-Value 0.0001) with infant appearance (median 3; IQR 3 -4) and parent infant relationship (median 4; IQR 3 – 4). The sights and sounds and infant appearance had statistically different medians as by the Dunns comparison test indicated in table 4.10.

**Table 4:10 Multiple comparison test for difference in rank sums of Stress subscale scores**

<b>Dunn's multiple comparisons</b>	<b>Rank difference</b>	<b>sum</b>	<b>Significance Level</b>
Sights & Sounds vs. Infant Appearance	-217		p< 0.001
Sights & Sounds vs Parent – Infant Relationship	-270		p< 0.01
Sights & Sounds vs Staff Behaviour	85.9		p< 0.001
Infant Appearance vs Parent – Infant Relationship	-154		P< 0.001
Infant Appearance vs Staff Behaviour	302		P < 0.001
Parent – Infant Relationship vs Staff Behaviour	456		P < 0.001

The Dunn's Multiple comparison test has also shown the medians between individual subscales are also statistically significant (P-Value 0.0001) while sights and sounds in NICU with staff behaviour (P- 0.001). Results of Dunn's multiple comparison test are shown in table 4.10.

#### **4.5 Ordinal Logistic Regression**

Univariable unadjusted Ordinal Logistic Regression was constructed to explain whether independent variables could predict stress among the mothers with neonates admitted to the neonatal intensive care unit. Proportion Odds assumption which was checked using *O model command* was not violated and therefore the

*ologit command* was used. The results of the *ologit command* showed that all the 280 observations in the data set was used in the analysis. The approximate likelihood-ratio test of proportionality of odds across response categories chi square of 6.87 with a p value 0.333. P value of 0.333 indicates that the model as a whole is not statistically significant indicating that the proportion odds assumption was not violated. The univariable ordinal logistic regression model predicting maternal stress with maternal and infant characteristics are shown in Table 4.11

**Table 4.11 Bivariate Ordinal Logistic Regression model predicting Maternal Stress with Maternal and Infant Characteristics**

Variable	Characteristics	COR	P value	95% CI
Maternal age in years	15 – 30	0.867	0.614	0.498 – 1.508
	31 – 50	Ref		
Marital status	Married	Ref		
	Not married	1.413	0.197	0.835 – 2.392
Education level	Primary and secondary	Ref		
	Tertiary	2.12	0.008	1.218 – 3.702
Getting a monthly salary	Yes	Ref		
	No	0.435	0.005	0.244 – 0.773
Previous pregnancies	≤ 2 children	Ref		
	≥ 3 children	1.22	0.368	0.784 – 1.927
Communicated to on child's prognosis	Yes	Ref		
	No	1.197	0.458	0.743 – 1.930
Place of birth	Within WNH	Ref		
	Referred to WNH	1.035	0.930	0.476 – 2.250
Birth weight (grams)	< 2500	1.000	0.096	0.999 – 1.000
	≥ 2500	Ref		
Gestation age at birth (weeks)	28 – 36	Ref		
	37 - 42	0.936	0.776	0.597 – 1.467
Length of stay in NICU (days)	1 - 7	0.974	0.032	0.952 – 0.997
	≥ 7	Ref		
Type of Feeding	Nipple feeding			
	Tube feeding	0.487	0.012	0.278 – 0.854
	Cup feeding	1.266	0.434	0.700 – 2.286
	Parenteral	0.303	0.105	0.071 – 1.282

Table 4.11 shows results regarding stress of having a neonate admitted to NICU among mothers, the unmarried respondents were 41% more likely to be in the high

stress category (COR= 1.413; 95% CI [0.835 – 2.392]; p= 0.197) versus the combined mild and moderate categories keeping all other variables constant. Those who were nursing a first born child were 22% less likely to be in the high stress category (COR= 1.229; 95% CI [0.784 – 1.927]; p= 0.368.) versus the combined mild and moderate categories keeping all other variables constant. Those babies that were breastfed, their mothers were 52% less likely to be in high stress category (COR= 0.487; 95% CI [0.278 – 0.854]; p= 0.012) versus the combined mild and moderate categories keeping all other variables constant. The women who were working and getting a monthly salary were 67% less likely to be in high stress category (COR= 0.435; 95% CI [0.244 – 0.773]; p= 0.005) versus the combined mild and moderate categories keeping all other variables constant. The odds of being in the high stress category for those with tertiary education versus the mild and moderate categories of stress are 2.12 times greater (COR= 2.124; 95% CI [1.218 – 3.702]; p= 0.008.) given that the other variables in the model are held constant.

#### **4.5.1 Multivariate Logistic Regression**

The multivariable logistic regression model was run on all variables that had P values that were 20% and less to predict the maternal stress levels. The other variables that were included are those with a significant P value and those documented in literature to be significantly associated with stress. The results of the multivariable logistic regression model are shown in table 4.12.

**Table 4.12 Multivariate Ordinal Logistic Regression model predicting Maternal Stress with Maternal and Infant Characteristics**

Variable		AOR	P value	95% CI
Education level	Primary and secondary	Ref		
	Tertiary	1.389	0.378	0.668 – 2.889
Getting a monthly salary	Yes	Ref		
	No	0.544	0.118	0.254 – 1.166
Communicated to on child's prognosis	Yes	Ref		
	No	1.382	0.230	0.814 – 2.345
Place of birth	Home	Ref		
	Within WNH	1.244	0.611	0.535 – 2.891
	Referred to WNH	1.690	0.247	0.695 – 4.105
Birth weight (grams)	< 2500	1.425	0.008	1.0112 – 1.0738
	≥ 2500	Ref		
Gestation age at birth (weeks)	28 – 36	Ref		
	37 - 42	0.669	0.146	0.389 – 1.150
Length of stay in NICU (days)	1 - 7	Ref		
	≥ 7	0.663	0.120	0.395 – 1.113
Type of Feeding	Cup feeding	Ref		
	Tube feeding	0.371	0.001	0.203 – 0.679
	Nipple feeding	0.837	0.573	0.452 – 1.550
	Parenteral	0.259	0.078	0.057 – 1.165

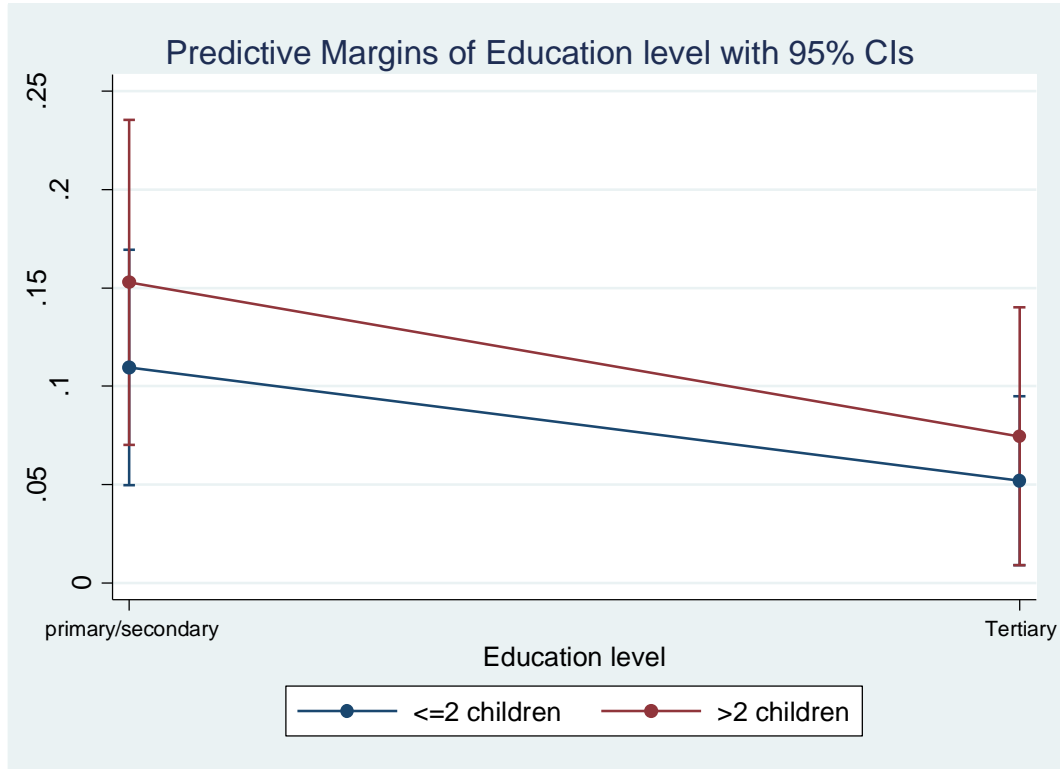
**AOR = Adjusted Odds Ratio; NICU = Neonatal Intensive Care Unit**

The results as shown in Table 4.12 below show a statistical significant association between stress and birth weight, the odds of being stressed when one had a baby with a low birth weight were higher than one who had a baby with normal weight.

Those mothers whose babies were breastfeeding were 63% less likely (AOR= 0.371; 95% CI [0.203 – 0.679]; p= 0.001.) to be stressed. The type of feeding is, therefore, significantly associated with maternal stress. Those who are educated were 40% more likely (AOR= 1.389; 95% CI [0.668 – 2.889]; p= 0.378) to be stressed compared to their counterparts. Those who did not receive any information on prognosis of their child were 38% more likely (AOR= 1.382; 95% CI [0.814 – 2.345]; p= 0.230) to be stressed than those who were explained to.

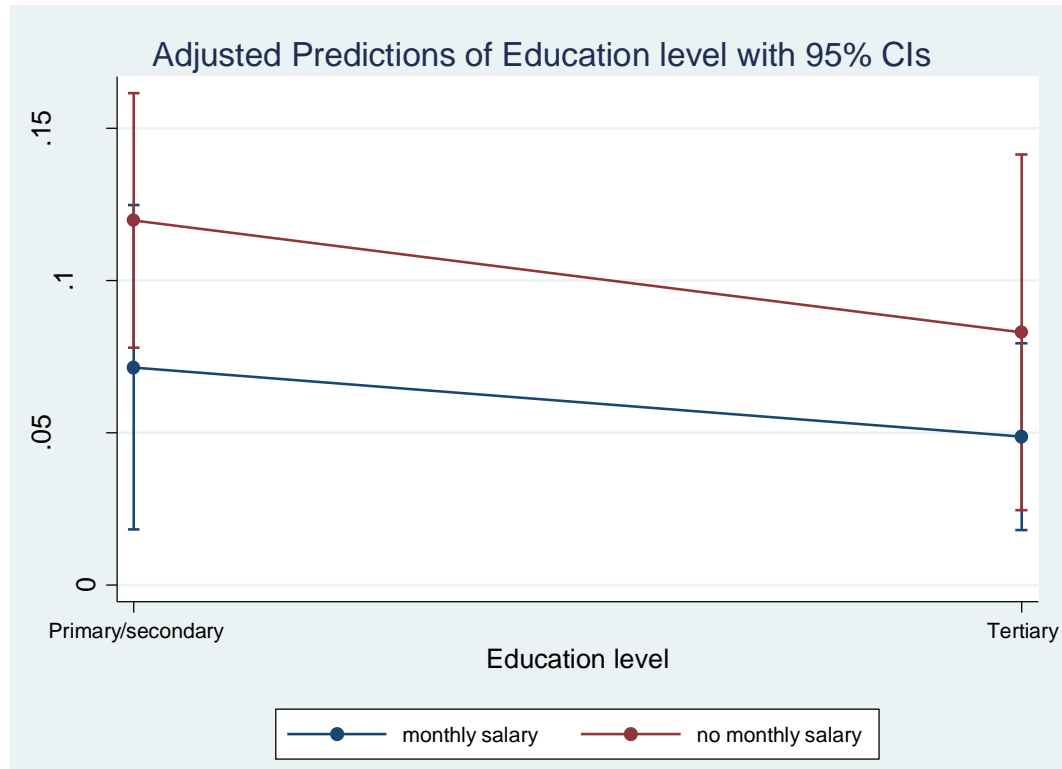
#### **4.6 Predictive Margins**

Predictive margins predict the likely hood of the mother being stressed if she has a neonate admitted to NICU and a combination of levels of specified variables in the data. The predictive margins presented are based on the logistic regression analysis given in Table 4.12 above. The probability of stress among the mothers with a combination of variables, level of education and number of children are presented in figure 4.12.



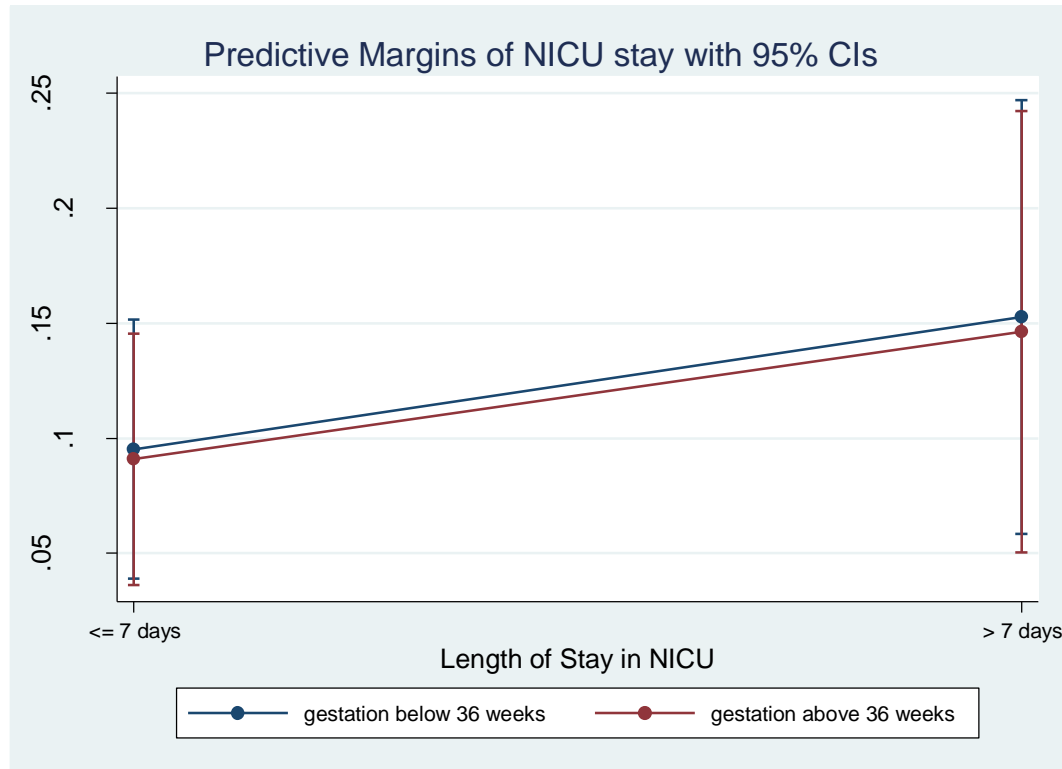
**Figure 4.12 Predictive margin of Education level and Number of children**

Figure 4.12 above shows that given two mothers with more than two children and different educational level. The one with primary/secondary educational level, the probability of being stressed is 0.15 compared to the one with tertiary education. The probability of stress among mothers equal on educational level and but different on being paid a monthly salary is presented in figure 4.13 below.



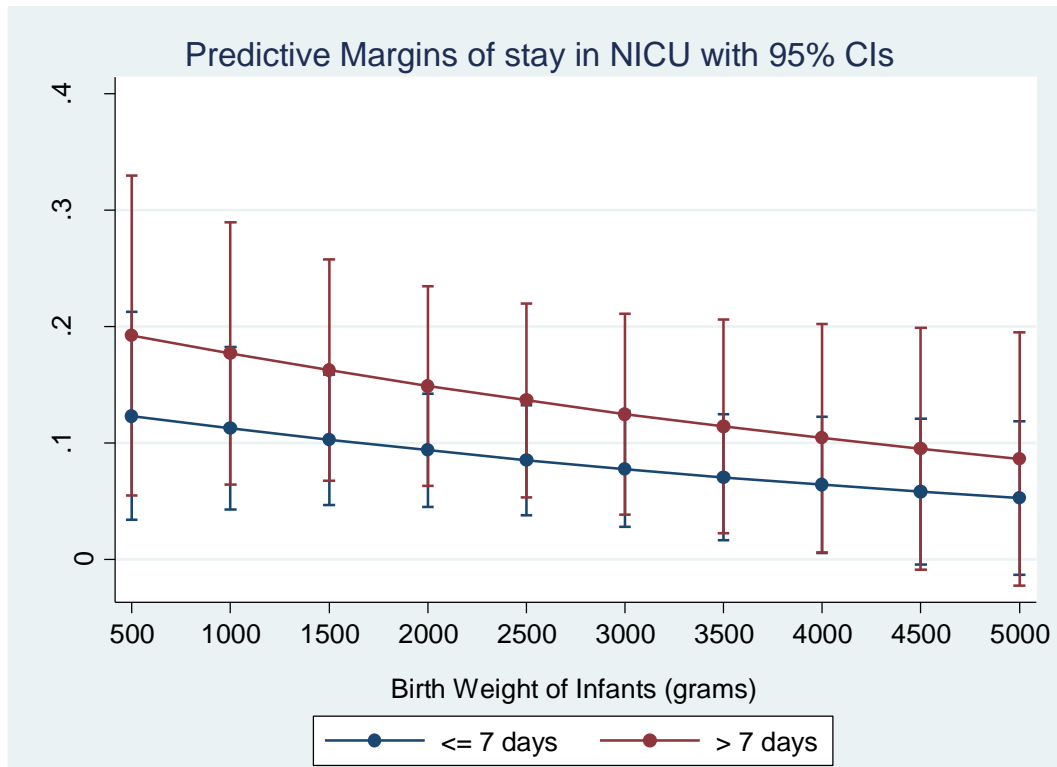
**Figure 4.13 Probability of stress between mother with a monthly salary and their education level**

The figure 4.13 above shows that two mothers who are equal on all variables but one has primary/secondary education and the other tertiary education, the one with primary/ secondary education the probability of being stressed is 0.1 compared to the one with tertiary education (0.5) whether both are not being paid a monthly salary. The probability of stress when length of stay in NICU and gestation age variables are combined is presented in figure 4.14.



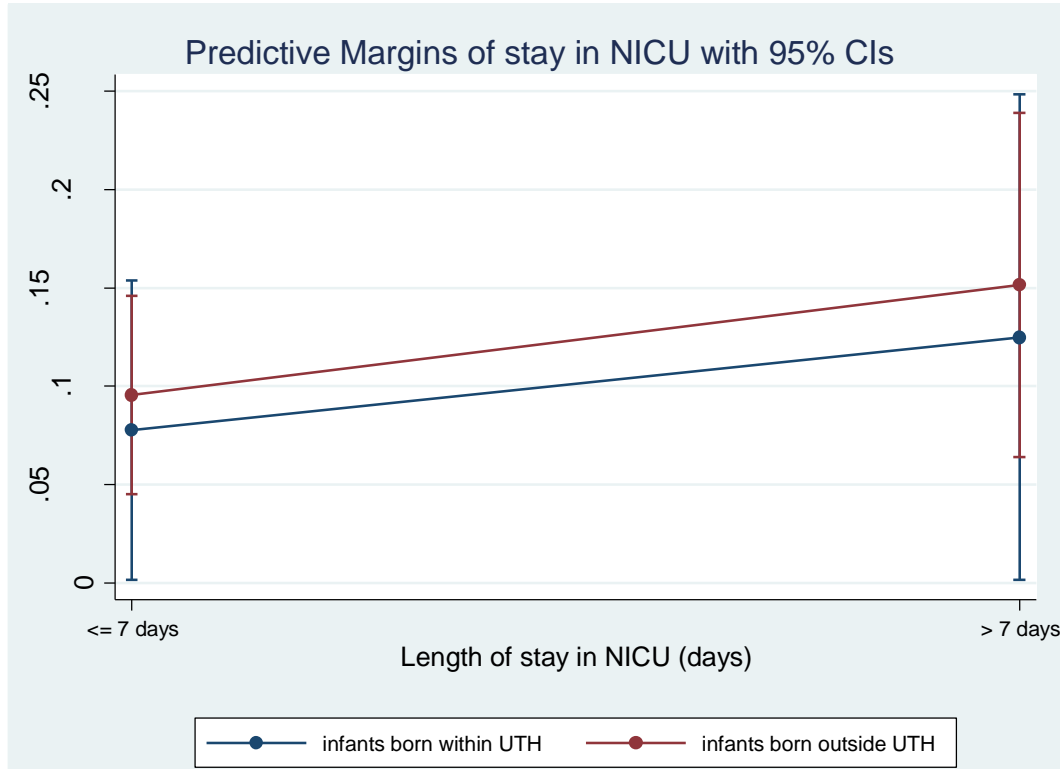
**Figure 4.14 probability of stress between duration of stay in NICU and gestation age at birth of the baby at birth**

The figure 4.14 above shows that given mothers who are equal on all variables but one has stayed in admission for more than seven days and the other less or equal to seven days, the one who has been in admission for more than seven days the probability of being stressed is 0.15 compared to the one with less or equal to seven days of admission (0.05) whether both are nursing babies with a gestation age above 36 weeks at birth. The probability of stress when length of stay in NICU and birth weight variables are combined is presented in figure 4.15.



**Figure 4.15: Probability of stress between birth weight and duration of stay in NICU**

The figure 4.15 above shows that two mothers who are equal on all variables but one has stayed in admission for more than seven days and the other less or equal to seven days, the one who has been in admission for more than seven days the probability of being stressed is 0.2 compared to the one with less or equal to seven days of admission (0.1) whether both are nursing babies with a birth weight of 500g at birth. The probability of stress when length of stay in NICU and place of variables are combined is presented in figure 4.16 below.



**Figure 4.16: Probability of stress between the place of delivery and duration of NICU stay**

The figure 4.16 above shows that given mothers who are equal on all variables but one has stayed in admission for more than seven days and the other less or equal to seven days, the one who has been in admission for more than seven days the probability of being stressed is 0.15 compared to the one with less or equal to seven days of admission (0.1) whether both are delivered from another hospital and were referred to WNH at UTH.

#### 4.7 Presentation of Qualitative Results

The qualitative data was analysed using a hybrid approach of qualitative methods of thematic analysis which incorporated both the data-driven inductive approach (Boyatzis, 1998) and the deductive a priori template of codes approach outlined by Crabtree and Miller, (1999). The qualitative results obtained are presented in this section, table 4.13 below shows the characteristics of the respondents.

**Table 4.13 Baseline characteristics of Nurses' (N= 15)**

Variable	Category	Frequency (N= 15)	Percentage
Gender	Female	13	86.7
	Male	2	13.3
Work experience (years)	Less than 1 year	2	13.3
	1 – 5 years	8	53.3
	More than 5 years	5	33.3
Professional qualification	Registered Nurse	5	33.3
	Registered Critical care Nurse	4	26.7
	Registered Paediatric nurse	1	6.6
	Midwife	1	6.6
	Enrolled Nurse	4	26.7

The baseline characteristics of nurses summarized in Tables 4.13 show that 13 (86.7%) respondents were female. Although the majority worked in the NICU for more than a year, 2 of 15 (13.3 %) had less than a year of experience. The in depth interviews with 15 nurses brought out the perceived NICU environmental stressors which have been summarised as subthemes and major themes as highlighted in Table 4.14.

**Table 4.14: Nurses' perception of stressors in NICU**

<b>Major Themes</b>	<b>Sub Themes</b>
1. NICU Environment	<p><b>1.1 Infrastructure</b></p> <p>1.1.1 Sanitary facilities 1.1.2 Issues of privacy 1.1.3 Room to accommodate mothers and babies</p> <p><b>1.2 Sights and sounds</b></p> <p>1.2.1 Machines and other medical equipment 1.2.2 Alarming machines 1.2.3 Very sick babies 1.2.4 Staff working in NICU 1.2.5 Too small babies</p>
2. Standard Operating Procedures	<p><b>2.1 Rules and regulations</b></p> <p>2.1.1 Visiting time 2.1.2 Accessibility to NICU by mothers 2.1.3 Accessibility to NICU for other family members 2.1.4 Use of hospital gowns before entry to NICU 2.1.5 Mothers separated from their babies</p> <p><b>2.2 Unclear policy direction</b></p> <p>2.2.1 Frequency of visiting 2.2.2 Information sharing</p>
3. Maternal – infant relationship	<p><b>3.1 Maternal role</b></p> <p>3.1.1 Feeding 3.1.2 Holding the baby 3.1.3 Changing nappies 3.1.4 Kangaroo mother care 3.1.5 Mothers separated from their babies</p>
4. Staff behavior	<p><b>4.1 Interpersonal Relationship</b></p> <p>4.1.1 Mistrust by mothers 4.1.2 No time to explain issues to mothers 4.1.3 Not allowing mothers to witness nursing procedures 4.1.4 Only babies are the patients not mothers 4.1.5 Lack of knowledge</p>
5. Communication	<p><b>5.1 Information sharing</b></p> <p>5.1.1 Nurses decide information needs of mothers 5.1.2 Mothers need to ask for updates 5.1.3 Nurses share information concerning feeding 5.1.4 Doctors explain to those with critically ill babies</p>

#### **4.7.1 Theme 1 - NICU Environment**

The NICU environment in this study included the physical set up of the ward, in which there are medical equipment such as ventilators, incubators and open cribs, medical staff working, the neonates admitted in the ward among others. Numerous participants described the NICU environment as a stressor to mothers.

##### **4.7.1.1 Infrastructure**

The layout of NICUs have been found to be different, some are single rooms that accommodates mother and baby while others are open wards where only babies are accommodated. The women and New-born Hospital NICU is an open ward to accommodate the sick babies and mothers are separated from the babies and only allowed during visiting time. The Unit is situated on the first floor of the hospital while the mothers are either accommodated at the mothers' shelter if discharged or in the postnatal ward within the hospital. The nurses working in the Unit perceived separation of mothers from their babies as one stressful event. The mothers are separated from their babies because the room is inadequate to accommodate both mother and baby and has inadequate facilities. As such, only babies are admitted while mothers have to visit the Unit every two to three hours depending on the baby's birth weight. The other stressor highlighted was the non-availability of sanitary facilities for the mothers in the unit. In early puerperium, mothers use sanitary pads and need to be changing their sanitary pads and pass urine frequently, without sanitary facilities mothers have to walk back to the shelter. There is only one room for mothers to change into hospital gowns compromising their privacy. Mothers do

not get to use the same gown every time they visit the unit, the nurses working in the unit feel this is also a source of stress. In relation to this some respondents had this to say:

*'The unit is located upstairs it is stressful for those who have been operated on, we had one lady who was lame and was limping, it was difficult for her to get here. She further said some mothers would want to come with their own gowns but we don't allow, we give them our gowns to use. Maybe we should allow those who can afford to buy their own gowns.'* (RN/RCN 12)

*'There are no ablutions for mothers, when they come especially from 18 hours to midnight then the place is littered with urine'* (ZEN 7).

The NICUs where the mothers and babies are accommodated in the same room have been recommended as they enhance mother baby bonding, successful breastfeeding on demand and reduce hospital stay. When mothers are separated from their babies they are worried about having left their babies with strangers who are busy and may not pay attention to the needs of their baby. Mothers may not understand the use of medical equipment in the unit and the alarms would depict a critical environment to them.

#### **4.7.1.2 Sights and Sounds**

Contrary to the mothers' responses on who indicated that NICU environment was a little stressful, the Nurses working in NICU perceived physical environment of the unit as a major stressor to the mothers. The NICU is not structured like any other

medical, surgical and obstetric wards that most mothers are familiar with. The entry to the unit is restricted, it has a high room temperature and there are machines like the ventilators and CPAP with alarms. On a particular day there could be about 70 babies so the place looks crowded and very busy. Majority of the admitted babies are premature and some mothers are afraid to even hold their own babies because they look too small and in active. In relation to this some respondents had this to say:

*'When they walk in this unit, there is all this medical equipment to them it is quite scary and there are also sounds alarming from the machines'* (ZEN 05).

*'Other sick babies and machines are strange to them because some of them are seeing them for the first time. They have never seen them so they ask a lot of questions'* (ZRN 03).

In the NICU what mothers are exposed to is usually a strange environment that is not similar to the other hospital wards. The alarming machines, large number of staff working in the Unit and babies with different conditions and treatment modalities usually are stressors. In developed countries where an orientation programme to NICU is part of antenatal care most mothers have an idea of what to expect in an event that their baby is admitted. They are made aware of the rules and regulations to be followed in the Unit before admission (William et al., 2018).

## 4.7.2 Theme 2 - Standard Operating Procedures

### 4.7.2.1 Rules and regulations

An Intensive Care Unit is a ward for nursing critically ill patients who need close observations. Therefore, most hospitals have set rules and regulations which visitors and nursing staff have to adhere to. Mostly, the rules and regulations are made to improve patient care and expedite their recovery. Some of these rules include, for instance, limiting the number of visitors for infection prevention and control purposes, fixed visiting time regardless of the condition of the baby. Adherence and enforcing adherence to the set rules by nurses and other health workers is dependent on individual discretion. Nursing staff working in NICU feel that these rules contribute to stress experienced by the mothers as highlighted in the statements below:

*'Mothers come to visit babies as per standard, those with preterm babies its 2 hourly while those with term babies its three hourly regardless of the condition so when its 30 minutes during the visit, they do not want to leave. They put babies on the bed to walk out if the baby cries the mothers usually come back'* (RN/RCN 10).

*'The criteria is only the mother and father are allowed in the NICU, this stresses the mothers who delivered by caesarean section who can't come to the unit initially and the father is also just allowed during visiting hours'* (RN/RM 14).

Adherence to laid down rules and regulations by the mothers is not easy as the cultural background of these mothers encourages other family members especially

the grandmothers and aunts to take more active role in taking care of the new-born than the father. Most studies have documented different stress levels in mothers and fathers which could be attributed to the roles culture has prescribed for them (Wormald et al., 2015; Busse et al., 2013; Kegler et al., 2019; Turner et al., 2015). Mothers are more involved in new-born care than fathers but they need support from their mothers, who in this case are not allowed in the unit. Nonetheless, the nurses apply these rules differently at their discretion, some mothers are allowed to visit more often. Lack of uniformity in enforcing rules and regulations by the nurses may lead to confusion among mothers as others may feel unfairly treated.

#### **4.7.2.2 Unclear policy directions**

The nurses working in NICU gave contradictory responses on some policies being implemented in the NICU. Some would say those mothers with critically ill babies are allowed to visit more frequently while others said they only considered the baby's birth weight to determine the frequency of the visit. Rules regarding information sharing were also not clear, such that some nurses indicated that all mothers are updated on their baby's progress on a daily basis while the others said only those with critically ill babies are communicated to and those who ask. That is reflected in their response below:

*'mothers with preterm babies visits are 2 hourly, term babies are visited 3 hourly regardless of condition'. Further the respondent added that for 'critically ill we consider them to come more often. It is two way, mother can request to come more often or have a relative to be around with them. Those with big babies especially*

*those who go in hypoglycaemia and those babies on phototherapy we allow 2 hourly visits because they need more fluids. Critically ill we do them a favour, a mother may ask to come more often.'* (ZEN 02).

### **4.7.3 Theme 3 - Maternal Infant Relationship**

Most mothers expect to take care of their babies after delivery, when the expected does not take place stress ensues. The mother-baby bonding requires that the new born baby and the mother be close to each another, so that the baby can signal its needs and the mother responds effectively. However, normal bonding process is hindered by illness, as the infants are separated from their mothers when admitted to Neonatal Intensive Care Units. The mother baby relationship is not just about being with the baby but it is also about being involved in the care of the baby. The mother feels confident when they are able to attain the maternal role, being able to feed, bath, change the baby immediately the diaper is wet and calming the baby when she/he is crying. Failure to do these roles leaves them with a feeling of having failed to care for their baby.

#### **4.7.3.1 Maternal Role**

The transition to motherhood is considered a major developmental life event as it involves moving from a known, current reality to an unknown new reality (Mercer, 2004). During postnatal period, women undergo some psychosocial changes which have been associated with transitions into motherhood role. The nurses in NICU indicated that mothers with admitted babies would love to take care of their babies

unlike leaving caring function to the nurses. The mothers also indicated that not being able to care for their babies, feeding and holding the baby when they want was very stressful. In some instances, when visiting time is over the mothers would usually hesitate to leave, if a baby cries as they are leaving NICU, they would usually turn back to take care of the baby.

The nurses working in NICU had the following to say on what could stress mothers:

*'They change diapers and do Kangaroo mother care to preterm babies and sometimes even for term babies, those who can breastfeed they do. Those with critically ill babies they sit and we encourage them to change diapers or touch their babies'* (ZEN 15).

*'They are not really allowed to do much apart from changing diapers and feeding. The rest Doctors and nurses do'* (RN/RM 14).

Mothers come to the hospital with information from their support persons on how they should take care of a new-born. Most of these teachings start immediately they get pregnant and most of the teachings antenatally are centred on ensuring a safe delivery and a healthy baby. The mother, therefore, starts to fantasize and role play during pregnancy. According to the maternal role attainment model, the infant is considered as an active partner in maternal role taking process as they are affected and affect the process. With unexpected admission to NICU, all that the mother planned during pregnancy is disrupted. They cannot play their role fully and they

may not have support from those they had identified antenatally. The attainment of maternal role then becomes more challenging especially for the first time mothers.

#### **4.7.4 Theme 4 - Staff Behaviour**

Nursing staff are on duty 24 hours per day and they interact with mothers more often than they do with other health care providers. Developing a trusting relationship with clients promotes communication and adherence to medical advice. Mothers usually find it easier to consult nurses compared to Medical Officers (Kegler et al., 2019). Nurses, on the other hand, believe that when mothers lack knowledge on medical procedures they should not be involved as they would misinterpret or delay treatment.

##### **4.7.4.1 Interpersonal relationship**

Nurses and midwives acknowledged that some specialised nursing procedures performed in NICU increase the stress mothers experience. The mothers are not allowed to witness and participate in the care of their new born when nurses are carrying out some nursing procedures like neonatal resuscitation. The mothers may not have information on the importance of the procedure and how it is done. Failure to explain the procedures and not allowing mothers to be part or observe some nursing procedures may lead to mistrust between nurses and mothers. On the contrary, the mothers were not stressed by not being part or observe the procedures and not being given much information about test and treatment performed on their babies. Some nurses feel they have nothing to do with mothers since the patient is

the baby and not the mother. Furthermore, nurses and midwives indicated that they do not have enough time to explain to mothers about their babies. These were revealed in the following response:

*'When they are not allowed to feed unstable babies they think you don't want to give them to feed the baby you are just starving the baby' (ZRN/RCN 04).*

*'I can't really know, am not sure they may need care but I don't know, here we care for babies only. This week we are one-one in each room when mothers come with their issues I may not answer them well. It is very busy when they come and they are asking some questions continuously. You may be struggling to put an IV cannula therefore not pay attention to them.'* (ZRN 09)

Mothers may have indicated that they are not stressed by issues of not being aware of the care being given to their baby and how staff act towards them but improving the interpersonal relationship between nurses and mothers has been found to be helpful in reducing stress (Chourasia et al., 2013). The mothers may believe that the medical personnel are not obliged to explain to them probably because they do not understand their right to information. Despite this belief, most mothers are left with speculations on their baby's disease prognosis which could contribute to the stress they experience in NICU.

#### **4.7.5 Theme 5 - Communication**

Effective communication is one of the principles of the family centred care model stating that the mothers should be part of the medical decisions made for their child.

They should also be availed detailed information that medical personnel know on the diagnosis, investigations, treatment, and prognosis of their baby. Mothers can only be empowered to make sound medical decisions if health care providers explain to them in simpler terms what they are doing.

#### **4.7.5.1 Information Sharing**

Information sharing between health care providers and mothers is one of the important aspects of care in NICU. The current study found contradictory responses on information sharing between the health care providers and mothers. Nurses indicated that information sharing is done in the NICU though majority of them said it is usually initiated by Nurses or Doctors. Mothers also ask for any updates on their babies. There were no clear guidelines on communication in NICU as the nurses gave contradicting statements as indicated by the responses below:

*'The Doctors usually do give information, sometimes Nurses ask Doctors to counsel mothers. Not all are updated, some ask, for some, Nurses decide who needs information according to condition of the baby'* (ZEN 02).

*'First encounter, the Doctor talks to the mother, they ask if she is aware why the baby is NICU. They ask them to ask questions. Each shift a Doctor is there if there is anything we update the mothers. In fact we are supposed to just update those with critically ill babies but we do it to all mothers'* (ZEN 11).

Open communication would be helpful for mothers to air their views and fears as they nurse their babies. The mothers may not only be faced by situation of having a

baby admitted to NICU but they could have financial problems to meet the demands of admission requirements such as buying diapers. When there is open communication they may find it easier to explain to nurses other challenges they may be facing. Lack of communication on the other hand may lead to increased stress levels.

#### **4.8 Summary**

In-depth interviews with the nurses have revealed that they perceive the NICU environment to be stressful to mothers. The situations that they consider stressful include the sights and sounds in NICU, the separation of parents from their babies, lack or inconsistency on information sharing and the interpersonal relationships with the mothers and other family members. The result shows some similarities with what mothers indicated as stressors while there are also some differences in other aspects.

## **PHASE TWO: MODEL DEVELOPMENT**

### **4.9 Model Development**

#### **4.9.1 Introduction**

The phase two of this study focused on developing a maternal stress alleviation model for stress alleviation in NICU. The phase utilised results from phase one of the study to advance the evidence of stress mothers experience due to unexpected admission to NICU. Model development was based on mothers' self-identified stressors and perceived stressors as identified by nurses in phase one through a mixed study design. Literature search was also conducted to identify already existing strategies of parental support in NICU. This section presents the process that was followed to develop the maternal stress alleviation model for mothers nursing babies in WNH of the UTH in Zambia.

#### **4.9.2 Model Designing**

The evidence based data obtained from the phase one mixed method design; a cross section study identified the NICU environmental stressors and associated factors while a qualitative inquiry brought out NICU stressors as perceived by nurses working in NICU. Literature was also reviewed to identify support models of care that already exist in NICU care. The review also highlighted the importance and benefits of support programmes as well as the need to use evidence based strategies. The

literature also informed the development of the model as some concepts in the current model were adopted and adapted from already validated programmes. The model development was, therefore, targeted at the stressors mothers and staff identified as stressful.

The aim of this study was to develop a support model which would help mothers to cope with the identified stressors. Stakeholders consultation, used to develop a model that would alleviate stress among the mothers nursing babies in NICU. In the current study, during in depth interviews, nurses were asked to suggest solutions to what they had perceived as NICU stressors. After data analysis and identifying NICU stressors an independent group of 10 purposively selected nurses who had worked in NICU for more than five years were asked to suggest solutions to the identified stressors. The team was informed of the findings of phase one study as highlighted below. These were a team of nurse leaders who were constituted to discuss and suggest solutions to the identified stressors.

#### **4.9.3 Key findings from Phase one of the study**

The results highlighted here have been discussed on presentation of quantitative and qualitative data. As documented by Shaw et al., (2013), that knowledge of situations mothers perceive stressful promotes implementation of stress alleviation strategies which subsequently is good for baby's growth and development. The results of this study have shown that the level of overall stress experienced by

mothers was perceived as very stressful applying the PSS: NICU scale. Studies have shown that when parenting expectations are not met or are modified by hospitalisation of a neonate in NICU, mothers suffer emotional turmoil (Hall et al., 2015; Stacey, 2015; William et al., 2018). This study shows that the stress occurrence was high in subscales of infant appearance and behaviour and Infant-parent relationships. Stress due to sights and sounds and staff behaviour caused mild stress to mothers. The maternal and infant characteristics that were statistically significantly associated with stress included educational level, duration of stay in NICU, type of feeding and getting a monthly salary. The mothers were more likely to be stressed when they did not get any information in relation to disease prognosis. It is noteworthy, that some maternal and infant characteristics occurring at the same time are predictive of increased stress.

According to Grosik et al., (2013), once stressors have been identified, then interventions can be developed to improve the family-centered approach to care. It has been shown that there is a need to develop local interventions to decrease stress and enhance parents' abilities and understanding of their infant (Trudi 2012). The use of best practices related to FCC in interventions develops confidence in maternal role performance. Having recognised the unmet needs for support in NICU from the results of this study, a team of nurse leaders was convened. This team included experienced nurses who have worked in the NICU for a period of not less than two years. The roles of this group were to propose the solutions to the stressors in the context of what the nurses are able to do to help the mothers cope with having a

baby admitted in an intimidating NICU environment. It also included defining the needs for staff empowerment to support mothers and how best they can proactively support mothers around principles of effective communication. Throughout the research process there has been an open dialogue with the nurse in charge and nurses working in NICU. During the in-depth interviews the nurses were asked for suggestions on how care can be improved in NICU.

#### **4.9.4 Suggested Solutions to Identified Stressors**

##### **4.9.4.1 Subscale 1: Parent-Infant Relationship**

It was realised that Women and New-born Hospital of the UTH still separates the mothers from their admitted babies though for very premature babies, a separate ward for Kangaroo Mother Care (KMC) has been introduced. For those babies nursed in NICU the hospital has increased the visiting time from 30 minutes to an hour. The team noted that these interventions are necessary as they are aimed at reducing the duration of separation of mother and baby. Nurses indicated that the mothers were still hesitating to leave the NICU when visiting time was up, evident enough that they want to be with their babies longer. The nurses indicated that due to inadequate space in the unit to accommodate the mother and baby, a room nearer to NICU would be appropriate for the mothers. When mothers are nearer to the Unit they have enough time to rest and they are assured of reaching the unit faster in case of any need. Wilson et al., (2011), indicated that mothers were left with little time to rest and sleep due to the frequent visits to NICU. Research has shown

evidence of reduced stress levels due to separation in those parents who are not separated from their babies (Skene et al., 2015).

#### **4.9.4.2 Subscale 2: Infant Appearance and Behaviour**

The nurses were of the view that mothers needed to be empowered with knowledge for them to understand characteristics of a premature baby. This is an activity which could easily be implemented as it has no financial implications. The only challenge indicated was the need for improvement in staffing levels, at times the unit has a skeleton staff. The patient-nurse ratio is higher, leaving staff with limited to no time for client education. The need to improve on the staffing levels was one of recommendations that was mentioned by most of the nursing staff during the in depth interviews. Adequate staff would reduce the workload and accord nurses with time for supportive care to the mothers. Lam et al., (2007) documented that the busy workload may contribute to a perceived lack of time available for supportive care. In addition, they indicated that nurses may even forget that parents are profoundly reliant on them for emotional support and guidance on care. Stube et al., (2018) revealed that high stress levels due to infant appearance shows the importance of educational support by nurses to help the mothers understand the appearance and behaviour of the baby. Meanwhile Gregory, (2012) indicated that when aiming at reducing stress in NICU the most effective strategy is the nurse led client education.

#### **4.9.4.3        Subscale 3: Sights and Sounds in NICU**

The NICU is usually an unfamiliar environment to mothers. It is an environment with medical equipment like ventilators, suction machines, intravenous and feeding pumps, photo therapy and there are also rules and regulations to be adhered to. To reduce stress due to the NICU sights and sounds, nurses were of the view of orienting mothers to the Unit during their admission to antenatal wards. These are mothers with a high likelihood of NICU admission due to having a condition that is likely to complicate pregnancy and are admitted to hospital prior to delivery. Antenatal education on the expectations in an event the baby is admitted to NICU should be given to mothers. These should include videos and success stories from mothers who have had an experience of NICU admission. William et al., (2018) indicated that explaining the purpose and function of the machines in NICU and meaning behind the alarms help to relieve maternal stress.

#### **4.9.4.4        Subscale 4: Staff Behaviour**

The nurses working in NICU indicated that staff behaviour could be one of the stressors mothers were experiencing. However, the team acknowledged that what nurses could perceive stressful may not be what the mothers deemed stressful as it was on this subscale. Sikorova et al., (2012) highlighted that nurses have different opinions with mothers on NICU stressors. The use of a formal assessment would improve nurses' identification of situations mothers consider stressful in NICU. The team indicated that they had no formal assessment tool to identify mothers who are stressed and what might be stressing them. The few they had helped were only

identified by nurses who are very observant when the mother misses visiting times frequently or when they approach individual nurses to ask for assistance. It was also noted that nurses lack knowledge on FCC model therefore they do not acknowledge the importance of the family in care of the baby. Some of the nurses were not aware that it is their responsibility to take care of the mothers as well. The team proposed that nurses would need in-service training or orientation on FCC concept and incorporate it into the pre service nurse training curricula. Further proposal was made on improving nurses counselling skills by empowering them with knowledge on psycho social counselling. Taking into consideration of cases that may require specialised personnel to handle, the team recommended recruitment of mental health nurses in NICU. To help nurses identify mothers who are stressed, an assessment tool was required which could be administered on admission. This will enable the nurses provide quality care that is targeted on mother's needs.

#### **4.9.4.5 Information Sharing**

The study results revealed that there was a communication breakdown between health care providers and mothers. Often times, only those mothers who seek information are given either by Medical Officers or Nurses. The break in communication was noted to have led to a delay in implementing changes in care that required the mother to implement such as increasing the amount of feed. These changes are always made during the Doctor's round in the absence of the mother, if not informed the mother would not know about it. The team therefore, proposed that mothers be allowed during doctors' rounds. The mothers' presence during the

Doctors round would accord them with the opportunity to get information on change of treatment promptly. As recommended by FCC model, the family should have the same information the medical personnel know on their child.

Communication could also be enhanced by having a telephone in the unit to enable mothers communicate with nurses and vice versa. Nurses indicated that there were instances when babies die in the absence of the mother. Therefore, without a mode of communication, these mothers are informed of the death when it is time for visiting. Nurses working in NICU have been finding it challenging to break the sad news to such mothers who were coming with a hope to visit their baby. The mothers who witness such occurrences tend to be anxious if their bay moved to another section in their absence. To improve communication and trust between mothers and nurses there is need for mentorship on building a therapeutic relationship. Positive attitudes by nursing staff would help the mothers gain confidence in them and entrust their babies under their care. Heidari et al., (2017), documented that regular updates on the condition of the infant could reduce stress while improper communication intensifies it.

#### **4.9.4.6 Rules and Regulations in NICU**

The team noted that the way rules and regulations are enforced by members of staff might be a source of stress in NICU. Mothers are required to visit at stipulated time and change into NICU gown before entry in the unit. They are also requested to buy and use diapers for babies as nappies are not allowed. Some mothers are not

comfortable to use gowns because they do not get to use the same gown through the admission period. The gown that a mother wore on the previous day may be used by another mother the following day after laundry. In addition, those without a stable income, are unable to buy diapers and other requirements for personal use during the admission period. Therefore, the nurses were of the view that rules and regulations that could be modified to allow mothers to use the same gown or allow those who can manage, to purchase their own gowns. Alternatively, disposable gowns could be bought by the hospital. Baird et al., (2015), indicated that the Unit rules were significant source of contention between parents and nurses but respectful rule enforcement has potential to reduce stress and create a more positive NICU environment. The nurses should enforce the rules uniformly and be empathetic and show respect to the mothers.

#### **4.9.4.7 Physical structure of the NICU**

The physical layout of the unit was noted to be one of the stressors, an open Unit exposes mothers to observing different medical procedures being carried out on other babies. They are also able to see the other babies who are critically ill, those with different congenital abnormalities that might increase their anxieties. Moreover, the Unit just has one changing room, which compromises privacy. More importantly, the Unit has not got convenience rooms which are much needed by postnatal mothers as they need to change sanitary pads and pass urine frequently. The team suggested a long term plan, a modern NICU could be built that will provide rooms for families in NICU. It will also promote rest to the mothers as they will not need to

visit the unit frequently. A systematic review on evidence based design of NICU showed that a single family room design is recommended. It is recommended because it promotes breastfeeding, prevents and controls infections, reduces length of stay and improves neonatal outcomes (Callaghan et al., 2019).

#### **4.9.5 Interventions Aimed at Alleviating Stress Related to NICU**

The reviewed literature has shown that defining and assessing the specific NICU stressors have resulted in the development of interventions aimed at alleviating stress and promoting effective coping skills among parents. Since support programmes developed based on identified stressors, no one support programme may suit all parents nursing babies in NICU. The Creating Opportunities for Parent Empowerment (COPE) Programme is an example of this type of intervention. COPE is a behavioural intervention that involves four unique interventions beginning within one week of admission and ending up to 6 months following discharge (Melnyk et al., 2006). Melnyk et al., (2006), conducted a randomised control trial to demonstrate the differences between the parents who participated in the COPE program and those who received routine NICU care. The study demonstrated that parents who participated in the COPE programme recorded the following benefits; decreased infant length of stay in NICU, decreased parental stress levels, and development of critical parenting skills. In addition, Melnyk et al., (2006) studied the COPE programme in relation to maternal anxiety and depression following infant discharge from the NICU and revealed that participants experienced less post discharge maternal anxiety and depression when compared to a control group.

Literature has further demonstrated that support programmes have benefits to both mother and baby. Payne et al., (2016), indicated that since the development of on Individualized Developmental Care and Assessment Program (NIDCAP) the importance of maternal infant bonding was understood. To date the bonding is still emphasized and recommended through the Kangaroo Mother care which also stabilises the baby's body temperature, breathing and heart rate. It also promotes breastfeeding on demand and subsequently the baby gains weight and grows (Kampekete et al., 2018).

The following interventions have been posited to alleviate stress among the mothers nursing babies in the NICU at WNH of the UTH. Although the parents may be viewed as not being patients, they are still a concern because their health and psychological problems have an impact on the health of the neonates deemed as patients in NICU. The stress experienced by mothers in NICU has been attributed to increasing episodes of postpartum depression, impairing mother baby bonding, anxiety and decrease in milk production. More than half of all mothers with babies admitted to NICU are at a high risk of developing Post-Traumatic Stress Disorder Symptoms (PTSD) (Shaw et al, 2009). The current study has proposed the following interventions to be implemented by the nursing staff in NICU. Based on findings of Morey and Gregory (2012), nurse-led education is an effective intervention strategy when aiming at reducing maternal stress in the NICU.

#### **4.9.5.1 Mentorship and Knowledge empowerment**

Having identified a knowledge gap among nursing staff on their responsibility in the care of the family and on FCC model of care, education and mentorship is proposed. Among all other health workers in NICU, nurses are better placed to advocate for their patients because they work 24 hours a day. It is also their responsibility to educate and support mothers in care giving. To enable nurses, achieve this responsibility, they need to be empowered with knowledge on the FCC model. Wong et al., (2015) indicated that lack of knowledge about FCC is related to lack of awareness on nurses' role in collaborating with families of babies admitted to the Unit. Understanding FCC will help nurses realise the vital role the family plays in the care of infants and they will easily facilitate parental involvement in the care of babies in NICU. Brady-fryer and Van Acrde, (2010) reported that the most significant factor affecting parents in NICU is their relationship with nurses. Therefore, mentorship on maintaining therapeutic trusting relationships and communication skills is very essential. Morrey and Gregory, (2012) in their study tested nurse led education interventions and found them effective in reducing maternal stress in NICU. Morrison and Gullon-Rivera, (2017) revealed that providing educational and emotional resources to siblings, including the use of effective approaches is an integral part of assuring high quality services under the FCC approach. Providing FCC may not be the only interventions, the need to identify mothers who may need support and referral would be of help to alleviate stress.

#### **4.9.5.2 Screening, Support and Referral**

Glasheen et al., (2010) has indicated the need for screening, providing psychosocial support and referrals for NICU parents. The stress experienced by mothers in NICU, if left unattended has potential to progress to Postpartum depression which is a more serious condition. Freda et al., (2010) indicated that most mothers develop postpartum depression in the first six months after delivery, while Hyan and Vanderbilt, (2013) reported that NICU parents are at a higher risk of depression and post-traumatic stress disorder than general population. Brandon et al., (2011) stated that those with short NICU stay have elevated levels of depression and anxiety. The need for screening, psychosocial support and referral for NICU parents cannot be over emphasized. For this model, a proposal is to screen mothers at admission to NICU in order to capture everyone even those with short stay in the Unit. A two phase screening is proposed, the first screening should be done using a quick screening tool and then followed by a more detailed screening only for those with a positive test in phase one. The quick screening tool adapted from the United States (US) Preventive Services Task Force (PSTF, 2009), has two questions asking if one has ever felt down, depressed or hopeless and the other one is on interest or pleasure in doing things. A 'yes' to any of these questions is a positive screen. This test has been proposed on the basis that there's already a high workload in NICU and screening all mothers comprehensively may be time consuming for other competing activities. The test has been documented to have a 100% sensitivity rate (Hynan & Vanderbilt, 2011).

The mother with a positive screen will then be screened further using PTSD 4 item tool which has been used before in NICU and has been proved to have high validity and reliability (Glasheen et al., 2010; Hynan & Vanderbilt, 2011). They further reported that this tool has a high specificity rate of 87%. Rescreening is recommended because baby blues may give a false positive in early postnatal days. We propose rescreening at 10 days, as the median for NICU stay in this study was 10 days. Mothers could be exposed to different stressors during hospitalisation and their stress levels may either increase or reduce as they cope with the situation. However, screening will not be limited to two times additional screening can be done as the staff deem it necessary. The mothers with positive screen should be offered counselling targeting the identified stressors and those that need specialised services should be referred to mental health providers. Hence the proposal to have mental health nurses deployed to work in NICU. Some stressors would be financial and may need involvement of the social worker hence the need of a multi-disciplinary team in alleviating stress among mothers.

#### **4.9.5.3 Multi-disciplinary approach**

A multi-disciplinary approach to provide the necessary support services is very vital. Mothers exposed to the same NICU do not usually have the same needs and stressors. Some may need services of a social worker to meet their financial constraints, while others may need specialised counselling. Counselling services should be readily available in the Unit and to ensure quality of counselling services,

nurses specialised in mental health should be deployed to NICU. The specialised nurse will be able to assess, plan, manage and evaluate cases the psychosocial counsellors cannot handle.

The nurses need to collaborate with other nurses in wards where the women with high risk pregnancies are managed. This is for the purpose of educating the mothers and offering them an opportunity to tour the NICU in anticipation that their babies might be admitted to the Unit. The mothers whose babies are admitted in the unit need to be educated on various issues pertaining to the intensive care. Majority of NICU admissions in this study were due to prematurity. It's of importance that in collaboration with the nurse allocated to mother's shelter, mothers are taught the characteristics of a premature baby. This may reduce stress due to infant appearance and behaviour. The post discharge stress on care of a premature baby at home may be minimised by discharge planning and education before discharge. To ensure integration of the family in the care of the baby admitted to NICU before discharge the following FCC has been proposed.

#### **4.9.5.4 FCC Principles incorporated in the Model**

The family centred care model is based on the premise that the family is the primary source of strength and support. The role of the family in caring for their sick child is very important, for this to be achieved the health care providers need to acknowledge that the child's family is pivotal in the child's care. To achieve this the number of family members allowed during visiting hour should not only be limited to the father

of the admitted baby. The mothers should also be allowed to visit more often than the fixed two to three hours and be rendered support on care giving in the unnatural setting of the NICU. The proposal to have mothers around during doctor's round will increase the information sharing. The information that will be shared to the mothers will be unbiased and complete as they will be part of decisions made on care of their baby. The need to have mothers treated with dignity and respect will be achieved through mentorship by the nursing staff. Trajkovski et al., (2015) documented that developing a respectful partnership between health professional and parents of the infants admitted in NICU is a fundamental principle of FCC.

FCC interventions are associated with reduced symptoms, improved physical and mental health and functional status. Providing FCC means that the clinician incorporates into caregiving the knowledge and conviction that family is constant in children's lives; children are affected by and affect those with whom they have relationships; and by including families in care processes, children will receive higher quality care (Tondi, 2010). Therefore, in conclusion implementing the intervention described above would alleviate stress among mothers with babies admitted to NICU at WNH of the UTH. The interventions as earlier alluded to were developed to address the stressors identified in phase one of this study. Reducing stress among mothers can consequently improve the wellbeing of the mother and the babies. Figure 4.17 refers to a diagrammatic presentation of the stress alleviation model developed.

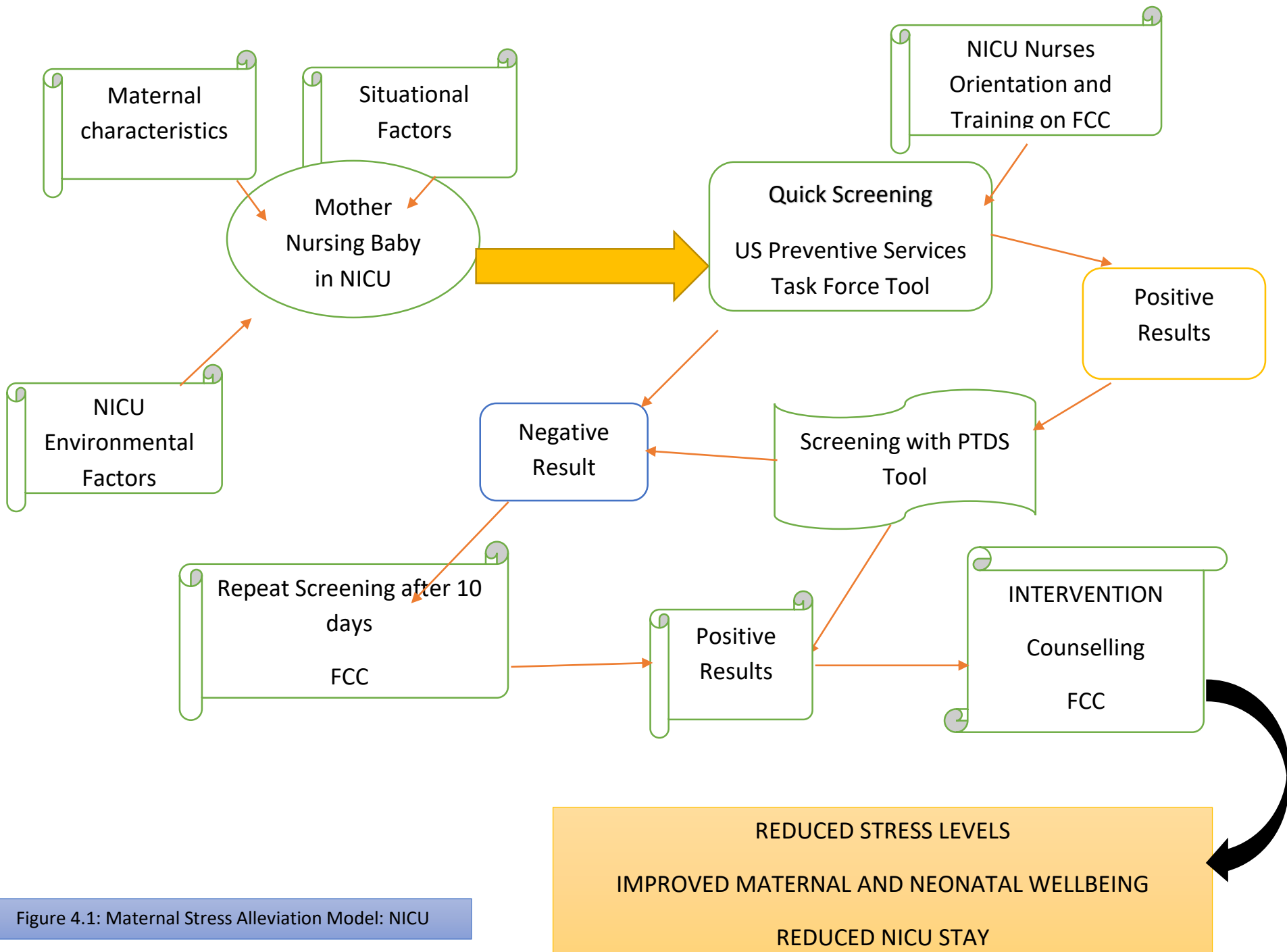


Figure 4.1: Maternal Stress Alleviation Model: NICU

The model has been developed and proposed for stress alleviation among the mothers. The model provides a step by step action that starts with identification of stressed mothers using a two item stress assessment tool on admission. The second step is a further assessment using the PTDS for those whose first result is positive. The PTDS has a high specificity test than the first tool which has high sensitivity. A knowledge gap on FCC among the nurses was identified in this study and the model provides for orientation of all staff allocated to NICU.

Family-centered care is a complex concept for nurses as it is constantly evolving with rapidly changing parenting styles and parental expectations (Boxwell, 2010). When a baby is born, family has to cope with great changes in their lives as they adapt to the whole new rhythm of life. In a situation where the new-born is in intensive care, it is the nurse's responsibility to offer support and care also for the family. Training of nurses in FCC is important and will enable them ensure parents take care, responsibility, and gain knowledge about their sick neonate. Nursing staff working in NICU who are educated in providing such support feel empowered in their caregiving roles and find reward in the improved well-being of families in the NICU. Training nurses in FCC concepts will empower nurses with knowledge on family centred care to enable them provide support to those mothers who will be found to be stressed.

Literature indicates that stress levels are likely to be different based on the length of stay in NICU. Therefore, the model has provided a re-assessment for the mothers with a negative test at tenth day in the NICU. Incorporating the principles

of FCC in the unit has been documented in previous studies to have reduced stress levels among mothers, reduced their stay in NICU and improved neonatal outcomes. Cockcroft (2011) documented that support network in the neonatal intensive care unit reduces maternal depression as well as creates greater parental competence. Thus, a family centred visiting policy that allow extended family visits in the Unit should be allowed. Therefore, it should be the Parents to decide whose support they need in the ward and with who they want to share their baby with and not the hospital. Family centered care helps families to cope with the situation-associated anxiety when communication between staff and mothers is enhanced. Parental involvement in the care would reduce the stress due to parent-infant relationship, the model therefore, advocates for involvement of mothers in basic care. Parents who feel they are properly involved in the care process of the neonate are able to make stronger care and treatment decisions.

It is therefore expected that if the mothers who are stressed are identified early on admission and during admission and interventions suggested are implemented the outcomes of both mother and baby will be good. The mothers would care and feed their babies with confidence which would continue even after discharge from the hospital. The child is most likely to have an optimal physical and developmental milestone when taken care of by their parents, this leads to shortened NICU stay.

As earlier on alluded to, literature was reviewed to also guide the model development. The model developed has interventions that are similar to what

other authors developed (Lubbe et al. 2005; Cusson and Lee, 1994, Hall et al., 2015). The interventions that are similar include the following;

- i) Provision of adequate parent facilities such as comfortable areas for feeding
- ii) Nurses need to be cognisant of the needs as identified by the parents.
- iii) Orientation to machines and equipment in the unit
- iv) Providing support to mothers during breastfeeding and use of basic information when explaining conditions to parents.

Despite the mentioned similarities the other interventions were different. The current study included assessment tools to be used by nurses for the purpose of identifying the women who are stressed. Further, a training has been suggested to ensure the nurses are oriented to the concepts of the Family Centred care model. The concept of re assessment has not been suggested by other authors but it was deemed necessary for the model in the current study. Evidence exist in literature that stress levels changes over time, therefore assessment at one point in time may miss other mothers. It can then be concluded that the model proposed has similarities with other interventions documented in literature and it has also brought interventions that are specific to the identified needs.

#### **4.10 Conclusion**

The results obtained in Phase one of this study and results of the literature review were a basis for developing a maternal stress alleviation model to be used by the

nursing staff working at Women and New-born Hospital NICU. The model can be used to reduce stress and mitigate adjustment and coping with regard to the identified stressful situations. This objective may be achieved by nurses implementing FCC interventions and by preparing and educating parents about their infants' appearance, treatment, and general health condition. Family should also be made part of the decision making about their infants. Priority should be given to empowering NICU staff with knowledge of FCC to enable them prepare and support parents in their parental role in the challenging and unfamiliar environment. Adopting rules and regulations that reduce separation of mothers from their infants would address a significant cause of stress for parents that was reported in this study. Screening the parents on admission will help the nurses identify those with characteristics that are likely to cause stress and consequently assist with preventing or reducing stress for parents and improve the maternal and infant outcomes.

## **CHAPTER FIVE**

### **DISCUSSION**

#### **5.1 Introduction**

This study investigated environmental stressors in NICU and maternal and infant characteristics that influence maternal stress. A two phased study approach was undertaken as the overall objective was to develop a support model to alleviate stress experienced by mothers. From the identified stressors and literature review a maternal stress alleviation model was developed in phase two. This chapter discusses the findings in light of existing body of evidence on stress experienced by mothers while nursing babies in NICU. It also includes limitations of the study and suggestions for future research are also highlighted.

#### **5.2 Overall findings of the study**

In the preceding chapter, the presentation and analysis of data obtained in phase one of the study have been presented. The first phase of the research produced two data sets, the quantitative data obtained from mothers and qualitative data from the nurses' sample. Respondents for the quantitative part were asked to score items of the PSS: NICU tool to determine NICU environmental stressors, infant and maternal characteristics associated with maternal stress. Therefore, maternal stressors that were statistically significant after adjusting for confounders include birth weight and type of feeding the baby during hospitalisation. The NICU environmental stress measured by PSS: NICU scale

focusing on the four subscales revealed that Parent-Infant Relationship and infant appearance and behaviour were rated most stressful by the mothers. Additionally, qualitative data was obtained through in-depth interviews conducted with nurses to identify perceived stressors in the NICU among the mothers. From the in-depth interviews, the major themes that emerged as stressors in NICU were NICU environment, standard operating procedures in NICU, maternal infant relationship, staff behaviour and communication.

### **5.3 Characteristics of the Sample**

The quantitative part of the current study sampled mothers who had just delivered and were nursing their babies in NICU at WNH of University Teaching Hospitals. Majority of the respondents in this study were within the child bearing age (15 – 49 years) with the mean age of 26.5 years and a range of 15-47 years. The Zambia Statistics Agency (ZSA) reported higher fertility rate among the urban women aged 25-29years (ZSA et al., 2019), a possible explanation to results of this study where the mean age of the respondents was 26.5 years. The lowest age was 15 years which is consistent with ZSA et al., (2019) which indicated that about 6% of women in Zambia begin childbearing at the age of 15 years. The ZSA et al., (2019) further indicated that 91 percent of the pregnant women in Lusaka deliver in health institutions and are assisted by a skilled medical professional. Similarly, the findings of this study revealed that majority of the respondents (90.7%) were delivered by a skilled attendant in a health facility. According to ZSA et al., (2019), universal access to skilled care at birth is one of the cost effective measures in reducing chances of infants being admitted to

NICU and neonatal deaths. The findings of the current study indicate that only nine percent of the neonates included in this study were delivered at home and were not assisted by a skilled attendant. A result which is not in agreement to ZSA et al., (2019) which attributed to neonatal admission to NICU and deaths to lack of access to skilled birth attendants at delivery. Seeking medical care from a skilled attendant and delivering in an institution by pregnant women has been attributed to ones' educational level.

As a pregnant woman's education level increases the likelihood of seeking care from a skilled provider also increases (ZSA et al., 2019). Similarly, the findings of this study has revealed that all the respondents had formal education, with most of them having attained primary and secondary level (78.2%). Level of education could be a possible explanation to the findings of this study as majority of the women delivered in a health facility. Appropriate care for the women during pregnancy and delivery is important for the health of both the baby and herself. Nonetheless, there are other factors that would still increase the chances of the baby's admission to NICU like being born before term.

About half of the infants (51.8%) in this study were born prematurely between 28-36 weeks gestation age and most of them weighed less than 2500g at birth. This finding is consistent with Myles et al., (2014) who revealed that as the gestation age increases the weight of the foetus in utero is also expected to increase. Where all factors are held constant (mother's health and baby's condition are optimum during pregnancy) the baby's birth weight should be above 2500g when

born at term. Myles et al., (2014) further reported that babies that suffered intra uterine growth restrictions due to maternal conditions during pregnancy would still have a birth weight below 2500g at term. The babies born between 28-36 weeks their birth weight should range from 900g to 2500g. However, babies born from mothers with Diabetes Mellitus are more likely to be born prematurely but still with a birth weight above 2500g. Medical conditions like Hypertension, Diabetes Mellitus and Anaemia may predispose a pregnant woman to preterm labour. The current study revealed that about 20% of the respondents were diagnosed with a medical or an obstetric condition during pregnancy which may have led to reported low birth weight or delivering before term. However, even if prematurity is not synonymous to low birth weight, most of the babies who are born before 37 weeks of gestation have their birth weight below 2500g.

A baby with low birth weight and prematurity is most likely to stay longer in hospital than one born at term and with only low birth weight. In the current study, duration of stay in NICU ranged from one day to 90 days with the median being 10 days. At the time of interview 30% of the neonates had stayed in NICU for more than seven days. A result which was expected with a discharge criteria of steady weight gain and 67.5% of the neonates in the current study were born with a low birth weight and prematurity. Premature babies were expected to stay longer in NICU since they are born with poor sucking reflex and weight gain would take longer. This study further revealed that less than half (37.9%) of the neonates in the study were breast feeding while the rest were fed by cup, naso gastric tube or parenteral feeds. Most babies were unable to breastfeed as 46.4% of the neonates included in this study were premature who were born with a poor

sucking reflex and 21.1% had difficulties in breathing. The current study assessed the above mentioned maternal and infant characteristics because they were associated with stress the mothers experience while nursing their neonates in NICU by previous authors (Foligno et al., 2020; Magliyah and Muhamamd, 2015; Montiroso et al., 2012; Abdeyazdan et al., 2014; Turner et al., 2015). The study also assessed the NICU stressors from the nurses' perspective for data triangulation. Sikorova and Kucova (2012), indicated that nurses have different opinions with mothers about causes of stress among the mothers with babies admitted to NICU.

To determine nurses' perception of stressors in NICU among mothers, qualitative data was obtained from 15 nurses who had worked for more than two months at the time of data collection. Most of them had a work experience of one to five years in NICU, which made them suitable for inclusion in the study. Majority of them were female and in the category of Registered nurses and Critical care nurses. The number of Midwives and Paediatric nurses were limited hence the available were included in the study. Therefore, the findings discussed in this chapter are based on the two data sets drawn from the respondents of both the quantitative and qualitative described above.

## **5.4 NICU STRESSORS**

### **5.4.1 Situational Factors**

The theoretical framework that guided this study indicated that situational factors (infant characteristics) are associated with stress that parents nursing babies in

NICU may experience (Wereszack et al., 1997). The present study results show that birth weight is associated with maternal stress ( $p= 0.008$ ). The odds of stress increased as the birth weight reduced. Those who had babies weighing less than 2500g were more likely to be stressed than the mothers whose babies weighed more than 2500g. The results are consistent with findings of previous studies conducted by Varma et al., (2019), Musabirema et al., (2017), and Lefkowitz et al., (2010) who also reported an association between high stress levels in mothers and low birth weight of their babies. The high levels of stress associated with birth weight may be understood from ZSA et al., (2019) explanation that birth weight is an important indicator of child's vulnerability to risk of childhood illnesses and reduced chances of survival with those weighing less than 2500g having a higher risk. In Zambia, neonatal mortality amongst those with birth weight below 2500g was 65 per 1000 births compared to 15 deaths per 1000 births for those weighing more than 2500g (CSO, 2015). Mothers who would be preview to this information associating low birth weight with reduced survival rates, may be anxious and consequently experience stress. Contrary to the findings of this study, a study conducted by Umasankar and Sathiadas (2016), indicated that there was no statistical significant between stress experienced by parents on NICU and birth weight. Similarly, Palma et al., (2017) in a study which assessed stress levels in parents with new-borns hospitalised in NICU also documented that birth weight was not associated to stress experienced by parents in NICU. The weight of the baby at delivery is closely related to the gestation age at birth, therefore a further assessment was conducted in the current study on the relationship between gestation age and maternal stress.

Despite the relationship which exist between birth weight and gestation age as earlier alluded to, gestation age in the present study was not statistically associated with maternal stress ( $p = 0.146$ ). This finding is in line with Palma et al., (2017) who reported that gestation age was not associated to parental stress. Chourasia et al., (2013) also reported results in agreement to Palma et al., and the current study on gestation age. However, the current study findings are contrary to findings of studies conducted by Umasankar and Sathiadas, (2016) and Dubek-Shriber's, (2004) where gestation age was found to be statistically significantly associated to maternal stress. The babies that are born before 37 completed weeks of gestation age are referred to as premature babies since they are born before Term.

Zambia Statistics Agency et al., (2019) estimated the prevalence of prematurity and low birth weight at 13% and 9% respectively in Zambia. Most of the infants in this study were admitted to NICU due to prematurity. The results of the current study are consistent to findings by Byiringori et al., (2020) and Abdeyazdan et al., (2014) who documented that preterm infants constitute a large proportion of newborn babies in NICU. Previous studies that studied stress among the parents with premature babies reported that most of these parents' experience stress (Montirosso et al., 2012; Wormald et al 2015). Stube et al., (2018) reported that parents of premature babies feel guilty fear and are anxious when their baby is admitted in NICU. In the same vain, (Mwanza and Vwalika, 2014) reported that the extent of prematurity of an infant has been shown to be a predictor of increased levels of maternal stress. Mwanza and Vwalika, (2014) attributed the stress to an association that exist between the extent of prematurity with more

complications. The very premature babies born at 28 to 34 weeks are more likely to experience complications and are more likely to die than those born at 36 weeks. A finding which was supported by a report by ZSA, et al., (2019) that, majority of neonatal deaths in Zambia are due to prematurity. This is an indication that most of the premature infants had a higher risk of dying than those with other conditions. Therefore, it is suggested to conduct another study to determine stress levels with gestation age segregated by birth weight for comparison of findings as these two variables are related.

With regard to duration of stay in hospital, the premature babies are likely to stay longer as most of the body systems are immature at birth. The association between length of stay in NICU and maternal stress was not statistically significant in the current study ( $p=0.120$ ) which is consistent with findings of the study conducted by Varma et al., (2019). The study conducted by Varma et al., (2019) found that majority of the neonates were admitted to NICU with prematurity and mean length of stay in the unit was 21.5 days but no association was reported with parental stress. Contrary to findings of the current study and Varma et al., other previous studies by Folifno et al., (2015), and Chourasia et al's (2013) reported a correlation between high stress levels and duration of stay in NICU. Umasankar and Sathiadas (2016), also documented an association between stress and duration of stay, in their study parents who reported low stress levels had reduced duration of stay in NICU. However, high stress levels due to NICU environmental stressors in subscales of staff behaviour and sights and sounds were reported in those mothers who stayed longer (Umasankar and Sathiadas (2016).

On the other hand, the low stress levels due to duration of NICU admission reported in the current study could be explained by the evidence that most of the babies were in admission for less than seven days at the time of data collection and stress was assessed at one point in time. Based on findings of the study by Umasankar and Sathiadas, (2016) stress experienced by mothers in NICU may be different at admission and at discharge. Therefore, this study recommends further research that should assess levels of stress experienced by mothers at different times of admission in order to compare the study findings. When determining the association between duration of stay and maternal stress it is, therefore, important to consider the period the data was collected from the mothers. Chourasia et al., (2013) reported an association between length of stay in NICU and maternal stress for the data they collected on the sixth to eighth day. The study conducted by Sikorova and Kucova, (2012) where the PSS: NICU tool was administered after the mother had made just one visit to NICU found no association between stress and length of stay in the NICU. The longer the mothers stay in the strange environment of NICU the more parenting disruptions they experience in terms of caring and feeding the baby.

WHO (2001), recommends that all new-born babies are exclusively breastfed for the purpose of promoting the development of immunity in the new-born and enhancing mother baby bonding. Exclusive breastfeeding may not be recommended for all infants in NICU, therefore the mode of feeding is usually advised by medical officers. Medical officers advise mothers on mode of feeding as some babies may not be able to breastfeed due to immaturity or clinical

condition. If the baby is unable to breastfeed, feeding by cup, Naso gastric tube feeding or parenteral feed can be advised. In this study, a statistically significant association was found between type of feeding and maternal stress ( $p = 0.001$ ). The findings of the current study are in agreement with findings of the studies conducted by Foligno et al., (2020) and Chourasia et al., (2013), who reported a statistical significance between maternal stress and inability to breastfeed. In the current study, mothers with babies who were breastfeeding were 63 % less likely to be stressed compared to those who were fed by the other mentioned feeding methods. Failure to breastfeed is one of the danger signs in a neonate that mothers are taught to look out for during antenatal period. Based on this teaching, the stress experienced by mothers whose babies were not breastfeeding may be attributed to them being aware of it as a danger sign.

Breastfeeding is culturally acceptable for all women with new born babies in Zambia. Despite that respondents in this study were from different cultural backgrounds where there are common beliefs on breastfeeding that cut across cultures. Msoka & Mabuza, (2015) in their study reported that breastfeeding in public place and at the same time with other breastfeeding mothers is discouraged as it is believed to cause child illness. The lay out of the NICU where the current study was conducted is an open ward with prescribed visiting times. During these visiting times, mothers breastfeed their babies, a situation which does not allow for any privacy. Despite the mothers coming from a culture that discourage breastfeeding at the same time with others, mothers who had babies who were able to breastfeed in this study experienced reduced stress levels. Ability of the baby to breastfeed was more important to the mothers than the

cultural beliefs. Having a baby who was able to suck, could have assured mothers of good prognosis based on antenatal teaching as earlier alluded to and a quick discharge.

The criteria for discharge from the WNH NICU include ability of the child to breastfeed and gain weight. Nonetheless if mothers understood that not only babies with severe illness fail to breastfeed but also level of maturity at birth could reduce stress. Further stress in mothers could be avoided by teaching them on the characteristics of a premature baby as most of these babies are born with poor sucking reflex. Understanding these characteristics may reduce assertions by the mothers that all poorly breastfeeding babies have severe illnesses and consequently will have poor prognosis. Dispelling anxiety and fear that mothers whose babies are unable to breastfeed feel is very vital as it has a negative influence on the success of breastfeeding (Alakaam et al., 2018). Mothers need support from nurses working in NICU to initiate and sustain breastfeeding in the unfamiliar environment of the NICU. A mother who is calm is more likely to produce milk than the one who is anxious (Lau et al., 2001). A conclusion can be drawn from the findings of this study that situational factors as indicated in the theoretical frame work are predictors of stress in NICU. Some of these factors can be modified by personal characteristics of the mother.

#### **5.4.2 Personal Characteristics**

The effects of maternal characteristics on the amount of stress that parents with infants in NICU experience is well documented. The current study found a

statistical association between educational level and getting a monthly salary with maternal stress. After adjusting for confounders no statistically significant association was found between level of education, age, marital status and earning a monthly salary with maternal stress. Contrary to the findings of this study, a statistically significant association was found in previous studies between mothers' education level with maternal stress. Musabirema et al., (2015) argues that parents with high education experience higher levels of stress. Chourasia et al., (2013) equally reported an association between educational level, maternal age with maternal stress in NICU, with older mothers reported higher stress levels than the younger ones. Woodward et al., (2014), and Carter, (2007) reported stress in unmarried, low-income and less-educated mothers, as well as in younger and married mothers with high levels of education.

The findings of the current study were in line with what was reported by Busse et al., (2013), Abdeyazdan et al., (2014), Foligno et al., (2020) who found no correlation between education level and maternal stress. Other earlier studies also reported no statistical association between heightened levels of stress and maternal demographics, such as age, marital status, education or employment status (Dudek-Shriber, 2004; Meyer, 1995, Frank, 2005). In addition, the current study predicted high level of stress given a mother who had a lower education level and no monthly income. The high stress levels when one has no income may be attributed to the cost of requirements demanded by the hospital. The present study results indicate that mothers who had no income had challenges to meet costs of diapers and food. However, they had no challenges on the cost of care since parents are not expected to pay for consultation, treatment and

diagnostic investigations at WNH NICU. Similarly, Martinez et al., (2012), reported that the cost of material needed for care, transportation and food are serious challenges for parents nursing babies in NICU. Byiringon et al., (2020), reported similar results, almost all respondents in their study mentioned that the cost of materials required in NICU was a challenge and great source of stress. Further research is recommended to understand stress related to cost demands of being hospitalised.

The demands that come with hospitalisation of the new-born may be very demanding and overwhelming to the mother especially when the whole responsibility is left to her alone. It is evident in this study that apart from mothers and fathers of the admitted infant, no other family member was allowed to visit in NICU. Family support has been associated with reduced stress caused by adjustment of the mother to motherhood and new member added to the family. In the Zambian culture as documented by Sichimba, (2015) grandparents provide a wide range of care to the new-born and the partner's role is mainly financial support. Therefore, mothers who may not have a spouse but have their own mother rendering them support taking care of a hospitalised baby would experience reduced stress levels. On the other hand, single mothers may not get much help from the parents because having a child outside wedlock is not culturally acceptable in Zambia. Family rejection and embarrassment may be contributing to risk of stress for women who were single with a baby admitted to NICU. Maimbolwa et al., (2003) documented that there are cultural beliefs that attribute complications of pregnancy and delivery to infidelity during the pregnancy period. Such cultural beliefs may contribute to risk of stress among

the mothers. Despite the reported cultural beliefs on childbirth and breastfeeding by previous studies, the current study did not assess the relationship between cultural beliefs and stress experienced by mothers in NICU. Another study to determine if culture is associated with maternal stress in NICU is recommended.

In addition to other personal characteristics assessed in the present study, findings revealed that despite most of the respondents not being given information relating to their hospitalised child, poor communication was not a source of stress among mothers ( $p = 0.230$ ). Contrary to the findings of this study, according to Jones et al., (2007), effective communication is an essential component of neonatal care and it results in stress reduction among parents. Similarly, a study conducted by Heidari et al., (2017), reported that improper communication with parents who seek information intensifies the parents' stress. Heidari et al., (2017), attributed the reduction in stress levels among the mothers to provision of regular updates to parents on the infant's condition. Lau et al., (2007), indicated that majority of parents seek information and assurance on their infant's condition from health workers. Generally, nurses are said to be more approachable than other members of the health care team. In a study conducted by Jones et al., (2007) revealed that parents felt more comfortable to enquire on their infants' condition from nurses. Similarly, Heidari et al., (2017) documented that nurses are of great help to the parents in facilitating healthy transition from the expected normal delivery to the reality of admission in NICU.

When mothers are helped to understand their infants' health and treatment modalities they become more confident and experience less stress. Information

sharing between mothers and nurses is very essential in NICU because it empowers parents to be part of the clinical decision making process for their children. Clinical decisions that parents are required to make for their child in NICU are in most times technical and parents would need guidance from the health professionals. The health workers should, therefore, acknowledge the pivotal role the child's family has in the care of their hospitalised child for them to empower them with enough information to contribute in clinical decisions. Recognition of the parents' roles in NICU care would also facilitate an open communication between the nurses and parents. Contrary to what the previous studies indicate, nurses in this study indicated that their role was to take care of the child and not parents. This finding of the current study was consistent with results of a study by Bruce and Ritchie, (1997) who revealed that nurses do not view the needs of the family as part of their responsibility. This finding implies that the family may not get needed support from the health care professionals predisposing parents to a risk of stress related to either the situation or their personal characteristics.

It is evident in this study that situational factors and personal characteristics as indicated in the theoretical frame work that guided this study have an association with maternal stress. However, the findings of the current study are either in agreement or contrary to previous study on maternal and infant characteristics that influence maternal stress in NICU. The Inconsistencies between the current study and previous research can be attributed to differences in the value attached to the maternal characteristics studied, the time factor on data collection and other causes that were not part of the model like cultural diversities.

### **5.4.3 NICU Environmental Stressors**

As indicated earlier, environmental stressors were measured using a PSS: NICU tool focused on four subscales; Sights and sounds in NICU, Infant appearance, Parent – Infant relationship, and Staff behaviour. Mothers were asked to rate how stressful the experience of having an infant admitted to NICU was to them. All mothers experienced high level of stress from having their new-born admitted to NICU. On different aspects of the unit, mothers reported different levels of stress from low to high.

#### **5.4.3.1 Sights and Sounds**

This study established whether the sights which includes equipment, machines, other sick babies, a lot of staff working in NICU and sounds (alarms from the machines in NICU) were stressful to mothers. The mothers reported low levels of stress (median 2.00). Over 53% (150) of the mothers reported that sights and sounds subscale was a little stressful and the stressful items were other sick babies admitted in the Unit at the same time with their baby. Low levels of stress due to sights and sounds reported by mothers in the current study were also reported in previous studies (Kegler et al., 2019; Turner et al., 2015; Montirosso et al., 2012; Wormald et al., 2015). Contrary to findings of this study, high stress due to sights and sounds were also demonstrated by other previous studies which reported that the NICU technological environment creates an intimidating atmosphere and mothers report that they often feel overwhelmed and stressed (Turan et al., 2008; Johnson 2016; Wigert et al., 2009; O'brien & Warren, 2014;

Musabirema, 2015; Umasankar et al., 2016). Parents who are unfamiliar with the NICU environment and how to care for the infants become worried, and anxious and feel they have lost control (Heidari et al., 2017). The low stress levels due to sights and sounds reported in the current study may be attributed to an assurance parents may have that use of advanced technology increase survival rates in NICU. A study conducted by Heidari et al., (2013) also attributed increased survival rates of premature and low birth weight babies in NICU to advanced technology. Therefore, presence of machines and equipment in NICU gives mothers some hope of a better outcome than it being a stressor. On the other hand, parents may experience low stress levels due to sights and sounds because they concentrate much on their fears of losing the infant than the equipment in the Unit (Heidari et al., (2013). The current study and previous studies have reported convergent and divergent results on sights and sounds as a stressor in NICU environment.

The inconsistencies on levels of stress experienced by mothers on sights and sounds that has been cited in literature could be attributed to orientation that some mothers may have had before or on admission to NICU. William et al., (2018) indicated that orientation to medical equipment, the purpose and meaning of alarms and alerts helped relieve maternal stress. Therefore, it may be expected that those mothers who were not oriented to the lay out and functions of the machines in the unit are more likely to experience high levels of stress due to sights and sounds. The reduced stress levels experienced by parents who undergo orientation have been attributed to the parents' prior knowledge of the lay out of the unit and importance of the machines in the NICU. Melynk et al.,

(2006) attributed the parental knowledge of Intensive care unit to coping with the situation and a sense of predictability of the experience. The tour of NICU has been further associated with reduced fear by parents, inspiring a sense of hope for better outcome and emotional preparation (Melynk et al., 2006).

Most of the mothers in this study rated seeing other sick babies in NICU as very stressful. The infants in WNH NICU are nursed in a multi-patient open ward because it lacks sufficient space for private rooms that can accommodate both mother and baby to provide privacy. The open type of arrangement exposes mothers to equipment in the Unit and other sick babies, and may contribute to an increase in the risk of stress. Aftyka et al., (2019) documented that parents in a multi patient NICU may not experience stress due to sights and sound probably because they pay too little attention to them. However, the current study has revealed the prime source of stress in mothers of infants admitted to the Unit in infant appearance and behaviour subscale.

#### **5.4.3.2 Infant Appearance and Behaviour**

Regarding the Infant appearance and behaviour subscale, mothers reported different levels of stress occurrence on the items. The items; the baby having a respirator, witnessing needles and tubes inserted on the baby, small size of the baby, and temporary cessation in breathing were the ones more than 60% of mothers referred to this experience as moderately and very stressful. The current study the infant appearance and behaviour subscale level of stress occurrence was rated moderately stressful (median = 3) by majority of the mothers. This

finding is consistent with previous studies that reported moderate stress levels due to infant appearance and behaviour. Dubek-shriber, (2004) reported moderate stress levels among parents due to infant behaviour and appearance on a study conducted among mother and fathers of the admitted infants.

Contrary to the findings of this study, Musabirema et al., (2017) and Wormald et al., (2015) reported high stress levels among parents of hospitalised infants due to infant appearance and behaviour. The reported high levels of stress could be attributed to the respondents they recruited in these studies. Musabirema et al., (2017) enrolled in their study parents with infants admitted in NICU and their results showed that 90% of the babies were premature while Wormald et al., (2015) had only enrolled mothers of premature babies. Premature babies usually are small in size and are less active compared to other babies born on term. Moghaddam et al., (2017) reported that mothers in their first contact with their babies mainly focus on the baby's appearance and most of the respondents in their study were frightened and concerned to see a very small baby and avoided to touch. Similarly, the study conducted by Moghaddam et al., (2017) only recruited mothers whose babies were admitted to NICU due to very low birth weight. Therefore, the difference in levels of stress occurrence due to infant appearance and behaviour subscale can be attributed to the characteristics of infants recruited in relation to level of maturity and birth weight. Studies that recruited more of premature babies and low birth weight babies are more likely to report high stress levels compared to those who recruited babies born at term.

In the current study, moderate stress levels reported due to infant appearance and behaviour could be attributed to half (51.8%) recruited infants were premature and (67.5%) had low birth weight. Premature babies have been associated with increased medical risks such as a higher risk of experiencing the temporal cessation of breathing, having a small size baby and poor sucking reflex because they are born before complete physiological development. In relation to these medical risks that require medical attention, premature babies are usually the majority of the babies admitted in NICU as it was found in this study. Similarly, Carter et al., (2007), documented that majority of infants admitted to NICU are prematurity and low birth weight infants. Musabirema et al., (2015) reported that the mothers experienced heightened stress levels due to temporal cessation of breathing.

High stress levels due to infant appearance were also reported by Stube et al., (2018), where parents' perception that their child is different from a healthy newborn led to compensatory parenting needing adaptation. Similar conclusion was drawn by authors of studies conducted by Unesi et al., 2017; Busse, 2013; Chourasia et al., 2013; Mwanza, 2014; Ashwani et al., 2017 which also revealed that infant appearance and behaviour was a primary source of stress identified in NICU. Teaching mothers on prematurity will help them understand the appearance and some behaviours of premature babies which in turn will reduce their anxieties and uncertainties. Parents who did not understand their baby's condition were perceived as to have highly stressful experiences (Magliyah and Muhamamd, 2015). Moghaddam et al., (2017) demonstrated that mothers who

received information from nurses regarding their baby and care, it improved their confidence in caring for their baby.

In contrast to the findings of this study and earlier studies that reported high stress levels, Varma et al., (2019), Turner et al., (2015), Umasankar et al., (2016) and Aftyka et al., (2019) reported low levels of stress due to infant behaviour and appearance. Differences in reported occurrence of stress between the present study and previous studies can be attributed to differences in measurement of stress. Sikorova and Kucova, (2012) low stress levels were scores between 1.10 and 2.59, medium was 2.60 and 3.59, High scores between 3.60 to 5.00 while studies by Varma et al., (2019) and Chourasia et al., (2013) measured stress where scores of 1 and 2.9 accounted for low stress levels, moderate stress 3 and 3.9 and high stress levels are scores between 4 and 5. In the current study the cut off points were as reported by Varma et al., (2019) and some previous studies did not state the cut off points of each subscale. The medium stress levels in study conducted by Sikorova and Kucova would have fallen in the low stress category for the current study and some previous studies (Varma et al., 2019; Chourasia et al., 2013). It is, therefore, important to pay attention to cut off point of different studies when making inferences on the contribution of particular subscales to stress among parents in NICU. It is noteworthy, that all parents who participated in previous studies referred to in this study reported stress ranging from mild to high levels due to infant appearance and behaviour subscale.

#### **5.4.3.3 Infant Parent Relationship**

In the current study in the subscale 'Infant Parent Relationship' subscale was the most stressful with majority (65%) of the respondents reporting that they experienced high stress levels (median 4:00). The items that were rated most stressful are; being separated from the baby, inability to breast feed the baby, inability to take care of the baby, and inability to protect the baby from painful procedures in the Infant Parent relationship subscale. The results of this study are in line with findings from other studies (Kegler et al., 2019; Turner, 2015; Aftyka et al., 2019; Palma et al., 2017), which found the most stressful aspects of having an infant in the NICU as altered parent role and relationship with their baby. De Rouck and Leys (2009), also reported that the feeling of disruption of the parental role contributes greatly to the amount of stress experienced by parents of infants in NICU. In addition, (Musaberima et al., 2017) and earlier studies conducted by (Dudek-Shriber, 2004; Lau et al., 2007; Preyde & Ardal 2003; Shaw et al., 2006), also reported that change in parental roles is an important aspect behind parental stress in NICU settings. Alkozei et al., (2014) obtained similar results in a group of American mothers who were nursing babies in an open bay NICU.

The findings of this study were not in agreement with findings of studies conducted by Musabirema et al., (2017) and Umasankar et al., (2016) who reported low levels of stress (mean, 2.3 and 2.9 respectively) in the subscale of parent infant relationship. Umusankar et al., (2016) results can be attributed to most of the respondents in their study spent less than seven days in the NICU

and did not experience the disruption of parental role for a longer period. The parents who participate in the care of their babies and have unlimited access to NICU have been reported to have experienced low stress levels due to parental role alteration.

Regarding parental role alteration, it is well documented that the use of best practices related to Family Centred Care on involvement of parents in the care of their sick infant in NICU results in reduced stress levels. Majority of respondents in the current study could have experienced high stress levels on parental relationship because of restricted access to the Unit, visiting is only allowed two to three hourly in 24 hours. The restriction of access to NICU does not conform to the FCC principles which advocate for a non-restrictive access to the Unit. Interaction between parents and their infants is regarded as a crucial activity that has a significant impact on stress alleviation. Phillips and Tooley, (2005) documented that a source of stress for mothers is the distress mothers often feel when they are separated from their babies and therefore do not see, touch, or are not in close proximity of their babies.

Without any support to cope with stress, it may lead to inadequate bonding, feeling of being unskilled to take care of their infant among mothers (Heidari et al., 2012). The challenge of not knowing how to take care of their child increases after discharge as the baby is abruptly handed over to the mother. In most of these instances, the chances of readmission increase. Busse et al., (2016) emphasised that the consequences of NICU stress continues after discharge and it compromises mother infant bonding. A study conducted by Pineda et al., (2017)

emphasizes that when parents stay longer at the bedside they develop a healthier parenting relationship with their babies which is also necessary for continuity of care after discharge.

In addition, the current study revealed that among other stressful items of the parent infant relationship, majority (70%) of the respondents indicated that inability to feed the child on their own was very stressful. As indicated earlier, mothers who breastfed their babies had significantly lower stress levels as compared to mothers who did not. Findings of the current study are consistent with Chourasia et al., (2013) where parents who were unable to feed their babies experienced higher stress levels. Foligno et al., (2020) stated that the anxiety and fear that mothers experience during hospitalisation could influence the success of breastfeeding. Lau et al., (2007) further indicated that involving mothers in the care of their babies in the Unit has a positive influence on the lactation process by increasing the amount of milk production. Therefore, separation of mother and baby immediately after delivery compounds on establishment and sustenance of breastfeeding. Therefore, understanding possible factors associated with parental stress is a fundamental principle for providing support and quality care that responds to the parents' needs in such a way that it reduces stress and anxiety in a NICU. Support in NICU could be mutual from fellow parents, from the family members and from the health workers and all forms of support are positive influences in reducing parental stress.

In relation to family support, the findings of this study revealed that other than the father of the admitted infant other family members are not allowed to visit in NICU.

Lack of family support may be very challenging to the first time mothers who may need support and guidance to breastfeed correctly. While breastfeeding is not considered a learned act but a natural act, first time mothers may require guidance and support from nurses and the family to establish and sustain appropriate breastfeeding practices (WHO, 2017). Ranch et al., (2019) asserted that support for breastfeeding is very essential as it is not unusual for problems to occur especially for first time mothers. Maternal role attainment occurs in the microsystem, the family has a major role to play in guiding the mother and offering social support on any challenges in performing maternal role (Mercer, 2004). Similarly, Moghaddam et al., (2017) reported that participants in their study expressed that their mothers and spouses were a strong support in developing maternal role and coping with challenges of being a mother. In another study by Williams et al., (2018) similar findings were reported that mothers found social support to have a positive effect on adaptation to the role of motherhood. The family support is an important aspect of care during the time of admission the same way it is emphasized for mothers whose babies do not require admission at birth. Those nursing babies in NICU require professional support from health care workers on care and feeding the baby. Weis et al., (2014), Butt et al., (2013) and William et al., (2018) indicated that healthcare professionals have an important role to play in supporting parents during their infant's hospitalisation. Abdeyazdan et al., (2014) also reported that nursing support can help parents manage their crisis better.

Regarding physical proximity, not being able to hold their babies when the mother wanted was one of the very stressful item of parent infant relationship in the

current study. Most of the respondents (67%) rated this item as being very stressful. Similarly, Mansson et al., (2019) reported that parents were more stressed when they were not able to hold their babies and provide care. Failure to hold and provide care to their babies makes parents feel their role has been relegated to spectators while medical staff take the centre stage (Alkozei et al., 2014). Similar results were reported Flacking et al., (2013) among mothers of premature infants who often felt alienated from their infants during their NICU admission and often felt that staff were closer to their babies than they were. The inability for mothers to have skin to skin contact with their babies may affect the mother-baby bonding and may in some instances lead to abandonment of babies or poor relationships in future. Payne et al., (2016) emphasized the importance of bonding which is being advocated recently through the Kangaroo Mother Care (KMC). Kangaroo Mother Care is a skin to skin contact between mother and baby which does not only promote bonding but also stabilises baby's temperature, breathing and heart rate and also helps the baby to gain weight. The proximity achieved by KMC reduces the stress the mothers experience and worry that something bad might happen to the baby in their absence. In addition, other authors (Turner et al., 2015; Skene et al., 2015; Abdeyazdan et al., 2014), documented that parental involvement in the care of their babies is important as it facilitates bonding and also reduces parental stress.

While major sources of stress may vary, the common thread in most studies indicated that parental role alteration is the prime cause of stress among the mothers nursing babies in NICU. Contrary to these studies, Varma et al., (2019) and Umasankar and Sathiadas, (2016) indicated that the prime source of stress

was the sights and sounds in NICU. Musabirema et al., (2017) was not in agreement with the current study, the most stressful aspect among the mothers interviewed in the study was infant appearance and behaviour. Shaw et al., (2006) explored the influence of psychological distress amongst parents of infants in a NICU and found a strong correlation between severe acute stress disorder and parental role alteration. Nonetheless all the studies reported that parents experience stress due to parental role though levels of stress range from mild to severe. The differences in the level of stress recorded due to parental role alteration between the present study and previous studies can be attributed to individual differences in lay out of NICU and level of involvement in care of their babies. However, all studies reported that parents experienced stress as they were all subjected to parenting in unfamiliar environment. Turner et al., (2014) asserted that identifying the aspects of NICU environment that can cause stress among parents may be useful in facilitating nurses to understand their roles in stress alleviation. Awareness of nursing roles in stress alleviation will, therefore, facilitate implementation of interventions that may reduce stress due to parental role alteration and facilitation of mother baby bonding. Stube et al., (2016) compared stress levels at admission and discharge and statistical difference was found on parental role. Therefore, future studies are recommended to assess stress due to parental role alteration at different levels as stress levels tend to change on admission and discharge.

#### **5.4.3.4 Staff Behaviour**

The staff behaviour subscale measured aspects of information sharing in NICU. This included how information is given, how much of the information staff share

with parents, staff looking worried about the baby and acting like they did not want parents around the NICU. The staff behaviour was least stressful among the four subscales that measured NICU environmental stressors. The mothers reported low levels of stress (median 2:00) due to staff behaviour subscale. The findings of the study corroborate with the findings of studies conducted by (Dubek-shriber, 2004; Carter et al., 2007; Musabirema et al., 2017; Umasankar et al., 2016) who reported that low levels of stress due to staff behaviour in NICU. In addition, Varma et al., (2019) also reported low levels of stress in the area of staff behaviour compared to other subscales that were in moderate and high stress categories. However, Alfonso et al., (1992) was of the view that low levels of stress have been recorded on staff behaviour because parents found it difficult to honestly appraise staff at the time their infant is sick and under their care. Varma et al., (2019) also attributed the low levels of stress to parents giving a socially desirable response on the questions that assessed staff behaviour because they were interviewed by a staff nurse.

Contrary to findings of the current study, Umasankar and Sathiadas, (2016) reported high stress levels due to staff behaviour which were attributed to the duration of stay in NICU. Their study revealed that the occurrence of stress tends to increase for the parents who stay longer in NICU. Similarly, a study conducted by Magliyah and Muhamamd's, (2015) revealed high stress levels in parents because nurses did not allow them to be involved in the care of their infants. In addition, results from a study by Williams et al., (2018) found that mothers perceived bedside manners of staff to be stressful. In agreement to finding of authors who reported high stress levels of stress due to staff behaviour, Linda

and Trudi, (2012) attributed the stress the parents were experiencing to inconsistencies in staff behaviour contributed to high stress levels. The lack of involvement of parents in care of their neonates led to high levels of stress associated with parents not understanding their baby's condition (Magliyah and Muhamamd's 2015). Similar conclusions were drawn from a study by Sikorova and Kucova, (2012) who indicated that there is a direct linear relationship between mother's perception of stress on Parent Infant relationship and staff behaviour. However, in the current study, such a relationship was not demonstrated. The mothers reported high levels of stress in the area of parental role despite the positive staff behaviour. Based on the reasons brought forward by other authors that mothers could not assess the staff objectively when their babies are still under their care, further research to assess staff behaviour at is recommended for comparison of the results.

In addition, the staff behaviour subscale also assessed an item on information sharing between nurses and mothers. A study by Hatupopi et al., (2020) explained that information sharing includes provision of advice, suggestions and any sharing that mothers could use to address their problems related to NICU admission. In the current study, most of the mothers (66%) indicated that they were not given adequate information on either diagnosis or prognosis of their admitted neonate. This result corroborates with the findings of the study conducted by Kampekete et al., (2018) which found that half of the respondents did not receive information from nurses and among the other half of respondents who received only 65% received adequate information. About 32% of mothers in the current study reported high stress levels concerning difficulties in obtaining

information when they visited NICU. Similar results were reported in a study conducted by Charchuk and Simpson, (2005). Their study revealed that the parents of infants admitted to the NICU face challenges on accessing to information, disclosure about the diagnosis, and treatment and prognosis of their new-borns.

According to Stacey et al., (2015), and Harvey, (2010) when parents are not provided with communication and information about the needs, care, and physical appearance of their infants, their stress levels increase tremendously. The inadequate information sharing that was reported in this study could be attributed to the work overload among the staff in NICU which leaves them with less time to engage all the parents. The findings of this study are not in agreement with findings of the study by Hatupopi et al., (2020) which reported that nurses paid attention to the parents and they took time to inform them in all the dimensions of care that was given to their neonates. In their study, they further indicated that to relieve stress among the parents, the manner in which nurses informed the parents should promote mother-baby bonding. The nursing staff are key in information sharing as most mothers depend on them for information and support.

The findings of the current study revealed that mothers would always inquire more from the nurses about their child's prognosis than they would do with other health care providers. Similar conclusion was drawn by other authors who documented that families prefer to seek information from the nurses because they are approachable (Kegler et al., 2019; Wong et al., 2015). Wong et al., (2015)

indicated that during the process of information sharing in NICU, nurses are often the channel between the family and other health workers. Therefore, poor communication between the nurses and those mothers who seek information may increase their stress. An essential component of neonatal care is open and clear communication among parents and healthcare providers as it results in stress reduction (Mc Grath, 2012; Jones et al., 2007). Parents who do not understand their babies' condition experience more stress, it is only through effective communication that the parents can understand the diagnosis and treatment procedures (Magliyah and Muhamamd et al., 2015; Jones et al., 2007). The FCC model that guided this study emphasizes that open communication and information sharing to all parents with babies admitted in NICU reduces maternal stress and enhances their role in the care of their babies.

The findings of the current study revealed that among all health care providers working in NICU, nurses were on the ward throughout the day and were responsible for the majority of everyday care provision to infants. Similarly, Unesi et al., (2017) in their study, stated that nurses play a very essential role in supporting mothers and alleviating their stress because of their constant presence in NICU. Lee et al., (2009) also indicated that nurses are advocates for their patients and play important roles in educating and supporting mothers for infant care. In agreement to other authors, Heidari et al., (2013) asserted that nurses can be of great help in decreasing parental stress by ensuring effective communication. The nursing staff can only be of help to the parents if they understand their role in supporting parents to cope with parenting in a strange NICU environment. However, an earlier study by Bruce and Ritchie, (1997) found

that nurses do not view the needs of the family as their responsibility. This finding is consistent with Trajkovski et al., (2012) who found that the nurses' main concern in NICU was the health of each neonate despite noting that taking care of families was also important. In addition, McGrath et al., (2012) found that nurses' lack of awareness of their role in supporting parents with infants admitted to NICU was attributed to lack of knowledge on FCC model. The FCC principles that have been adopted by most NICUs can only be implemented if the health care staff are knowledgeable and willing to support mothers.

## **5.5 General stress in NICU**

The mothers in this study were asked to rate how stressful the whole experience of being hospitalised was to them. This study has revealed that majority of the respondents experienced severe stress arising from having their babies admitted to NICU. In agreement to the findings of this study are results of the studies conducted by Busse et al., (2013) and Turan et al., (2008) who documented high average intensity of stress among parents. The findings of studies by Dudek-Shriber, (2004) and Carter et al., (2007) found different conclusions, their results reported overall stress in the range of mild to moderate levels. Mothers in the current study reported high stress levels from the experience of having their babies admitted to the NICU. The results by Turner et al., (2015), similarly reported low levels of stress on the general stress in NICU.

The results of the current study have demonstrated the stressors mothers experienced in the WNH NICU. The results are either in agreement or contrary to previous studies. Similar results were reported by authors (Musaberima et al., 2015; Carter et al., 2007; Dudek-Shriber, 2004; Lau et al., 2007; Preyde & Ardal 2003; Shaw et al., 2006) who found that the most stressful aspects of having an infant in the NICU is altered parent role and relationship with their baby. The low levels of stress in area of the NICU's physical environment in the current study was also documented in earlier studies (Kegler et al., 2019; Turner et al., 2015). The stress caused by the environmental factor (sight and sound component in the PSS: NICU) was unexpectedly low in our study. Most studies that reported low levels of stress due to environmental factor attributed it to orientation of mothers to NICU before admission which is not the case with mothers in the current study. The finding of a study by Heidari et al., (2017) indicated that the equipment in NICU would also be assurance of good care among the mothers. In addition, their earlier study (Heidari et al., 2013) reported that with the introduction of advanced technology in NICU and increase in scientific knowledge the chances of survival for premature babies has improved. This indicates that it is not only knowledge of the NICU that reduces stress but also reassurance that the technology and the equipment which is connected to the baby are for the child's benefit. Knowledge of benefits may make the mothers more comfortable and stress caused by the intensity of the environment may reduce. Consequently, it may also be effective in reducing the overall stress of the mothers.

The subscales that were found to be mild or moderately stressful to mothers are still important in our intervention as the goal is to alleviate stress for better maternal and neonatal outcomes in NICU. Assel et al., (2002) concluded that parental stress, even at low levels, has been shown to disturb the relationships of parents with their healthy infants. This finding is consistent with what other researchers documented on stress being one of the most common barriers to effective parenting and yet one of the most important predictors of the developmental outcome of the infant (Umasankar et al., 2016; Hall et al., 2015; Hildingsson & Thomas, 2014 and Shaw et al., 2006). In addition, the distress that these parents experience has been noted to influence their parenting behaviour (Lefkowitz, Baxt & Evans, 2010) and can affect the long-term relationship with their children and their ability to take care of them.

## **5.6 Nurses' perception of stressors in NICU**

The current study had two data sets, in the previous section, the findings of the data that were obtained quantitatively from the mothers have been discussed. The data that was obtained qualitatively from the nurses as earlier on mentioned will be discussed in this section.

### **5.6.1 NICU Environment**

The nurses perceived that sights and sounds were more stressful to the mothers because of the presence of unfamiliar machines and equipment in the ward. The perceived high stress due to sights and sounds as reported by the nurses, was

also demonstrated by other previous studies which reported that the NICU technological environment creates an intimidating atmosphere and mothers report that they often feel overwhelmed and stressed (Turan et al., 2008; Johnson 2016; Wigert et al., 2009; O'brien & Warren, 2014; Musabirema, 2015; Umasankar et al., 2016). The nurses could also have rated sights and sounds subscale as a stressor probably because of the lay out of the Unit. The WNH Unit is an open bay without private room exposing mothers to all the equipment and other sick babies who are admitted in the ward. A NICU with private rooms exposes parents to only equipment and machines that are necessary for the care of their neonates. Contrary to the findings reported, other authors are of the view that advanced technology in the Unit is an assurance to the mothers of increased survival rates (Heidari et al., 2013; William et al., 2018). Therefore, mothers who see technology as an assurance for better outcomes do not experience stress associated to sights and sounds. Parents need to be educated on the function of the equipment in the Unit for them to appreciate them. Muhamamd and Magliyah, (2015) study indicated that with nursing support in NICU, the stress experienced by families reduces.

### **5.6.2 Standard Operating Procedures**

In the WNH, mothers were expected to visit the NICU to feed their babies three or two hourly, nurses indicated that it was not easy to get them out of the Unit when visiting time was over. Mothers would hesitate and mostly turn back if the baby cried as they walked out. The rule on visiting time to the Unit could be frustrating mothers as it interfered with their ability to care for or spend time with their babies. In the current study, the nurses indicated that rules and regulations

in the NICU and the manner in which they were enforced by nursing staff were stressors to the mothers. It came to light from the nurses' response that this rule was not being uniformly enforced, therefore, leading to confusion amongst mothers. Despite the clear guideline on the visiting times, the nurses could allow mothers to visit more often at their discretion. Therefore, nurses indicated that these rules and regulations and the way of enforcement would be sources of stress mothers experience. This result of the current study corresponds with documentation by Griffin et al., (2013) who indicated that acts of implementing rules differently in NICU may lead to reports of 'good nurses' and 'bad nurses' which may compromise the therapeutic relationship between nurses and mothers. In addition, Baird et al., (2015) reported similar results that unit rules were a significant source of contention between parents and nurses. Respectful and empathetic rule enforcement by nurses in the NICU has the potential to create a more positive environment and, in turn, reduces stress levels among mothers (Williams et al., 2018). When rules are not uniformly enforced it highlights the need for in-service training of nurses on awareness, therapeutic relationship and empathy in order to facilitate a less stressful care environment for mothers and their medically fragile infants in the NICU (Williams et al., 2018).

In addition to the rules to be adhered to in NICU, the current study revealed that the infrastructure was not adequate since the Unit had no bathrooms for the mothers to use. Bathrooms for mothers who are in early puerperium are very important for them to change sanitary pads and empty their bladder frequently. The nurses indicated that the absence of bathroom contributed to the stress the mothers were experiencing when they visited the unit. These findings suggest

that the physical environment, including rules and regulations of the NICU, should be reconsidered with maternal comfort in mind in addition to the clinical care of the infant.

### **5.6.3 Maternal Infant Relationship**

Regarding maternal infant relationship, previous research indicates that maternal involvement in the care of the baby during NICU admission is linked to positive outcome to both mother and baby (Klawetter et al., 2019). Hospitalisation of infants in NICU implies that a mother finds herself in an extraordinary life situation in which maternal role begins and evolves in a medically focussed context (Sheeran et al., 2015). The nurses interviewed in this study indicated that mothers are separated from their babies and are only allowed in the Unit at visiting times. The mothers of premature babies avoid to touch and even feed their babies because they are too small. This finding is consistent with previous studies that studied stressors among mothers of premature babies. The study by Byiringori et al., (2020) reported that mother who had a baby weighing 1.2kg felt anxious and hopeless because the baby was too small. Similarly, Stube et al., (2018) indicated that parents of premature babies feel guilty, fear and experience anxiety. In addition, Contim et al., (2017) reported that negative feeling felt by parents, favour stress and anxiety that compromise effective relationship between parents and the baby.

The family centred care model advocates for mothers to be empowered with enough information to help them understand and care for their babies. Empowering mothers with information on characteristics of a premature baby may be helpful in reducing stress due to infant behaviour and appearance. Well informed mothers may respond positively when they experience cessation of breathing temporarily in their babies. In the current study nurses noted that most mothers could not even interpret some behaviours noted on their babies. Fits in a baby were mostly mistaken for playing and they would not report to the nursing staff. This result indicates that the mothers are not explained on the danger signs that need attention by the medical personnel.

#### **5.6.4 Communication**

Effective communication can assist mothers gain confidence in caring for their babies admitted to NICU and consequently mother baby bonding is achieved. In the current study the nurses indicated that they were not able to share information with the mothers because of the work overload. This finding is in line with results of the study by Chourasia et al., (2013) which highlighted that the NICU is a very busy place such that it may be difficult for the health personnel to find time to focus on maternal stressors and give appropriate counselling to alleviate stress. Nonetheless, Stacey et al., (2015) reported that failure to communicate to the parents by nurses causes anxiety and stress. In the same vain Ashwani et al., (2017) documented that if the staff are unable to respond to what parents expected or their information needs, they may have a negative view of NICU admission. Lau et al., (2007) cited that majority of the parents seek information and reassurance on their infants' condition from the medical staff. May and Hu,

(2000) indicated that mothers experience less stress and are more confident about treatment if they have a better understanding. When open communication between mothers and staff is maintained, the maternal role development is achieved as mothers may take part in caring of their babies with confidence. Communication between parents and NICU staff is an essential part of the support offered to parents and can reduce emotional stress (Wigert et al., 2014).

### **5.6.5 Staff Behaviour**

Staff behaviour was one of the major themes that emerged in this study as a stressor to mothers. The nursing staff are expected to develop a therapeutic relationship with the mothers which is based on open communication. However, in the current study, nurses reported that they were uncomfortable to perform nursing procedures like cannulation and resuscitation in presence of mothers. The nurses attributed their discomfort to lack of understanding of medical procedures by mothers who, in turn, felt nurses were inflicting pain on their babies and thought resuscitation could cause death of the baby. Having a baby admitted in NICU may make mothers to feel they have lost their ability to protect their babies. Heidari et al., (2015) reported similar findings where parents indicated that watching their new-born undergo painful medical procedures was one of the most stressful experiences whose memories remained vivid long after discharge.

In addition, Turan et al., (2008) indicated that as a primary caregiver loss of control among mothers brings a sense of defeat and hopelessness. This study revealed that nurses were of the view that their main concern was to take care of

the neonates and not their mothers. The exclusion of parents in care of their babies may lead to mistrust as parents may not be preview to all medical decisions on their babies. The failure to develop a trusting relationship between nurses and mothers reported in this study could be attributed to nurses' lack of awareness on their role in collaborating with families so they tend to concentrate on the neonate's health. On the other hand, Ahern, (2013) reported that evidence from neonatal settings has shown that nurses feel inadequately prepared educationally and emotionally for the role of collaborating with parents. The nurses may understand the importance of sharing information with parents in an honest manner but may find it difficult to do while giving hope to the family.

### **5.7 Triangulation of Data Sources**

Triangulation is used when more than one approach is applied in research to answer a question. The objective of triangulation is to increase confidence in the findings through the conformation of a proposition in using one or more independent measures (Haele and Forbes, 2013). Triangulation may be the use of multiple theories, data sources, method or investigations within a single phenomenon (Haele and Forbes, 2013). In the current study two separate data sources were collected from the mothers and the nurses on the NICU environmental stressors. The two data sets were very important for the phase two of this study which involved developing a stress alleviation model to be used by nurses to reduce stress experienced by mothers of babies admitted to NICU. To obtain the data, this study used both the structured and unstructured questionnaires. Questionnaires and interviews were used to gain a more

comprehensive and in depth understanding of stressors in NICU from mothers and nurses' perceptions. Through these two data sources the findings of this study has discovered both convergence and divergence perceptions on NICU stressors.

The findings of this study has revealed that admission of an infant to NICU is stressful to the mothers as reported by other researchers and the theoretical framework that guided this study. The current study has documented a statistically significant association between birth weight, type of feeding the infant and maternal stress. Though some maternal and infant characteristics were not statistically significant, when these characteristics exist together, the chances of a mother experiencing stress increase. The predictive margins are very important for our interventions as mothers with babies admitted to NICU may be more likely to be stressed if some variables exist in combinations. The mothers reported high levels of stress due to parent infant relationship, moderate levels of stress due to infant appearance and low levels of stress due to sights and sounds and staff behaviour with the lowest levels. Mothers who are stressed need to be identified and helped to alley the anxiety and stress in NICU. On the other hand, the nurses sampled identified that the mothers were stressed due to the NICU environment thus the machines, equipment and sounds, maternal infant relationship, standard operating rules, staff behaviour and communication.

It is evident in this study that in some instances the nurses' perceived NICU stressors were different from what the mothers indicated as stressors. This is in agreement with the previous studies that have shown that mothers and nurses

have different opinions about what is stressful to mothers (Mundy, 2010; Sikorova & Kucova, 2012). The hospital environment is unfamiliar and parents are dependent on doctors and nurses to be able to cope with their situation (Wigert et al., 2013). When members of staff are not aware of what stresses the mothers their efforts are directed on issues that mothers do not consider stressful. A finding which was very important in the model development, nurses will need to be empowered with knowledge of the identified stressors and how to screen women for postnatal depression. Nurses will then be able to identify and intervene appropriately to reduce stress experienced by mothers in NICU.

The results of this study revealed higher stress levels on parent- infant relationship subscale which was complemented with what was reported from the nurses' sample. The most stressful item of parent infant relationship was the separation of mothers from their babies. In agreement with mothers, the nurses working in NICU were also of the view that separating mothers from their babies was one of the stressors. In addition, the results reflected a statistical significant relationship between birth weight and stress and equally nurses perceived it as a stressor. On a contrary, the least reported stressors in the maternal group was staff behaviour and sights and sounds however, the nursing sample perceived them as maternal stressors. In addition, the nurses' perception of communication as a cause of maternal stress also differed from those reported by the mothers.

Therefore, these findings from the two data sets highlights the need for increased awareness by nurses in both the technological and emotional environment of the NICU. The findings further reveal that the FCC model of care is not being

implemented. The FCC model is based on principles of communication and respect between the health care providers and mothers (Ramezani et al., 2013). The FCC prepares parents for their parenting roles in a strange and unfamiliar environment of the NICU. Despite having identified some of the challenges mothers were facing in NICU, formal strategies are not available to help the mothers cope with their fears. The current study has, therefore, proposed strategies based on identified stressors and evidence from literature for alleviating stress experienced by the mothers.

## CHAPTER 6

### CONCLUSION, IMPLICATIONS AND RECOMMENDATIONS

#### 6.1 Conclusion

The results obtained in the current study allow the conclusion that mothers of babies admitted in NICU suffer significantly high levels of stress. Among the NICU environmental stressors, the main sources were infant appearance and behaviour and parental-infant relationship. On the parent-infant relationship subscale the most stressful items were mothers being separated from their infants and not being able to participate in the care of their babies. In addition, mothers experienced mild levels of stress due to sights and sounds and staff behaviour in NICU.

The study has further concluded that situational factors are associated with high levels of stress experienced by mothers in NICU. The situational factors related to high stress levels in the mothers include type of feeding and birth weight of neonate. With regard to breastfeeding, previous studies documented that culturally, a mother is expected to breastfeed their babies. Similarly, teaching in the health facilities emphasize on exclusive breastfeeding for neonates and recognition of failure to breastfeed by a baby as a danger sign which requires urgent medical attention. The current study concludes that having a baby who was able to breastfeed reduced stress in mothers. Further, the conclusion was drawn that birth weight is statistically associated with maternal stress in NICU.

This study demonstrated that gestational age and duration of stay in NICU had no statistical significant association with maternal stress after controlling for confounders in the model.

Predictive margins further revealed that the probability of stress in a mother with a baby whose birth weight was 500 grams and had been in NICU for more than seven days was higher than one who had a baby with 5000 grams but same duration of stay in the unit. Similarly, the mothers who were referred to UTH, Women and New-born hospital after delivery for admission and spent more than seven days in NICU had a higher chance of stress than their counterparts who delivered within UTH WNH. This study has, therefore, drawn a conclusion which is consistent with other studies that the type of feeding of the neonate may increase or reduce stress experienced by mothers in NICU. Though not consistent with the findings in the model that guided this study where severity of illness of the infant was associated with stress on situational factors. This study has also demonstrated that situational factors may influence the stress experienced by mothers and added to the stress factors that were identified by Wereszczak et al., (1997) through the identification of type of feeding and birth weight.

On the other hand, the study concludes that the nurses' perceived stressors among the mothers include NICU environment, Maternal infant relationship, infant appearance and behaviour, information sharing and also standard operating procedures in NICU. This conclusion was made by other previous authors that mothers tend to be stressed by rules and regulations that limit access

to NICU. The stress in previous studies was attributed to the way the rules were enforced in NICU was not uniform and created a feeling of favouritism in mothers. Therefore, the study concludes that the nurses working in NICU had unclear standard operating procedures. Contradicting responses were noted among the nurses on information sharing with the mothers and visiting time to NICU. Some nurses indicated that all mothers were given information by the Medical Officers on admission and on subsequent days while others indicated that only those who enquired were given information. On visiting hours to NICU some nurses indicated that they strictly followed the two and three hour prescribed visiting time while others indicated that mothers who had critically ill babies were allowed more frequently. Therefore, this study concludes that nurses working in NICU lack of understanding of their supporting roles to their mothers. The nurses were of the view that their job ends at caring for the admitted baby and they had nothing to do with the mothers. This left the mothers with anxiety as they were nursing their babies in a highly technical and unfamiliar environment.

In addition, from results obtained in this study a conclusion is drawn that family centred care principles were not being implemented in the NICU. The parents are excluded from caring for the babies, only mothers are allowed at prescribed times and fathers are only allowed once at visiting time. The other family members who are a source of social support to the mothers were not allowed to visit in the NICU. Most of the mothers were not given information on the treatment and diagnosis of their babies, which entails that they did not participate in the decision making on treatment modalities of their babies. The caring role of the mothers was limited to feeding and changing diapers when they could have been allowed to do much

more under the supervision from the nurses. The FCC which is now considered as a gold standard in NICU care advocates for a family approach in care giving. The family approach is advocated for because the family is constant in the child's life, while the time in the NICU is temporal. Family centred care model emphasizes on the following principles; parent and professional collaboration in the care, information sharing, dignity and respect and equal family participation in the care. The individuality of families, their strengths and different patterns of coping should also be put in consideration.

Developing a culture to promote comprehensive family support in the NICU is of benefit to both babies and parents, and NICU staff. There is much that can be done to minimise the stress mothers experience during NICU admission, and many ways to improve care so that families feel optimally supported and empowered. Supporting mothers in NICU has the potential to improve their functioning while they are in the NICU and after discharge, enhance their bonds of attachment with their baby and improve their child's ultimate outcome. Loving, positive interactions with parents or emotionally-involved primary caregivers improves physical, cognitive and emotional development of babies. Providing psychosocial support to mothers in the NICU should not be considered an optional activity, but should be the foundation upon which NICU staff provide excellent nursing care.

It is asserted that the current study has made three main contributions to NICU care at WNH NICU. This study has created a new knowledge base of stressors

in NICU at WNH of the UTH based on the mothers' and nurses' perspective. It has also highlighted the importance of the family centred care in NICU as its implementation may eliminate most of the identified stressors. In addition, it has developed and proposed a model for stress alleviation. The conclusions of the study have further advanced the findings of Wereszckak et al., (1997) model on NICU stressors.

## **6.2 Strength of the Study**

The large sample of 280 that was drawn for this study can be contended to be representative of the study population. The respondents of the quantitative part were randomly selected and all the mothers who met the inclusion and approached consented to participate. If others had declined to participate it could have been assumed that they could have had different characteristics with those who consented. A large sample size gave a representative number and the sample included women from different cultural backgrounds, economic and educational status. Therefore, this sample provided sufficient power to detect statistically significant associations.

The Women and New-born Hospital of the UTH where the study was conducted is a national referral hospital that caters for infants in either low, medium and high dependency categories. This study was planned to exclude mothers with babies with severe congenital abnormalities whose chances of extra uterine survival was not guaranteed. It is noteworthy, that at the time of the study no such a baby existed so basically all the mothers present during data collection were eligible to

participate. The presentation was therefore a diverse of range of neonates admitted unlike some previous studies that concentrated only on premature babies.

The qualitative part was conducted among nurses who were purposively selected using variation sample selection. This enabled equal representation of nurses with different professional qualifications and those who had gained the necessary experience in NICU. The interviews were done by the researcher who is not part of the staff in NICU or the hospital, the respondents were free to give their responses without fear of victimisation.

In addition, the study used a PSS: NICU tool to measure stress in NICU. This is a tool that has been tested and found reliable and valid to measure stress in NICU. Since the tool was being used for the first time in Zambia, a Cronbach's alpha Coefficient test was done on all items measured by this tool. A Cronbach's alpha coefficient of 0.91 – 0.93 in this current study on all items has proved that all items measured were fit to be included in the analysis. The study has therefore demonstrated that the internal consistency of Zambian adaptation of the PSS: NICU was high. The values of the Cronbach alpha allow for application of the tool in empirical research.

Additional data analysis included post hoc comparison tests, test for normality, categorisation of stress into three (Low, Moderate, High), logistic regression and predictive margins which provided more valuable data required for intervention. The mothers were interviewed by nurse graduates who understood the medical

concepts used in the questionnaire and they could clarify issues the mothers could not understand. The interviewers were not staff in the NICU which increased the level of confidentiality of the information and dispelled all fears of victimisation.

The Zambian model of stress alleviation developed in this study was designed with full participation of the nursing staff and nurse leaders in NICU. This enabled incorporation of evidence based knowledge. Further the model was developed from empirical evidence obtained from the Zambian mothers and Nurses during the study. The model also incorporated the already existing evidence from previous studies.

### **6.3 Limitations of the Study**

This study was not without limitations. Generalisability of the findings may have been limited by nature of the study being conducted at one public hospital and in the NICU which is open space and has no room for the mothers. Therefore, the findings of this study cannot be generalised to other NICUs and those with a different physical set up.

Another limitation that need to be considered when assessing the model is while the aim of this thesis was to develop a model for stress alleviation for the mothers admitted to Neonatal Intensive Care Unit for the first time, the interventions were created together with the staff and relies on the viewpoint of the staff working in NICU. While mothers' perspective of stressors considered and the model aims to

support mothers though they were not consulted when creating the intervention. Thus some details mothers find important might have been overlooked. Still, it could be argued that the staff had an insight of what kind of information mothers need and want, and what is important for them to know of the everyday functioning of the unit from the results of phase I of the study.

The study also did not have a comparison group, women who had new-born infants not admitted to NICU would have enabled assessment of stress from having an infant cared for in the NICU to be distinguished from the stress of having a new-born. However, the tool which was used to measure stress was specific to NICU and would not have been applicable to those who were not admitted to NICU.

The present study used a cross-sectional study design, whereby the questionnaires were administered to parents at one point in time: from 24 hours after admission of their infant in NICU. A longitudinal design would have demonstrated the levels of stress experienced by the mothers overtime. Therefore, mothers' stress levels at different times of admission were not measured and could not be distinguished from stress levels at admission, at other times during admission and at discharge. However, mothers who represented different durations of stay in the NICU, the range of stay was between one day to 90 days in NICU in the current study were sampled. A comparison could be made to determine whether duration of stay influenced maternal stress. Nonetheless a longitudinal study would have shown if the same mother had different levels of stress at different times during admission in NICU.

This study did not include fathers to the admitted infant thereby limiting the application of the model to all parents. Previous studies have demonstrated different stressors and stress levels between mothers and fathers. A future study is therefore recommended to determine stressors and levels of stress among the fathers. A further modification can then be made to the model, to ensure that it encompasses all parents.

The other limitation of this study involves the model which was not reviewed by the mothers to confirm if it represented their support needs. The model took into consideration the stressors as indicated by parents but the strategies were developed in conjunction with the care givers. Thus some details parents find important might have been missed. However, the strategies were developed with participation of nursing staff who are primary care givers and required to render support to mothers. Previous evidence demonstrate that Nurse led patient education have been an effective intervention strategy in NICU to reduce maternal stress. The model can still be modified at implementation stage and those issues that could have been missed still can be added at that stage.

#### **6.4 Implications of the Findings**

The key programmatic implications of the study findings are discussed in categories which include: Nursing practice, Nursing education, Research and Policy.

#### **6.4.1 Implications to Policy**

The hospital policy of separating mothers from their babies during admission and visiting are contributing significantly to stress experienced by mothers in NICU. The mother-baby bonding is disrupted because of the separation of mothers from the babies, and yet increasing access and proximity with the infant promotes interactions and bonding. The rules and regulations in the NICU should be revised to ensure that mothers have access to the Unit most of the time. There is also need to include other family members to those allowed to visit babies in NICU.

#### **6.4.2 Implications to Nursing practice**

Nurses working in NICU are unaware of their role of care and support to mothers whose babies are admitted to NICU. High levels of stress due to parental role alteration require clinical attention targeted at preparing and supporting mothers to caring in the unfamiliar NICU environment. Therefore, Mothers need support from nurses to comfortably care for their babies in a highly technological and intimidating environment. However, Nurses have different perceptions of stressors in the NICU with mothers who they are supposed to help to relieve stress by targeting care on the stressors. Hence, Nurses need to increase their knowledge about the NICU environmental stressors for mothers of the infants admitted to NICU in order to provide support and alleviate stress. Not all nurses working in the Unit were able to identify the mothers who needed support

emotionally, informational and financially. Formal assessment for anxiety and depression in the NICU would standardise the care given by nurses.

### **6.4.3 Implications to Nursing Education**

The findings of the current study have revealed a knowledge gap in both nurses and mothers. Therefore, the importance of educational support by nurses to help the mothers understand why their babies appear and behaves in certain ways should be emphasized to relieve stress due to infant appearance. In addition, the nurses' lack of awareness of their collaborative role with families of babies admitted to the Unit is related to lack of knowledge about FCC. The information regarding family centred care model enhances the nurses' understanding of their role in supporting mothers with babies admitted to NICU. Thus implying the need for the nurse training institutions to include information on FCC, maternal stress in NICU and importance of evaluating women for postnatal depression on admission in the curriculum.

### **6.4.4 Implications to Research**

The findings of the current study revealed scarcity of local research on NICU environmental stressors and associated factors among the mothers nursing babies in NICU. This limited comparison with previous studies conducted in the local context as most literature reviewed were from developed countries. Therefore, the findings of this study have provided baseline data on NICU stress factors that need to be developed further. In addition, developed model needs to

be implemented and modified further as the stressors evolve. Nurses equally need some technical support to implement evidence based practices in the care of babies and mothers in NICU. Future research should also assess the stress levels and factors among the fathers of the babies admitted to NICU.

## **6.5 Recommendations**

The recommendations made from the current study are based on evidence from the conclusions made. Therefore, the recommendations are directed to the major stakeholders in policy directions and management of neonates admitted to NICU.

### **6.5.1 Recommendations to Ministry of Health**

The current study has indicated that the rules and regulations of the NICU contribute largely to the stressors that have been identified in this study. These include; limited access to the Unit, proximity of mothers to their babies and communication among mothers and nurses. It is necessary for the management at the Women and New-born Hospital to advocate for the adoption of the new policies regarding the presence of mothers in NICU. Clear policies and guidelines, for visiting in NICU would help the mothers and nurses work collaboratively. It was revealed in this study that the nurses implemented the visiting rule differently as some would consider the condition of the baby while others just considered birth weight in determining frequency of visitation. There is need to also incorporate the clinical condition of the baby in the criteria to determine the frequency of visiting unlike just looking at birth weight. Those mothers who are nursing critically ill babies may be allowed to visit more often.

Reconsidering the rules and policies of the unit to incorporate some that are culturally sensitive will help the mothers. Culturally, grandparents to the newly born baby play a major role in supporting the newly delivered woman. Allowing them in NICU would provide a social support system to the mother.

### **6.5.2 Recommendations for Nursing Practice and Education**

The results of the study revealed that mothers who were nursing babies in NICU were experiencing different levels of stress from different causes. Therefore, it is recommended that mothers are offered counselling services. A collaborative approach between the social welfare and the counselling services at the hospital would facilitate the emotional and financial support of mothers. Nurses need to be equipped with knowledge on the principles of family centred care model and counselling skills. Having Mental Health Nurses in the Unit would improve counselling services to be offered in the Unit. The Nursing training should incorporate the family centred care model. Further the study revealed a knowledge gap among the nurses on implementation of FCC. The nurses working in NICU need to be trained on Family Centred Care model and on identification of maternal mental distress. Training in FCC may enable nurses appreciate the family as a very important component in the care of their sick babies. Consequently, parents should be allowed to participate in the care of their infants.

Nurses had different perceptions of NICU stressors with the mothers. It is, therefore, recommended that before nurses offer support to mothers for stress alleviation they should be cognisant of the NICU stressors as identified by

mothers. The findings of this study reveal that the nurses' role in NICU is limited and disease oriented with little or no emotional support to mothers. Assessment, improved interactions and information sharing with mothers may enhance relationships that are most significant on experiences of mothers in the NICU. Allowing mothers to be involved in everyday care of their babies and providing them with on-going information is recommended. The information must be disseminated regularly on daily basis, to ensure that both clinical staff and mothers have the same information on treatment guidelines and prognosis of the baby. Institutionalising FCC as gold standard of NICU care, will enable nurses offer care that is disease oriented and viewing mothers' presence in NICU as a hindrance to care giving. Mothers will, therefore, not be viewed as an additional task but rather, as a part of the daily responsibilities of medical personnel working in NICU. Continuous professional development is important to keep nurses abreast with latest information. Application of knowledge to practice can influence the attitude of nurses towards mothers with babies in NICU and also on communication.

Research suggests that due to their constant presence the nurses are easily approachable in NICU and they are instrumental in implementation of the parental support programme that favours family centred care model. Parental support programmes which simultaneously cover educational and emotional aspects can reduce stress experienced by mothers nursing babies in NICU. In the current study, it was revealed that other family members other than the mother and father to the admitted infant are not allowed to visit in NICU. Family social support has a legitimate role in the provision of psychosocial support to mothers in NICU.

Therefore, Nurses need to facilitate formation of support groups. The support group may help relieve stress as the mothers who have gone through the same experience may help others cope with the perceived hopeless and intimidating NICU situation. The support model developed from this study can be used by the nurses working in NICU, to augment their current practices of offering general support to the mothers and for those who were not rendering support can be guided to help mothers.

With respect to being able to identify the stressors of every woman for the purpose of intervention, adopting already existing tools to assess likelihood of postnatal depression will improve the care rendered. The stress alleviation model developed in this study has provided a two-step assessment for postnatal depression. Therefore, implementation of the model in WNH is recommended. The hospital needs to have established support structures for referral for specialised social work and mental health follow up during admission and after discharge from the hospital. Mothers need the support even after discharge as they may not be conversant with taking care of the baby.

### **6.5.2 Recommendations for Nursing Research**

The support model developed in the current study should be implemented within the Women and New-Born Hospital, and its effectiveness should be evaluated and refined through future research. The application of the support model in other NICUs with a different physical environment can be further researched. Since the model was developed based on the stressors as perceived by mothers, further

research can be done to identify the stressors fathers could be facing. In addition, strategies for support to fathers can be incorporated on implementation of the model. Furthermore, the support model could also be tested in other public hospitals with similar set up with WNH in UTH. The model should be evaluated to determine if it does reduce maternal stress in NICU. A qualitative study to measure mothers' stress in NICU may be conducted in future to capture the aspects that are not in the PSS: NICU tool.

## **6.6 Dissemination of Findings**

Results from this study will be shared with Women and New-born Hospital and NICU management. The results have also been disseminated through publications in international peer-reviewed journals. Moreover, key results have also been presented at international conference (ECSACON and International Midwives Conference), and further be shared at national seminars aimed at practitioners, policymakers and postgraduate students. This will be done in order to influence policy on the benefits of family-centred policies and care and advocate for mental health nurses to be placed in NICU to improve psychosocial counselling of stressed mothers. Sharing of the findings to General Nursing Council of Zambia will advocate for inclusion in the nurses' curriculum the issues that were identified and advance the need for training of nurses and midwives in psychosocial counselling. Finally, dissemination of results among mothers of neonates admitted to the NICU. A copy of the thesis will also be deposited in the University of Zambia research repository for reference and an executive

summary will be given to the National Health Research Authority at the Ministry of Health.

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## APPENDIX I DATA COLLECTION TOOLS

### INFANT HEALTH INFORMATION FORM

1. Birth weight in grams \_\_\_\_\_

2. Gestational Age in weeks \_\_\_\_\_

3. Birth type (*circle one*):

- a. Single
- b. Twin
- c. Triplet
- d. Quad
- e. Quint

4. Length of stay in the NICU in days \_\_\_\_\_

5. Place of birth (if Hospital indicate name of the health facility)

- a. Home
- b. Health facility

\_\_\_\_\_

6. Was the child once put on a ventilator?

- a. Yes
- b. No

7. Current respiration (*circle one*)

- a. Room air
- b. Oxygen by hood
- c. Oxygen by nasal cannula

8. Current bedding (*circle one*):

- a. Open crib
- b. Incubator care

9. Current feeding:

- a. Tube feed
- b. Nipple feed
- c. Cup feeding

11. Presence of other Condition other than prematurity

Specify:

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## **DEMOGRAPHIC QUESTIONNAIRE (MOTHER)**

This is a study about the stress experienced by mothers with infants admitted to NICU

I would like to ask you a few general questions about yourself.

1. What is your age? \_\_\_\_\_
2. What is your present marital status?
  1. Married
  2. Single
  3. Divorced
  4. Widowed
3. Is your partner the biological father of the baby?
  1. Yes
  2. No
4. How long have you been in this present relationship? \_\_\_\_\_
5. Which of the following people live with you?
  1. Husband
  2. Children
  3. Parents and/or In-laws
  4. Other adults
6. At what age did you leave school?
  1. 14 years or younger
  2. 15 or 16 years
  3. 17 years

4. 18 years or older

7. Would you please tell me the highest level of education you've reached?

1. Primary School
2. Secondary School
3. Trade/Apprenticeship
4. Certificate/Diploma
5. Bachelor Degree/Higher

8. What is your usual occupation?

1. Professional
2. Owner/Executive
3. Owner of Small Business
4. Sales
5. Skilled Tradesperson
6. Unskilled
7. Farm Owner
8. Home Duties
9. Other

9. Are you usually in paid employment?

1. Yes
2. No

10. If **Yes** to number 9, is that full-time or part-time?

1. Yes, Full-time

2. No, Part-time

11. When are you supposed to report back to work? \_\_\_\_\_

12. Is this your first baby?

1. Yes

2. No

13. If No, how many babies have you given birth to? \_\_\_\_\_

14. How many children are you raising? \_\_\_\_\_

15. Did you have any problems with this pregnancy?

1. Yes

2. No

16. If **Yes**, please describe

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17. Have you been given any information about your baby?

1. Yes

2. No

18. If **Yes**, where did you get the information from?

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## **PARENTAL STRESS SCALE: NEONATAL INTENSIVE CARE UNIT**

Nurses and others who work in Neonatal Intensive Care Units are interested in how the experience of having a sick baby hospitalized in the Neonatal Intensive Care Unit (NICU) affects parents. We would like to know what aspects of your experience as a parent are stressful to you. By stressful, we mean that the experience has caused you to feel anxious, upset, or tense.

This questionnaire lists various experiences parents have reported as stressful. Please indicate how stressful each item listed below has been for you using the following scale:

1 = Not at all stressful: the experience did not cause the respondent to feel upset, tense, or anxious

2 = A little stressful

3 = Moderately stressful

4 = Very stressful

5 = Extremely stressful: the experience upset the respondent and caused a lot of anxiety or tension

6 = N/A If the respondent did not have the experience, meaning that they have "not experienced" this aspect of the NICU.

Now let's take an item for an example: The bright lights in the NICU. If for example the respondent feel that the bright lights in the Neonatal Intensive Care Unit were extremely stressful, circle the number 5 below:

NA 1 2 3 4 5

If the respondent feels that the lights were not stressful at all, you would circle the number 1 below:

NA 1 2 3 4 5

If the bright lights were not on when you visited (not likely), you would tick N/A indicating "Not Applicable"

NA 1 2 3 4 5

**PARENTAL STRESS SCALE: NEONATAL INTENSIVE CARE UNIT**

**SIGHTS AND SOUNDS** commonly experienced in a NICU. We are interested in knowing about your view of how stressful these SIGHTS AND SOUNDS are for you.

Circle the response that best response that represents the respondents' level of stress

NICU Environmental stress	Not stressful	A little stressful	Moderately stressful	Very stressful	Extremely stressful	N/A
<b>1.Sights and Sounds</b>						
(a) Presence of monitors & equipment	1	2	3	4	5	6
(b) Presence of constant noises	1	2	3	4	5	6
(c) Sudden noises	1	2	3	4	5	6
(d) Other sick babies	1	2	3	4	5	6
(e) Large number of people working in the unit	1	2	3	4	5	6
<b>2. Infant Appearance</b>						
(a) Tubes and equipment	1	2	3	4	5	6
(b) Bruises, cuts or incisions	1	2	3	4	5	6
(c) Unusual colour of my baby looking pale or jaundiced	1	2	3	4	5	6

(d) Unusual breathing	1	2	3	4	5	6
(e) Seeing my baby suddenly change colour (pale or blue)	1	2	3	4	5	6
(f) Seeing my baby stop breathing	1	2	3	4	5	6
(g) The small size of my baby	1	2	3	4	5	6
(h) The wrinkled appearance of my baby	1	2	3	4	5	6
(i) Having a machine (respirator) breathe for my baby	1	2	3	4	5	6
(j) Seeing Needles and tubes put in my baby	1	2	3	4	5	6
(k) My baby being fed by Intravenous line or tube	1	2	3	4	5	6
(l) When my baby seemed to be in pain	1	2	3	4	5	6

(m) My baby crying for long periods	1	2	3	4	5	6
(n) When my baby looked afraid	1	2	3	4	5	6
(o) When my baby looked sad	1	2	3	4	5	6
(p) The limp and weak appearance of my baby	1	2	3	4	5	6
(q) Jerky or restless movements of my baby	1	2	3	4	5	6
(r) My baby not being able to cry like other babies	1	2	3	4	5	6
(s) Clapping on baby's chest for drainage	1	2	3	4	5	6
<b>3. Parent-infant Relationship</b>						
(a) Being separated from my baby	1	2	3	4	5	6
(b) Not feeding my baby myself	1	2	3	4	5	6
(c) Not being able to care for my baby myself (changing nappies and bathing)	1	2	3	4	5	6

(d) Not being able to hold baby when I want	1	2	3	4	5	6
(e) Sometimes forgetting what my baby looks like	1	2	3	4	5	6
(f) Not being able to share my baby with family	1	2	3	4	5	6
(g) Feeling helpless and unable to protect baby from pain and painful procedures	1	2	3	4	5	6
(h) Being afraid of touching and holding my baby	1	2	3	4	5	6
(i) Feeling staff are closer to my baby than I am	1	2	3	4	5	6
(j) Feeling helpless about how to help my baby during this time	1	2	3	4	5	6
<b>4. Staff behaviours and communication</b>						
(a) Staff explaining things too fast	1	2	3	4	5	6
(b) Staff using words I don't understand	1	2	3	4	5	6

(c) Telling me different (conflicting) things about baby's condition	1	2	3	4	5	6
(d) Not telling me enough about tests and treatments done to baby	1	2	3	4	5	6
(e) Not talking to me enough	1	2	3	4	5	6
(f) Too many different people (doctors, nurses, others) talking to me	1	2	3	4	5	6
(g) Difficulty in getting information or help when I visit or telephone the unit	1	2	3	4	5	6
(h) Not feeling sure I will be called about changes in baby's condition	1	2	3	4	5	6
(i) Staff looking worried about baby	1	2	3	4	5	6
(j) Staff acting as if they did not want parents around	1	2	3	4	5	6
(k) Staff acting as if they did not	1	2	3	4	5	6

understand my baby's behaviour or special needs						
<b>General stress</b>						
(a) How stressful has the experience of having baby hospitalised been for you	1	2	3	4	5	6

## **INTERVIEW GUIDE FOR NURSES WORKING IN THE NICU**

1. Professional qualifications
2. Duration of work experience in the NICU
3. What do you think are the stressful elements to the mothers in the NICU environment?
4. Are there any elements that you would perceive stressful to mothers in the way you provide nursing care in the NICU?
5. To what extent are the mothers involved in the care of the infants admitted in the NICU?
6. Are there differences in the involvement of mothers in the care in relation to condition of their infants are admitted in the NICU?
7. How do mothers get information on the prognosis of their neonates?
8. What do you think should be changed in the management of infants in the NICU to reduce the stress the mothers go through?

## **APPENDIX II**

### **INFORMATION SHEET**

This is a research project being conducted by Miss Maureen Masumo a student at the University of Zambia, School of Nursing Sciences. I am inviting you to participate in this research project because you are the mother of an infant hospitalized in the neonatal intensive care unit (NICU) at the University Teaching Hospital, Lusaka, Zambia. The purpose of this study is to develop a support programme for stress alleviation in mothers during their infant's hospitalization in the NICU. Another objective of the study is to determine whether or not certain parent and infant characteristics are related to stress experienced by mothers.

Participation in this study will take approximately 30 minutes. If you agree to participate in this study you will be asked some questions about factors that you think are stressful to you while your baby is in the NICU. You will be asked to provide some demographic information about you and your family (e.g. your age, marital status, etc.) too. This will help us describe the general population of people who participated in the study. You will also be asked to grant the investigator permission to review your baby's medical records in order to obtain information about his or her health.

We will do our best to keep your personal information confidential. To help protect your confidentiality, all surveys and data forms that will be used in this study are anonymous and will not contain information that may personally identify you. A code will be placed on the surveys and other forms used to collected data. We will keep a list of the participants' names separate from your responses on the

survey and demographic form, as well as on the form used to collect data about your infant's health. Through the use of an identification key, the researcher will be able to link your survey to your identity and only the researcher will have access to the identification key. This will help to ensure that your opinions and family information are kept confidential. All study-related documents will be kept in a locked file cabinet at all times, again with only the researcher having access to that file cabinet

While participation in this study may help you identify your own unique needs, upon doing so, you may feel that those needs are not being adequately met. These feelings may cause psychological distress. In such a case, you will be asked whether or not you would like to be linked with a hospital social worker that can assist you with your concerns. The social worker may also be able to provide you with resources to help meet your needs. Such a referral would be completely confidential, voluntary, and unrelated to the study. In addition, while the study involves the collection of data on the health status of your infant, his or her medical record may also contain confidential personal information about you (i.e. Sexually Transmitted Infections, HIV status). Therefore, while it will not be recorded on study-related documents, the investigator reviewing your infant's medical record may view this information.

This research may not directly benefit you or your baby. However, even if this research does not help you personally, the results may help the investigator to develop a programme that will address the stress in NICU and alternatively improve the maternal and neonatal outcome. We hope that, in the future, other

parents might benefit from this study. The understanding of these stressors may also be used by policy makers and hospital management organize and implement support programs.

Your participation in this research is completely voluntary. You may choose not to take part at all. If you decide to participate in this research, you may stop participating at any time. If you decide not to participate in this study or if you stop participating at any time, you will not be penalized or lose any benefits to which you otherwise qualify, nor will it affect the care that your child receives in the NICU.

#### **PERSONS TO CONTACT FOR PROBLEMS OR QUESTIONS**

1. Masumo M. Maureen. University of Zambia. School of Nursing Sciences.  
P.O. Box 50110, Lusaka. Cell: 0977 862284
2. Dr L. Mwape and Dr M. Maimbolwa. University of Zambia, School of Nursing sciences. P.O. Box 50110, Lusaka. Cell: 0979093045 / 0977800067
3. The Chairman, Biomedical Research Ethics Committee, University of Zambia. P.O. Box 50110, Lusaka. Phone no. 260- 1- 256067

## TRANSLATED INFORMATION SHEET AND INTERVIEW SCHEDULE

### UTHENGA:

Uku ndi kufufuza komwe kukucitika ndi mai Maureen Masumo yemwe acita maphunzilo pa sukulu yapamwamba ya University of Zambia, School of Nursing Sciences. Ndikupemphani kuti mutengeko mbali kufufuza uku cifukwa ndinu mai wa mwana wa wam n'gono/khanda omwe ali mcipatala cocedwa kuti neonatal intensive care unit (NICU) ku cipatala ca University Teaching Hospital, mumzinda wa Lusaka, mdziko la Zambia. Colinga ca kufufuza uku, ndi kukhazikitsa programu yoona pa zofoketsa ku azimai pomwe ali kucipatala ndi mwana wa khanda ku NICU. Cina colinga ndi kuziwa ngati zolinga za makolo ena ndi ana akhanda ndi zofooka za makolo awo.

Kutengako mbali mu programu iyi kuzatenga mphindi 30. Ngati mwavomela kutengako mbali muzafunsidwa mafunso pa zinthu zomwe muona kuti ndi zofoketsa kwa inu pomwe muli ndi mwana wanu ku **NICU**. Muzafunsidwa kupeleka mbili ya inu ndi zinthu zokhuza inu ndi banja lanu monga zaka, zam'banja lanu , ndi zina zotele) izi zizatithandiza kuziwa anthu omwe anatengako mbali pa kufufuza uku. Muzafunsidwanso kuvomeleza kuti ofufuza aone mbili ya zaumoyo wa mwana wanu kuti aziwe umoyo wake wa mwana.

Tizasunga zomwe mwalembe ,mwa cinsinsi kuti mbili yanu ikhale ya cinsinsi, zomwe tizatenga mukufufuza uku, zizakhala zosadziwika ndi ena ndipo simuzakhala zinthu zakuti ena akuziweni. Pazaikidwa cizindikilo pa cipepala ca zomwe tizatenga . Maina ya anthu otengako mbali azalembedwa pa mayankhoya pamafomu ndi mafomu yomwe tagwilitsila ncito yonena za umoyo wa mwana wanu. Kupyolela mu zokuzindikilani, ofufuza cabe ndiye azakhala ndi mpata wa cizindikila mogwilitsa ncito cizindikilo cokuziwilani. Izi zizapangitsa kuti maganizo anu ndi mbili ya banja lanu ikhale ya cinsinsi. Mapepala onse yomwe yagwilitsidwa ncito azaikidwa pa malo obisika ndi kukhomako ndipo ofufuza cabe ndiye azakhala ndi mpata owona pa pepala awa.

Pomwe kutengako mbali kwanu kuzakuthandizani kuziwa zofuna zanu, pomwe mwacita izi, mungaone kuti mwina zofuna zanu sizikwanilitsika. Maganizo otele akhuza kukusokonezani, mwa ici, muzafunsidwa ngati mufuna kukulumikizani ku akucipatala kapena ogwila ncito omwe azakuthandizani pa zofuna zanu.

Okuthandizilani azafunika kukupasani zonse zofunika kuti muthandizike pa zomwe mufunikila. Izi zizakhala zacinsinsi, mozipeleka ndi zosiyanako ndi kufufuza uku. ,powonjezela, kuzafunika kutenga mbili ya mwana wanu wobadwa ca tsopano , mbili za umoyo wake ndipo zikhoza kukhala ndi mbili ina yacinsinci ya inu amake. (monga yotengela, kalombo ka HIV). Mwa ici, sizizaikidwa pamapepala yofufuza , koma ofufuza omwe akuona palipoti la cipatala la mwana wanu angaone zolembedwa izi.

Kufufuza uku, mwina sikuzapindulitsa inu kapena mwana wanu koma ngakhale kuti simuzathandizika inu, zotulukapo zake, zizathandizila ofufuza kupanga ma programu yomwe yazaonedwapo pa zofunika ku **NICU** ndi kupitisa pasogolo zaubeleki ndi zotulukapo za **mwana ocepa mwezi umozi wa kubadwa**. Tili ndi cikhulupililo cakuti msogolo, makolo ena azapindula ndi phunzilo iyi. Kunvetsa zinthu izi kukhoza kugwilitsidwa ncito ndi opanga malamulo ndi akulu-akulu amcipatala kupanga ndi kucita ma pogramu ena apadela.

Kutengako kwanu mbali mu kufufuza uku ndi kwaulele. Ngati mufuna mukhoza kukana. ngati mufuna kutengako mbali, mungasiye kutengako mbali nthawi ina iliyonse. Ngati mwaganiza zakuti musatengeko mbali kapena kuganiza kusiya pa nthawi iliyonse, simuzaimbidwa mulandu kapena kuluza malipilo yanu yomwe mufunikila kutenga kapena kukhuza cisamalilo ca mwana wanu comwe amalandila ku NICU.

## **MAFUNSO OKHUZA MUNTHU (MZIMAI)**

Uku ndi kufuna kofuna kuziwa zomwe azimai amapitamo ndi ana awo omwe ali ku **NICU**

Ndifuna kukufunsani mafunso inu ndipo nifuna kuti musilize mafunso ocepa cabe.

1. Muli ndi zaka zingati? \_\_\_\_\_
2. Kodi ndimwe okwatila kapena ai?
  1. Okwatila
  2. osakwatila
  3. cikwati ninatha
  4. amuna anafa
3. Kodi amuna omwe muli nao ndiye atate bake amwana?
  1. Inde
  2. Ai
4. Kodi mwankhala pamozi kwa nthawi itali bwanji? \_\_\_\_\_
5. Ndi anthu otani omwe akhala ndi inu?
  1. Mwamuna
  2. Ana
  3. Makolo/azipongozi
  4. Ena akulu-akulu
6. Kodi unaleka sukulu pa zaka zingati?
  1. Zaka 14 kapena kucepekela apo
  2. Zaka 15 kapena 16
  3. Zaka 17
  4. Zaka 18 kapena kupitilila
7. Conde ndiuzeni pomwe munafika /kulekezela maphunzilo apamwamba?
  1. Sukulu ya Primary
  2. Sukulu ya Secondary School
  3. Kucita zamalonda
  4. Certificate kapena Diploma
  5. Bachelor Degree/kapena kupitilila apa
8. Mumacita ciani?

1. Ndine katswili mu ncito zina
2. Ndine mwini wa malonda an'gono an'gono
3. Ndigulisa
4. Katswili wa malonda
5. Ndilibe ukatswili
6. Ndili ndi famu/pulazi
7. Ndimagwila ncito panyumba
8. Zina ndi zina

9.Kodi mumagwila ncito yamalipilo?

1. Inde
2. Ai

10.Ngati mwakamba kuti inde pa 9, kodi ndi ncito yamuyayaya kapena yakuti mukhoza kulekeza/ yakanthawi cabe?

1. Inde – mpaka kale kale
2. Ai , Nizalekeza

11.Kodi muzabwelelanso ku ncito liti? \_\_\_\_\_

12.Kodi uyu ndi mwana wanu oyamba?

1. Inde
2. Ai

13. Ngati ndi ai, ndi ana angati omwe mwabeleka.

14. Mulela ana angati? \_\_\_\_\_

15. kod munalipo ndi vuto pomwe munali ndi mimba?

1. Inde
2. Ai

16. Ngati ndi Inde, conde fotokozani.

17. kodi Mwalandila mau alionse okhuza mwana wanu?

1. Inde
2. Ai

18. Ngati ndi Inde, munacosa kuti mau awa?

**MUYESO OWONA ZOFOKETSA KWA KHOLO: CISAMALILO CA MWANA OCEPEKELA MWEZI UMOZI**

**ZA MALO NDI MAU** Zomwe kabili-kabili zimanveka ku cipinda ca NICU. Tifuna kuziwa za maganizo anu pa nkhani ya zokutangwanitsa zokhuza malo ndi mau/sounds .

Lembani mozungulila yankho yomwe muona kuti ndi yazoona pa nkhani ya zokutangwanitsani– 1= itanthauza kusatangwanika 2 – kutanganika pan'gono, 3 – kutangwanika kwambili 4 – kutanganika mofikapo 5 – kutangwanika kothelatu 6 – palibe

	N/S	A/S	M/S	V/S	E/S	N/A
<b>1.Malo/Mau</b>						
(a) kukhalapo kwake kwa openyelela ndi zogwililancito	1	2	3	4	5	6
(b) Phokoso pafupi-pafupi	1	2	3	4	5	6
(c) Phokoso losayembekezela	1	2	3	4	5	6
(d) Ana ena odwala	1	2	3	4	5	6
(e) Anthu ambili kugwila ncito pa malo ogwililancito	1	2	3	4	5	6
<b>2. kuoneka kwka mwana wa khanda.</b>						
(a) Matyubu ndi zipangizo zogwilila	1	2	3	4	5	6
(b) Kukhuluzika/ kuzicita/ kuziceka	1	2	3	4	5	6
(c) Mtundu osaziwika bwino wa mwana kusaoneka bwino-bwino	1	2	3	4	5	6
(d) kusapema bwino	1	2	3	4	5	6
(e) kuona mwa kusintha mtundu mosayembekezela mtundu (woyela kapena wa blue)	1	2	3	4	5	6
(f) kuona mwana kusiya kupema	1	2	3	4	5	6
(g) kucepa kwa mwana wakhanda/baby	1	2	3	4	5	6
(h) mankhwinya kuonekela pa mwana	1	2	3	4	5	6
(i) kukhala ndi makina (opemela) mwana wanga	1	2	3	4	5	6

(j) kuona sin'gano ndi matyubu akuikidwa pa mwana wanga	1	2	3	4	5	6
(k) Mwana kudyosedwa mogwilitsa ncito matyubu	1	2	3	4	5	6
(l) Pomwe mwana wanga anaoneka kuti akunva kuwawa	1	2	3	4	5	6
(m) Mwana wanga kulila nthawi yaitali	1	2	3	4	5	6
(n) Pomwe mwana anaoneka wa mantha	1	2	3	4	5	6
(o) Pomwe mwana anaoneka okalipa	1	2	3	4	5	6
(p) kusowa mphamvu kwa maonekedwe ya mwana	1	2	3	4	5	6
(q) kusayenda bwino/ kufooka kwa mwana wanga	1	2	3	4	5	6
(r) Mwana kulephela kulila monga momwe ana ena amalilila	1	2	3	4	5	6
(s) kugunda pa cifuba ca mwana	1	2	3	4	5	6
<b>3. Ubale wa Mwana ndi amai ake</b>						
(a) kutipatula ine ndi mwana wanga	1	2	3	4	5	6
(b) kusadyesa mwana wanga nekha	1	2	3	4	5	6
(c) osakwanisa kusamalila mwana wanga nekha monga (kusintha thebela ndi kusambika)	1	2	3	4	5	6
(d) osakwanisa kugwila mwana wanga ngati nafuna kumgwila	1	2	3	4	5	6
(e) nthawi zina kuiwala momwe mwana wanga aonekla	1	2	3	4	5	6
(f) kusakwanisa kupasa mwana anthu ba mbanja yanga	1	2	3	4	5	6
(g) kusowa mphamvu ndi kusakwanisa kuteteza mwana wanga ku ndondomeko zocitika zobaba.	1	2	3	4	5	6
(h) kuopa kugwila mwana ndi kunyamula mwana wanga	1	2	3	4	5	6
(i) kuona kuti ancito ali pafupi kwambili ndi mwana wanga kusiyana ndi ine	1	2	3	4	5	6

(j) kukhala osowa cocita za momwe ningathandizile mwana wanga pa nthawi ino.	1	2	3	4	5	6
<b>4. Zocita za ancito ndi kulankhulana</b>						
(a) ancito kufotokoza mofulumila	1	2	3	4	5	6
(b) ancito kugwilitsa ncito mau omwe sinikunva	1	2	3	4	5	6
(c) kundiuza zosiyana za momwe mwana alili/akunvelela	1	2	3	4	5	6
(d) osaniuza zambili zokhuza zomwe acita mwana monga zopima-pima ndi mankhwala	1	2	3	4	5	6
(e) osalankhula na ine mokwanila	1	2	3	4	5	6
(f) anthu ambili osiyan-siyana (madokotala, manesi, ndi ena ambili) kulankhula ndi ine	1	2	3	4	5	6
(g) kuvutika kutenga uthenga kapena thandizo ngati nafika kapena kutuma phoni ku malo yogwilila ncito.	1	2	3	4	5	6
(h) kuoneka osaziwa ngati pali kusintha kwina kulikonse pomwe mwana alili	1	2	3	4	5	6
(i) wancito kuoneka odandaula ndi mwana	1	2	3	4	5	6
(j) Ancito kuonesa monga safuna makolo pafupi	1	2	3	4	5	6
(k) Ancito kuonesa monga sananvetse momwe mwana wanga akucitila ndi zina zapadela zomwe mwana afuna.	1	2	3	4	5	6
<b>Kutangwanika kwina</b>						
(a) kodi zinthu zinali bwanji pa inu pa nkhani ya kukhala ndi mwana mcipatala	1	2	3	4	5	6

APPENDIX III: RESEARCH BUDGET

<b>BUDGET CATEGORY</b>	<b>UNIT COST (ZMK)</b>	<b>QUANTITY</b>	<b>TOTAL</b>
<b>1. STATIONERY</b>			
a) External hard drive			
b) Bond paper	1000.00	x 2	2000.00
c) Pens	50.00	x20	1000.00
d) Pencils	2.50	x10	25.00
e) Rubbers	2.50	x 4	10.00
f) Note book	5.00	x2	10.00
g) Tippex	8.00	x5	40.00
h) Bag for questionnaires	12.00	x5	75.00
i) Stapler	250.00	x5	1250.00
j) Staples	25.00	x1	25.00
k)Tape recorder	10.00	x1 Box	10.00
	1 250.00	x2	2 500.00
<b>SUBTOTAL</b>			<b>6,195.00</b>
<b>2. PERSONNEL</b>			
a) Lunch allowance			
Principal researcher	50.00	1 x 60 days	3,000.00
<b>Research assistant</b>	<b>50.00</b>	<b>4 x 60 days</b>	<b>12,000.00</b>
b)Transport or fuel			2000.00

<b>SUBTOTAL</b>			<b>17,000.00</b>
<b>3. SERVICES</b>			
a) Ethics committee	500.00	1	500.00
b) Data entry	3,000.00	1	3,000
c) Data analysis	3 000.00	1	3,000.00
d) Photocopying proposal	0.50	100 x3	500.00
e) Photocopying questionnaire	0.30x9pages	380	1026.00
	0.50	100x4	500
f) Photocopying report	100.00	4 copies	400.00
g) Binding	1500.00	1	1500.00
h) Printing Picture Report	2,000.00	3	6,000.00
i) Publications			
<b>SUBTOTAL</b>			<b>16,426.00</b>
<b>TOTAL</b>			<b>39,621.00</b>
<b>CONTIGENCY FUND10%</b>			<b>3,962.10</b>
<b>GRAND TOTAL</b>			<b>K 43,583.10</b>

## **JUSTIFICATION FOR THE BUDGET**

1. Stationery is required for paper work.
2. Allowances for the researchers were required because the team collected data throughout the day, away from their homes for 30days.
3. Funds are needed for photocopying and binding of the proposal and reports.
4. Contingency fund which is 10% of the budget is required for any extra costs due to inflation and for any eventualities

## **APPENDIX IV – LETTERS OF AUTHORITY TO CONDUCT THE STUDY**

### **APPLICATION LETTER FOR AUTHORITY**

University of Zambia,  
School of Nursing Sciences,  
P.O Box 5110,  
Lusaka.

The Senior Medical Superintendent,  
University Teaching Hospital,  
Women and New-born Hospital  
RW 5X,  
Lusaka.

Dear Sir/Madam,

#### **REF: REQUEST FOR PERMISSION TO CARRY OUT A RESEARCH STUDY IN THE NEONATAL INTENSIVE CARE UNIT.**

I am a student at the University of Zambia, School of Nursing sciences, pursuing PhD in Midwifery.

In fulfilment for the award of PhD in Midwifery, I am required to conduct a research study. My research topic is titled **“DEVELOPING A SUPPORT PROGRAMME FOR STRESS ALLEVIATION IN MOTHERS WITH INFANTS ADMITTED TO UNIVERSITY TEACHING HOSPITAL NEONATAL INTENSIVE CARE UNIT.**

I hereby request for permission to conduct this study in your respectable institution. The study involves interviewing mothers with babies admitted to NICU and the nurse who are currently working in NICU.

Kindly find attached a copy of approval letter from research ethics committee. Thanking you in anticipation for your favourable response.

Yours faithfully,

Masumo M. Maureen

## **APPLICATION LETTER FOR AUTHORITY**

University of Zambia,  
School of Nursing  
Sciences,  
P.O Box 5110,  
Lusaka.

The Senior Medical Superintendent,  
Levy Mwanawasa Hospital,  
RW 5X,  
Lusaka.

Dear Sir/Madam,

### **REF: REQUEST FOR PERMISSION TO CARRY OUT A RESEARCH STUDY IN THE NEONATAL INTENSIVE CARE UNIT.**

I am a student at the University of Zambia, School of Nursing sciences, pursuing PhD in Midwifery.

In fulfilment for the award of PhD in Midwifery, I am required to conduct a research study. My research topic is titled **“DEVELOPING A SUPPORT PROGRAMME FOR STRESS ALLEVIATION IN MOTHERS WITH INFANTS ADMITTED TO UNIVERSITY TEACHING HOSPITAL NEONATAL INTENSIVE CARE UNIT.**

I hereby request for permission to conduct a pilot study in your respectable institution. The study involves interviewing mothers with babies admitted to NICU and the nurse who are currently working in NICU.

Kindly find attached a copy of approval letter from research ethics committee. Thanking you in anticipation for your favourable response.

Yours faithfully,

Masumo M. Maureen

## PUBLICATIONS

- i) **Masumo M.M.**, Mwape, L., Mukwato – Katowa P., Maimbolwa, M., Chirwa, E. (2019). Perception of stressors by mothers with babies admitted to the neonatal intensive care unit in women and newborn hospital, Lusaka, Zambia. *IJNM*. Vol. 11(4) pages 25 – 31.
  
- ii) **Masumo. M.M.**, Mwape, L., Maimbolwa, M., Chirwa, E. (2019). Family-professional partnership a core principle of family centered care in the neonatal care unit: review of literature. *Journal of nursing and midwifery*. Volume 7 (2), 24 – 29.