

**CAREGIVER KNOWLEDGE OF EARLY DEVELOPMENTAL
INTERVENTIONS AFTER PERINATAL ASPHYXIA AT THE
KENYATTA NATIONAL HOSPITAL NEW BORN UNIT**

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DECLARATION

I declare that this dissertation is my original work and has not been presented for the award of a degree in any other university.

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DEDICATION

This dissertation is dedicated to my family; My husband Aggrey, for the moral and financial support during this journey.

My children; Nathan, Nigel and Zawadi for your constant reminder that “It can be done”

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With a grateful heart;

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All the caregivers who participated in this study

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ABBREVIATIONS

ANC-Antenatal Clinics

EDI-Early Developmental Interventions

HIE-Hypoxic Ischemic Encephalopathy

KDHS-Kenya Demographic Health Survey

KNH- Kenyatta National Hospital

KNH- UoN ERC-Kenyatta National Hospital Ethics and Research Committee

LMIC-Low and Middle-Income Countries

NBU-Newborn Unit

SDGs- Sustainable Development Goals

TH-Therapeutic Hypothermia

UON-University of Nairobi

WHO-World Health Organization

MRI – Magnetic Resonance Imaging

DEFINITION OF TERMS

Perinatal Asphyxia-this is a combination of lack of oxygen and blood supply to the brain. These babies have APGAR scores of <5 points at 10 minutes with cord blood pH less than 7.0.

Early developmental interventions-

Set of activities/services that identify and provide effective early support to infants and children who are at risk of poor neurodevelopmental outcomes.

Hypoxic ischemic Encephalopathy-

Acute brain injury occurring in the late antepartum or in the intrapartum causing brain hypoxia and ischemia.

Very ill caregivers- At time of baby's discharge the caregiver is admitted in the critical care unit or the post-natal wards.

ABSTRACT

Long-term perinatal asphyxia has been associated with convulsive disorders, learning disabilities, neurodevelopmental delays, vision and hearing impairments among others. Despite this, the developing human brain has the potential to create new synaptic connections even after brain injury in what is known as neuroplasticity. Early developmental intervention (EDI) programs attempt to avert or curb compromised cognitive function in early life by the use of defined practices. These activities include sensory play, breastfeeding, early occupation therapy, music, tactile stimulation and reading.

OBJECTIVE: The study aimed to assess the level of caregiver knowledge on early developmental interventions among babies with perinatal asphyxia at the Kenyatta National Hospital Newborn Unit.

METHODOLOGY This was a descriptive cross-sectional study. Using a structured tool, 92 caregivers of babies admitted with perinatal asphyxia were interviewed to assess knowledge of early developmental interventions using closed and open-ended questions. Data was entered into excel and then imported into R software for cleaning and analysis. Categorical variables e.g., sex of babies and education level of caregivers was summarized in frequencies and proportions. Continuous variables e.g., caregivers' age was summarized in means and standard deviations (normally distributed data) or medians and inter-quartile ranges for skewed data. A score for knowledge on neurodevelopmental interventions was computed based on five items. Each correct item was awarded one mark and then converted into a percentage score. The overall performance score was presented using a scatter plot diagram.

RESULTS: The mean age of the caregivers who participated in this study was 29.4 years, 78.2% were married, and 68.5% were multigravida. The median age for babies was 2 weeks with an inter quartile range of one to three weeks of age and 75% were males.

Overall only 8.9% of caregivers were informed that lack of oxygen just before or around the time of birth causes perinatal asphyxia, and 73% had no knowledge of the potential long-term impact of perinatal asphyxia.

There was overall sufficient knowledge at 80% on early developmental interventions. Of those interviewed, 84.8% of caregivers identified play as a way of enhancing neurocognitive

development. A further 80.4% of caregivers had knowledge of ways to enhance their child's speech and language, while 76% identified breastfeeding as a method of enhancing neuro cognitive development.

The only factor associated with poor knowledge of neurocognitive development was being a primi-parous woman. Compared to multigravida women, the odds of having insufficient knowledge was OR 2.84 [(95% CI 1.11, 7.30), p =0.03]

CONCLUSION

There was overall sufficient knowledge of early developmental intervention activities at a median 80%.

There was overall poor knowledge on the long-term outcomes of perinatal asphyxia where 73% of caregivers had no knowledge on the potential long-term outcomes of perinatal asphyxia.

Multiparity was significantly associated with good knowledge (p=0.03)

CHAPTER ONE

INTRODUCTION

1.1 Background

Early parent-child relationships and infant intellectual stimulation are key pillars of childhood cognitive and emotional function (1). Early intervention encompasses multidisciplinary facilities for children aged between 0–3 years to promote child health, increase divergent skills and reduce health associated problems. Early interventions are also aimed at encouraging adaptive parenting and promoting an overall healthy, functioning family. Infants are provided with developmental, educational, and therapeutic services in combination with a carefully planned support program for their families(2). The aim of the early intervention set of activities is to prevent the negative effects of perinatal asphyxia on infant outcomes, caregiver-infant interactions, and parenting (1). The rationale behind these interventions is an elevated level of neuroplasticity in the first 3 years of life and the impact of experiences in the infant’s early life on their later emotional, behavioural, and developmental outcomes. The development of neuronal connections in the brain (axonal growth and targeting) that provide sensory and motor support is greatly influenced by motor, sensory and physical stimulation during this period (3).

Perinatal asphyxia is the inability to initiate or sustain natural breathing at birth, (4) . which is an important cause of intellectual disability, cerebral palsy, neonatal encephalopathy and other childhood neurodevelopmental disorders especially in developing countries(5). Of the 3.5 million neonatal deaths in the world, 23% are due to birth asphyxia. About 90% of these deaths occur in middle- and low-income countries. Approximately one-third of infants in developing nations who survive birth asphyxia account for 50% of infants who were referred for a neurological assessment at 2 months of age because of an unusual neurologic examination (5). The one million children who are estimated to live beyond birth asphyxia develop neurocognitive challenges (6). Birth asphyxia is projected to cause forfeiture of approximately 40 million disability-adjusted life years, as a prominent cause for all ages worldwide(7), with the majority of such cases being in the low to middle income countries such as Kenya.

Africa accounts for more than a quarter of the global newborn deaths. Of these deaths, 24% were attributed to birth asphyxia by the World Health Organization in 2014. Sub-Saharan Africa accounts for 75% of countries with the greatest risk of neonatal mortality (7), with more than 80%

of neonatal deaths in Africa caused by complications of prematurity, intrapartum birth events where perinatal asphyxia falls. About three hundred thousand- approximately 20% deaths that occur on the first day of life are due to perinatal asphyxia (8)(9).

Perinatal asphyxia poses a significant health challenge in Sub-Saharan Africa, especially in East and Central Africa, the reasons for the high disease burden include poor health care spending, sociocultural norms, poor obstetrics coverage, shortage of healthcare workers, medical supplies and inaccessible health facilities, (10–12). Additionally, there was lower utilization of reproductive health services (trained delivery assistance and antenatal visits) in East and Central Africa as compared to the other Sub-Saharan African countries (13). In Kenya, perinatal asphyxia accounts for up to 31.6% of neonatal mortality according to the Kenya Demographic Health Survey (KDHS) 2014 and 20% of all monthly admissions at the KNH(14).

The process of breastfeeding is the first and most important source of stimulation to the baby (suckling and eye-to-eye contact that they have with the caregiver). This process is limited in asphyxiated infants due to the difficulties they have initiating and maintaining breastfeeding. Early developmental interventions are aimed at modifying the delayed development trajectory observed in infants diagnosed with perinatal asphyxia. This is done by manipulating the child's physical environment to encourage them to grow their motor and cognitive skills (15). Often, identification of diagnosed or undiagnosed developmentally delayed infants is a challenge, compounded by lack of rehabilitative centres for these children. The delay in diagnosis usually delays commencement of early developmental interventions in these infants (16). The main focus of previous studies over the past decade has been on preterm infants given the high rates of neurobehavioral challenges in this population(17). However, early identification of neurocognitive impairments in perinatal asphyxia patients, (18), continues to open avenues for researchers. local research done at the Kenyatta National Hospital that focused on the utilization of support services by children with cerebral palsy, highlighted that most caregivers had never been educated by health care workers on Cerebral Palsy despite the long duration of contact time they had with a health care worker.(19)

Lack of caregiver knowledge on cerebral palsy was also highlighted in another local study that assessed the presence of visual abnormalities in children with cerebral palsy. In this study caregivers reported to have received little education on the need for visual screening of their children despite the long duration of contact with health care workers(20)

The above local studies highlight the need for provision of caregiver knowledge on long-term follow-up of their children. They also note the gaps in client education provision by healthcare workers on the need for long-term care. It is important to note that caregivers should pre-emptively provide additional stimulation to any infant who suffered from perinatal asphyxia regardless of the current symptoms. There are no local studies focused on the role of the caregiver in stimulating their baby to avert or reduce the adverse outcomes associated with perinatal asphyxia. It is against this background that this researcher decided to assess caregiver knowledge on early developmental interventions after perinatal asphyxia in a Kenyan teaching and referral hospital.

1.2 Problem Statement

Grantham-Mcgregor et al in a study that looked at Developmental potential in the first 5 years for children in developing countries, found that (21), over 200 million children out of 700 million children under the age of five do not achieve cognitive development potential in low and middle income countries due to exposure to multiple risks including an under stimulating home environment. Early developmental intervention (EDI) programs attempt to avert or curb compromised cognitive function in early life by the use of defined practices. While numerous control trials have demonstrated the effectiveness of early developmental interventions,(10–12) none of these studies have taken into account the caregiver’s knowledge of EDI for infants with perinatal asphyxia in a low-income country. While there has been significant progress in pinpointing risk factors and possible interventions,(22) further research is necessary to determine what parents can do at home to improve their child’s cognitive function. This will require the assessment of a larger and more varied patient population including children from low and middle income settings. Studies on EDI programs that are of a longer period and of high intensity steered toward younger and underprivileged children and are most successful when integrated with nutrition and family support services and as such role of the right infant and young feeding practices cannot be over emphasized even in the infants who are at risk of adverse neuro cognitive outcomes(23)

Beebe and Lachman describes one on one parent infant interaction (24), at four months of age, as prognostic of the parental bond and cognitive outcome at one year of age. Early caregiver stimulation is also associated with early attainment of social, motor and speech milestones. Execution of post-discharge developmental intervention programs appears to enhance cognitive

outcomes (25,26), although long-term follow up outcomes may vary from one child to the other(27). Perinatal asphyxia has been associated with an interruption of the biological maturation of the infant's sensory, memory and emotional growth. This effect may begin to occur as early as the newborn period when neonates receive care away from their caregivers limiting the extent of early connection to their caregiver and ultimately the achievement of developmental maturity and independence. In the absence of the caregiver's security, an infant's environmental discovery is terrifying; and this may result in the development of pathological defensive mechanisms. [11]. It is imperative to recognize the caregiver's role in neural development, more so after experiencing lesions that may impair normal brain development.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

2.1.1 Mechanisms of neuronal injury

In perinatal asphyxia, hypoxia –ischemia causes primary energy failure and disrupted mitochondrial function. This in turn leads to the accumulation of generated lactate and inorganic phosphates thereby causing failure of the Na K ATPase pump that leads to intracellular fluid accumulation leading to oedema and cell death.

Secondary energy failure comes about as a result of the initial resuscitation with the restoration of cerebral blood flow usually 6-48 hours post insult. Reperfusion brings about oxidative stress with the release of the oxygen free radicals which leads to excessive release of glutamate and resultant excessive excitability that eventually results in cell death.

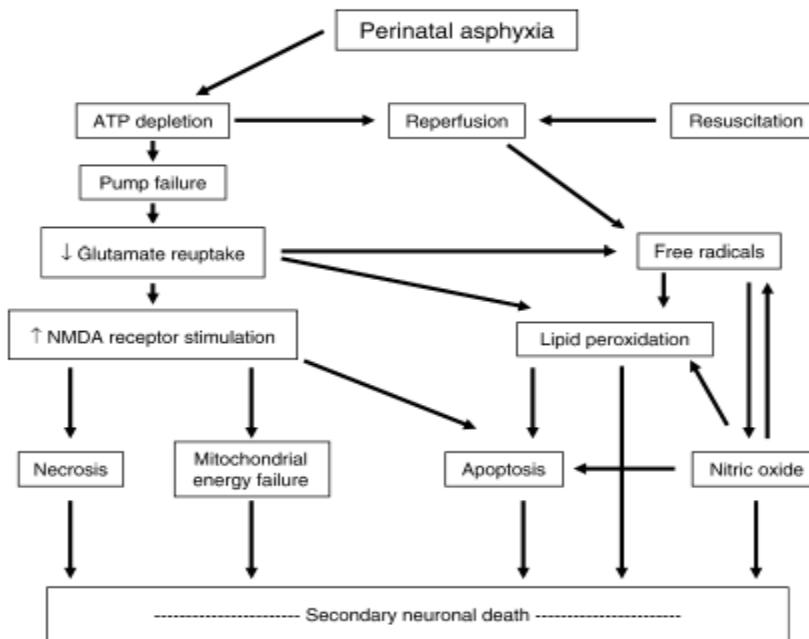


Figure 1 Mechanisms of neuronal injury

Adopted from Braun Falco 2009 Perinatal Asphyxia: Encyclopedia of molecular mechanisms of disease pg 1611-1615

The point in time at which the child is observed influences the presentation of neurological symptoms and signs in the newborn following asphyxia. They include seizures, hypotonia, and feeding difficulties(28,29). A common term for these presentations is hypoxic-ischemic encephalopathy (HIE), a condition observed in term or near-term neonates with onset within the first 24 hours of life. Modified Sarnat and Sarnat Clinical scoring categorizes perinatal asphyxia according to its severity. Stage 1 usually has an excellent prognosis and stage 2 invariably results in sequelae, whereas stage 3, in most cases, leads to death or a severe injury to the child(30). In a recent survey, (31), in low-income countries, out of 600 neonates, 30% developed HIE; of these 20% had stage 1, 35% had stage 2 and 45% had stage 3 HIE.

2.2. Long term effects of Perinatal Asphyxia

Evidence has shown that the presence, severity and duration of neurological deficits following perinatal asphyxia depend on the extent of the injury and the time interval before the establishment of spontaneous breathing. Severe asphyxia has been associated with cerebral palsy, epilepsy and intellectual disability(29,32), while mild-moderate asphyxia has been linked with the development of adult-onset psychotic disorders such as schizophrenia.(33,34) [27–29] and a low intelligence quotient score (35) in children and adolescents(36) .

A local study observed that children between the ages of two to six years old with mild perinatal asphyxia have broad executive functions similar to controls, while among those with moderate perinatal asphyxia consistently obtain inferior results compared with controls short of statistically important variances(37), (38). Children who experienced moderate perinatal asphyxia at birth have been shown to have problems in math, reading and spelling at the age of 7-9 years (39,40)..

Areas of the brain that are susceptible to perinatal asphyxia in neonates are the basal ganglia and the hippocampus (41,42)..(43).According to Martinez-Biarge et al. magnetic resonance imaging (MRI) has demonstrated focal brain lesions in the ventrolateral thalamus and posterior putamen. These children are noted to go on to have indiscriminate motor abnormalities at 1 and 3 months of

age (44), with an increased vulnerability to developing cerebral palsy.(45). Another MRI study done on 175 term infants following perinatal asphyxia obtained images at 6 weeks and 2 years of life (46). Findings showed discernable anatomical damage to the grey matter, hippocampus and frontal white matter, which were exhibited by the early images as well as the follow-up images, indicating a sustained effect. These MRI findings may offer proof of the close relationship between the severity of perinatal asphyxia, and the resulting functional deficits.

2.3 Role of Early Development Interventions

2.3.1 Neuroplasticity

There is evidence from both human and animal studies that early environmental experiences including parenting behaviour play a great role in an infant's brain development(47). The brain of a baby during infancy undergoes a period of rapid synaptogenesis with gray matter increasing 4-fold and white matter increasing 5-fold(48). The interruption of genetically planned brain formation configurations in neonates with perinatal asphyxia makes these neonates susceptible to altered brain development.

The developing human brain has the potential to create new synaptic connections even after a brain insult. The adverse outcomes of early brain injuries in neonates who are ultimately at risk of adverse neurodevelopmental outcomes can be alleviated by the initiation of interventions in the child's environment. Responsive caregiving practices enable parents to be champions of change in normalizing their baby's brain development after an early brain injury. Traumatic childhood experiences such as sexual molestation and child negligence have been associated with brain atrophy or loss of brain volume (49) compared to those raised in a nurturing maternal environment who demonstrated bigger brain volumes (50).

The brain is vulnerable to insults throughout the perinatal period; however, neuroplasticity provides room for early developmental interventions to positively impact brain development. The cat model of early intervention for motor impairment did show improvement in the motor function of cats that were initiated early versus those that were initiated when the cortico-spinal tract maturation was complete(51)With this in mind, developmental intervention activities are most beneficial when started early.

2.3.2 The role of parents in early intervention programs

A nurturing home environment and responsive caregiving practices have a positive effect on a child's development (52) notwithstanding other factors such as parental education and family income (53). Evidence shows that infants with perinatal asphyxia with a sensitive parent-infant relationship (close attachment/bonding between infant and parent) and a stimulating home environment i.e., providing toys, playing spaces and early childhood games are associated with superior neurodevelopmental outcomes(51). Destructive and invasive early parenting e.g., parents that are aggressive to the children and other family members and lack of parental support is linked to worse neurodevelopmental outcomes for perinatal asphyxia children across childhood(51). A positive home environment where children can play and interact freely and positive parenting skills have shown positive outcomes even in children who have brain injury at birth(51).

The home environment and a well-fostered parent-child relationship have been shown to have a great outcome (e.g. ability to walk properly, go to school and engage in physical activities) among babies born prematurely and with birth asphyxia (54). The Modified Caregiver-Infant transaction program that focuses on the caregiver and their infant has been successful in fostering responsive caregiving in caregivers with preterm infants. Studies on early interventions for perinatal asphyxia reported that programs that focused on the parent and infant concurrently were successful compared to those that looked at the parent or the child alone(17). Nonetheless, it is curious to note that there is inconclusive evidence on the ability of such programs to essentially modify parents' behaviour or the parent-child relationship (55)

2.3.3 Early developmental intervention activities.

1. Sensory Play

Includes hands-on activities that stimulate the senses of touch, sound, smell and taste and also contributes to proprioception. Play also enhances a stimulating caregiving environment

2. Breastfeeding

Breastfeeding has immense benefits for the infant. It has been associated with lower incidences of diarrhoeal illness and long-term benefits in neurodevelopment through the long-chain polyunsaturated fatty acids and docosahexaenoic acid components of breast milk(56).

Breastfeeding also enhances physical bonding through tactile stimulation and offers a responsive caregiving environment that enhances brain stimulation.

1. Music activities

Music and music activities like singing have been associated with the socio-emotional development of infants and have been shown to have increased neural activity in areas related to attention, memory and cortical plasticity in animal models(57)

2. Early occupational therapy

Occupational therapy services provided early to infants at risk of developmental delay help these infants learn adaptive skills in sensorineural, cognitive and communication through purposeful activity. Such activities are also taught to the caregivers who do the same at home.(58)

3. Responsive caregiving/sensitive parent-infant relationship

This refers to the ability of a caregiver to respond to an infant's cue in a timely and appropriate manner. This involves encouraging caregivers to make eye contact, cuddle, praise and respond appropriately to play and hunger cues among others. These set of activities to help in early infant development are outlined in the ministry of Health Mother to child booklet(59)

Table 1: Summary of literature review

AUTHOR/YEAR/COUNTRY/ SOURCE	STUDY TITLE	STUDY DESIGN & SAMPLE	EDI/OBJECTIVES	MAIN FINDINGS
<p>Carlo WA, Goudar SS, et al. 2017 INDIA, PAKISTAN, AND ZAMBIA</p> <p>The Journal of Pediatrics</p>	<p>Randomized trial of early developmental intervention on outcomes in children after birth asphyxia in developing countries (0-36 months)</p>	<p>parallel-group, randomized controlled trial</p> <p>n= 243</p>	<p>home visits by parent trainers</p> <p>health and safety counselling</p>	<p>Higher Mental Development Index (MDI) in the EDI patients compared to the control resuscitated children</p> <p>However, no difference noted in MDI between groups in the non-resuscitated children</p> <p>EDI group had a greater psychosocial development compared to both the resuscitated and non-resuscitated children</p>
<p>C. H. Blauw-Hospers & M. Hadders-Algra 2015</p> <p>Developmental Medicine & Child Neurology</p>	<p>A systematic review of the effects of early intervention on motor development</p>	<p>Systematic review</p> <p>n=34</p>	<p>Newborn Individualized Developmental Care and Assessment Program (NIDCAP)</p> <p>Neurodevelopmental treatment (NDT)</p>	<p>NIDCAP intervention may have a temporary positive effect on motor development</p> <p>Principles of neurodevelopmental treatment (NDT) do not have a beneficial effect on motor development</p> <p>specific or general developmental programmes can have a positive effect on motor outcome</p>

<p>P. K. Maulik and G. L. Darmstadt, 2019</p> <p>Journal of Perinatology</p>	<p>Home-based interventions to optimize early childhood development in low-resource settings</p>	<p>Systematic review</p> <p>n=76</p>	<p>Play and reading</p> <p>Music</p>	<p>Play and reading are effective interventions for early childhood interventions in low- and middle-income countries</p> <p>More research is needed to evaluate the effectiveness of music</p>
<p>J. L. Wallander et al.,2020, INDIA, PAKISTAN, AND ZAMBIA</p> <p>BMC Pediatrics</p>	<p>Brain Research to Ameliorate Impaired Neurodevelopment - Home-based Intervention Trial (BRAIN-HIT)</p>	<p>randomized controlled trial</p> <p>n= 174 children with perinatal asphyxia & 257 in the controls</p>	<p>Home-based, parent-implemented EDI - <i>Partners for Learning</i> (Sparling & Lewis 1984)</p>	<p>Relatively inexpensive programs of early developmental intervention, delivered during a home visit by parent trainers, are capable of improving neurodevelopment in infants after perinatal asphyxia</p>
<p>Malar, G et al 2013 (INDIA)</p>	<p>Caregiver's involvement in early intervention for children with communication disorders</p> <p>N=205 caregivers</p>	<p>.</p>	<p>-caregiver counselling</p> <p>-speech language skills</p> <p>-listening skills</p>	<ul style="list-style-type: none"> Empowered caregivers had children with better outcomes in language and speech as well as academic performance

2.3.4 Theoretical framework

This simple theoretical framework describes the process from the birth of a baby with perinatal asphyxia to the point of discharge. When babies are born with perinatal asphyxia, their caregivers are informed. They are also given reasons as to why the baby was born with perinatal asphyxia. The babies are then admitted to the newborn unit for treatment and prevention of further complications as a result of perinatal asphyxia. Caregivers are informed of the treatment modalities in the newborn unit. In addition to treatment modalities, caregivers are also apprised on the possible long-term complications of perinatal asphyxia e.g., delayed milestones.

Once the patient improves and does not need admission care, the discharge process is initiated. The healthcare workers are supposed to educate caregivers on the care of the baby at home e.g., administering the prescribed medication, identification of danger signs, when to take the patient to the hospital, and exclusive breastfeeding. Caregivers are also advised on follow-up clinics for the baby, and when and where to attend occupational and physiotherapy sessions. In addition to the above, caregivers are encouraged to talk to and play with the baby to stimulate their neurological and physical growth. All the above information helps boost the caregivers' knowledge of early neurodevelopmental interventions for babies born with perinatal asphyxia.

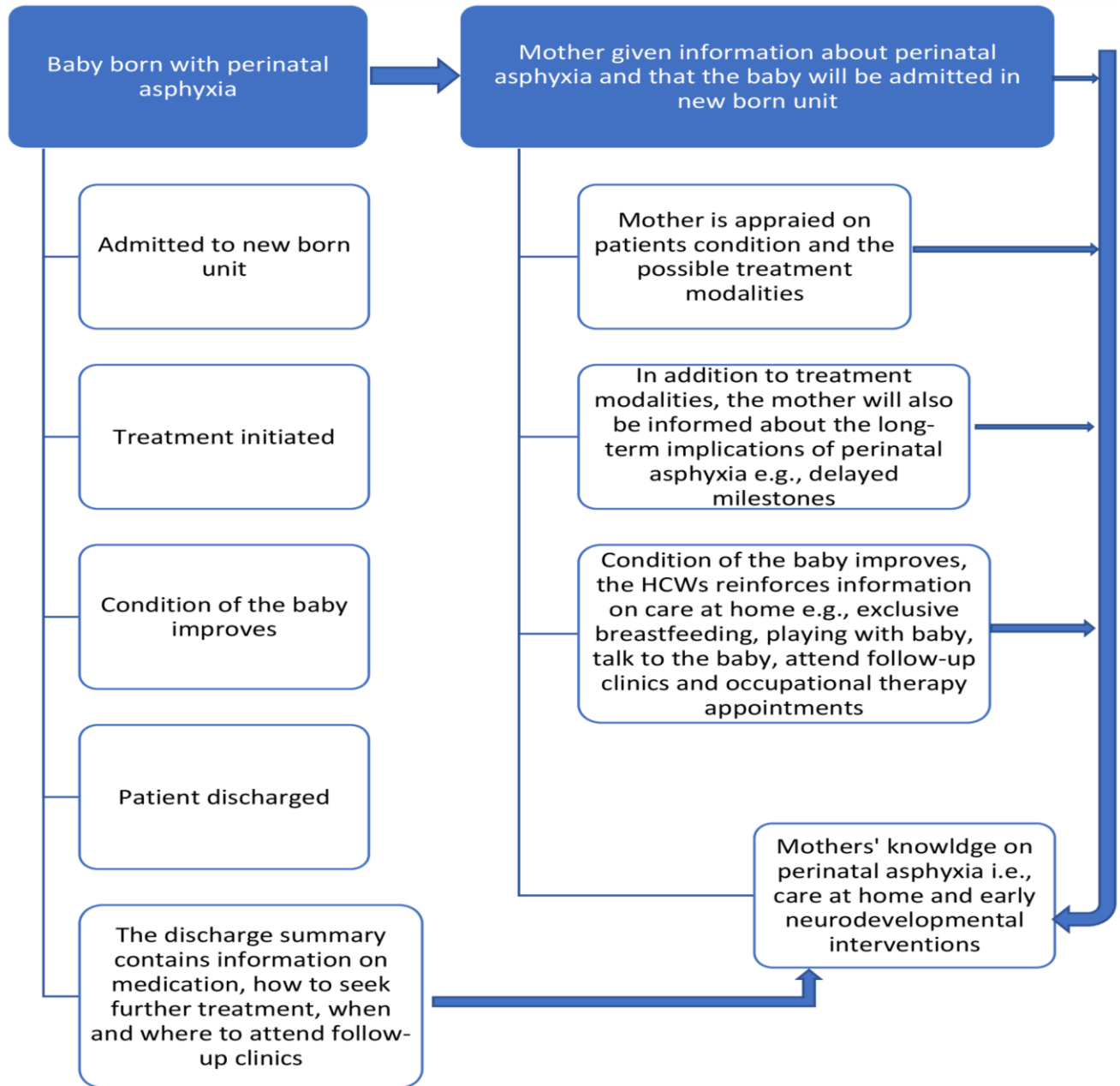


Figure 2 Theoretical framework; caregivers' knowledge of early neurodevelopmental interventions among babies born with perinatal asphyxia

2.3.5 Conceptual framework

The conceptual framework above assumes that the independent variables directly affect the dependent/outcome variables. For example, the caregiver's level of education will enhance the health education that is given by health workers. Those with a tertiary level of education will most likely understand the teachings on perinatal asphyxia and its complications compared to those with no education. Caregivers with a higher parity are likely to have interacted more with the hospital environment and may have heard about perinatal asphyxia before compared to first-time caregivers. The assumption of parity also applies to age. Married women may have learned partners who have interacted or heard of perinatal asphyxia. The spouse may also take a step further and learn through the internet and share with the caregiver. The same may not apply to single caregivers.

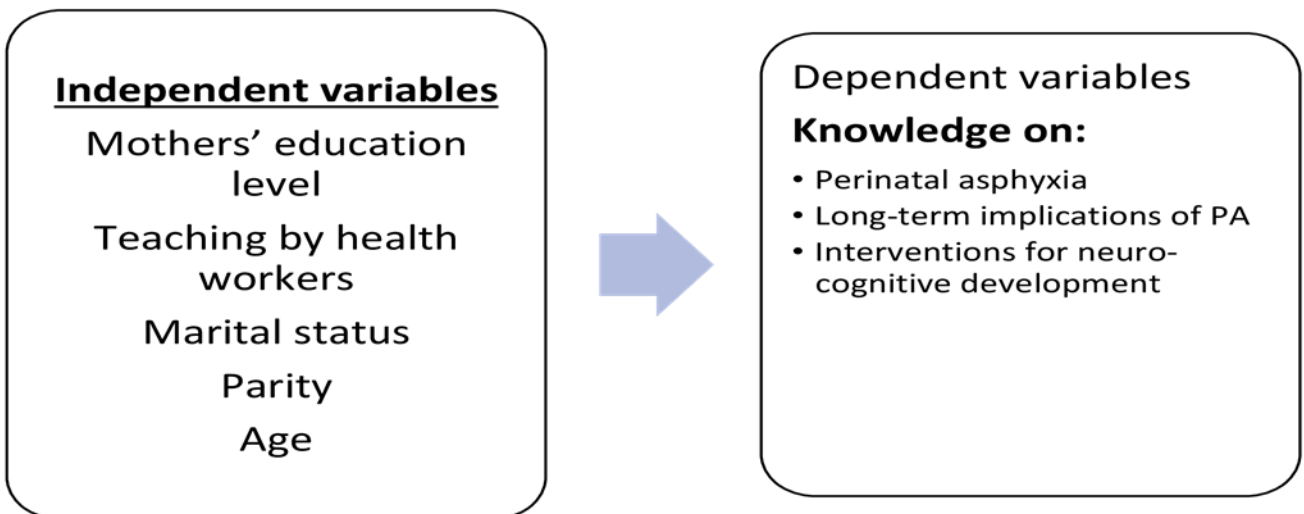


Figure 3 Conceptual framework

2.4 STUDY JUSTIFICATION

Early developmental interventions have already been proven in previous research to greatly improve the neurological outcomes of children at threat of adverse neurodevelopmental outcomes.

Caregivers' involvement in early intervention programs has been associated with better outcomes for their children.

Home learning activities are affordable and can be easily in-corporated in the daily activities e.g during feeding, bathing and play time.

Of note, rehabilitative services are not readily accessible and so we rely on parents learning some basic stimulatory skills e.g. playing with their child and practicing responsive caregiving practices to support their babies. Of the several studies carried out very few looked at the caregiver awareness of early interventions after perinatal asphyxia. Therefore, this study topic was purposively chosen to look at the awareness of perinatal asphyxia and caregiver knowledge on early developmental interventions at the Kenyatta National Hospital.

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2.5 Research question/Broad objective

What is the level of caregiver knowledge on the role of early developmental interventions and the associated factors after perinatal asphyxia at the KNH NBU?

2.6 Specific objectives

- To assess caregiver knowledge and understanding of perinatal asphyxia and its long-term outcomes
- To assess the level of caregiver knowledge of early developmental interventions among babies with perinatal asphyxia at the Kenyatta National Hospital Newborn Unit.
- To determine the factors associated with caregivers' knowledge of early neurodevelopmental interventions among babies with perinatal asphyxia.

CHAPTER THREE

METHODOLOGY

3.2 Study design

This was a descriptive hospital based cross-sectional study.

3.3 Study setting

The study was conducted at Kenyatta National Hospital Newborn unit.

KNH is a regional and national referral hospital located in Nairobi County serving the whole country (Kenya) and part of East Africa. It has a catchment area of about 4 million people within an area of 1,317 square kilometers.

The hospital has a bed capacity of 1800 beds. The hospital serves a big majority of people living in the capital city and its environs. On average about 800 newborns are admitted to the newborn unit (NBU) yearly due to perinatal asphyxia.

The newborn unit is the department where babies with perinatal asphyxia are admitted daily from the hospital's labour ward and referrals from other hospitals. The unit also offers a setting where the caregiver interacts with the healthcare worker and may discuss the diagnosis, supportive treatment and discharge instructions on how to get further management.

3.4 Study population

Caregivers of term newborns who were diagnosed with perinatal asphyxia at the Kenyatta National Newborn Unit.

3.4.1 Inclusion Criteria

- Caregivers of term babies admitted to NBU with an admission diagnosis of perinatal asphyxia
 - Failure to sustain breathing at birth with the need for Resuscitation for 10minutes PLUS
 - Evidence of Sarnat and sarnat staging of HIE
 - Cord blood Sampling-Evidence of Metabolic acidosis with pH less than 7.0

3.4.2 Exclusion Criteria

- Caregivers who refused to give informed consent
- Very ill women – who were admitted in the wards or the critical care unit

3.4.3 Outcomes of Interest

- Understanding what perinatal asphyxia is
- Knowledge of the potential long-term impact of birth asphyxia
- Knowledge of strategies for promoting neuro-cognitive development

3.5 Sample Size Determination

The sample size will be estimated by the use of the recommended Fisher's et al. (1991) formula:

$n =$ The sample size will be estimated by the use of the recommended Fisher's et al. (1991) formula:

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

$$N = 720,$$

the population of babies with perinatal asphyxia as established by Dr. Kanguha (2018), this is the latest available census on perinatal asphyxia among babies admitted to KNH newborn unit.

Since this study was conducted in 2 months, this population will be $N = \left(\frac{720}{12}\right) * 2 = 120$

- Z= critical value at 95% confidence level (1.96)
- P=estimated proportion of outcome (assumed at 0.5, in the absence of previous studies in similar settings)
- d=desired level of precision (0.05)

$$n = \frac{1.96^2 \times 120 \times 0.5 \times (1 - 0.5)}{0.05^2 \times (120 - 1) + 1.96^2 \times 0.5(1 - 0.5)}$$

$$n = 92 \text{ caregivers}$$

3.6 Sampling Method

Consecutive sampling was utilized in the recruitment of study participants; all caregivers with babies with perinatal asphyxia who met the inclusion criteria and who gave consent for the study

3.7 Study enrollment procedure

This was a hospital based cross sectional study carried out from January 2023 to March 2023 at the Kenyatta National Hospital New Born unit.

Approval was obtained from the Hospital Ethics and research Committee and informed consent was obtained from each caregiver at the time of interview.

Potential study participants were obtained from screening of patient files who were discharged to identify those with a diagnosis of perinatal asphyxia.

103 files were screened for eligibility, 5 were excluded as the mothers were very ill and admitted in the wards or in the critical care unit. The principal investigator then approached the 98 caregivers and explained the nature of the study to them and thereafter informed consent was sought, six caregivers declined.

Data was collected from the identified caregivers using an interviewer administered pre tested questionnaire (appendix II). Each questionnaire was assigned a study number, while ensuring no patient or caregiver identifiers was used.

At the end of the questionnaire, ALL caregivers were educated on neonatal danger signs and strategies to promote neuro cognitive development i.e. sensory play, breastfeeding to enhance maternal bonding and brain development, importance of early occupational therapy, music activities and practicing responsive caregiving.

This is illustrated in the study procedure figure below

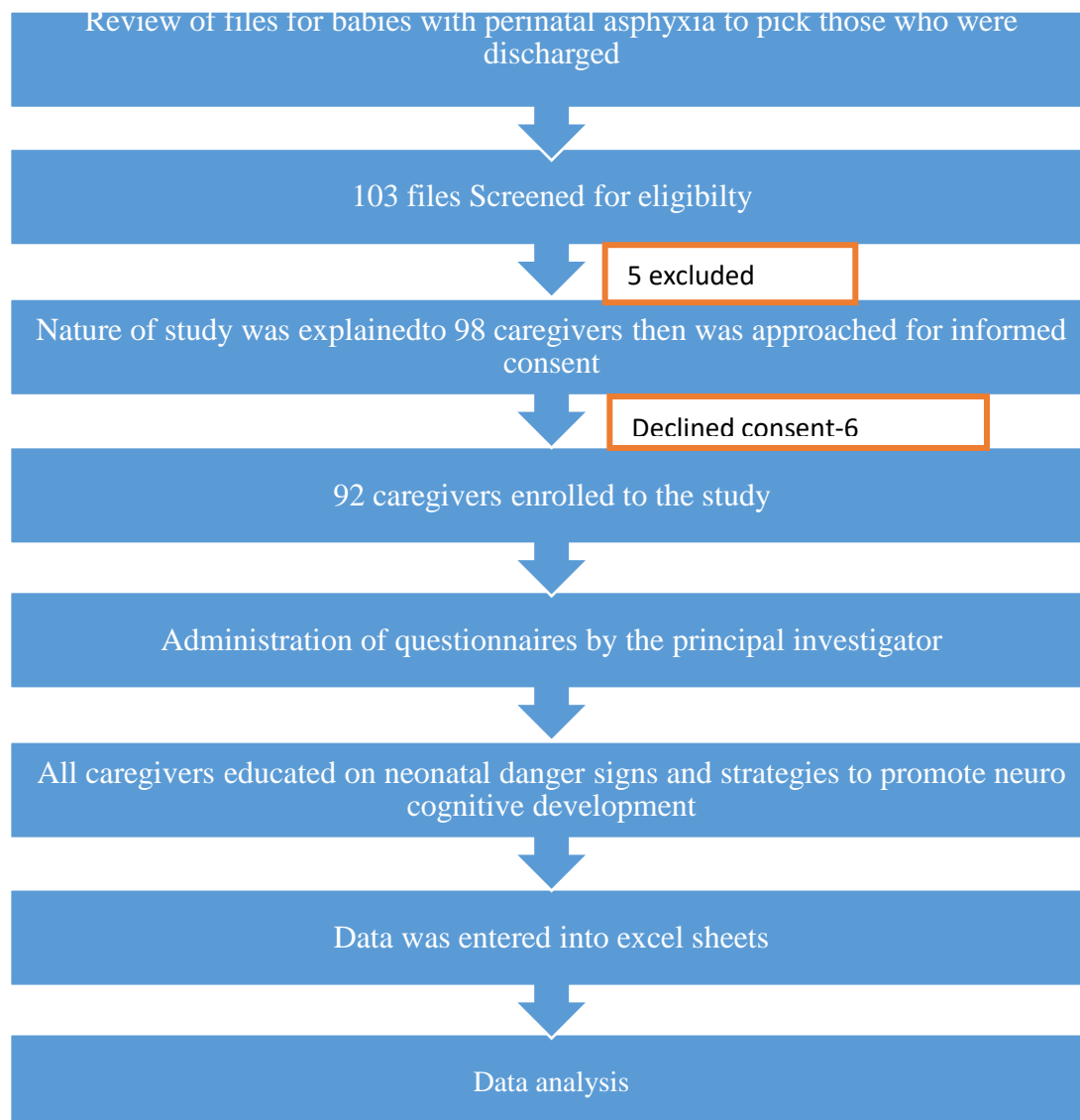


Figure 4: Study Procedures

3.8 Data Management and Analysis

Completed questionnaires were coded and the responses entered into excel spreadsheets. The data was then exported into R version 4.1.2 for recording, cleaning and analysis.

Analysis of categorical variables was presented in tables and charts. Categorical variables e.g., the education level of caregivers, sex of the babies, place of birth of the babies and mode of delivery were presented as frequencies and proportions. Continuous variables e.g., the age of caregivers and babies was summarized using medians and interquartile ranges.

For the knowledge score, each correct item was awarded one mark and the total was divided by the total number of items to get a percentage. The percentage knowledge score was summarized using medians and interquartile ranges. The scores were presented using scatter plots.

The differences in scores in knowledge of neurodevelopmental interventions between the different levels of the various predictors e.g., age categories and parity were analyzed using Mann-Whitney U test for the binary predictors and Kruskal Wallis test for the polynomial predictors. The significance was determined using p values at 5% significance level. Factors associated with knowledge of neurodevelopmental interventions among children with perinatal asphyxia were assessed using multiple linear regression. The results were presented using odds ratios, confidence intervals for odds ratios and p values at 5% significance level.

3.9 Ethical Considerations

3.9.1 Ethical approval

Ethical approval and clearance to perform the study was sought from the Kenyatta National Hospital/University of Nairobi Ethics and Research committee.

3.9.2 Informed consent

Written consent was obtained from the caregivers prior to administration of the questionnaires.

3.9.3 Confidentiality

Confidentiality of the data collected was maintained via use of passwords and limited access to the principal investigator and the statistician.

3.9.4 Benefits

ALL caregivers in this study were educated on neonatal danger signs and strategies to promote neuro cognitive development i.e. sensory play, breastfeeding to enhance maternal bonding and brain development, importance of early occupational therapy, music activities and practicing responsive caregiving.

**CHAPTER FOUR:
RESULTS**

4.1 Descriptive characteristics of the study participants

The mean age of the caregivers who participated in this study was 29.4 years with a standard deviation of 5.7 years. The majority, 63/92 (68.5%) of the caregivers were multigravida and the rest were primigravida. The majority, 72/92 (78.2%) of the caregivers were married, followed by 18/92 (19.6%) who were single and the rest were separated (table 2).

Table 2: Descriptive characteristics of the study participants

<i>Characteristic</i>	<i>Detail</i>	<i>Frequency/Mean</i>	<i>Percent (%) /SD</i>
<i>Parent characteristics</i>			
<i>Age in years</i>	Mean	29.4	SD = 5.7
	<i>Parity</i>		
	Primigravida	29	31.5
	Multigravida	63	68.5
<i>Marital status</i>	Single	18	19.6
	Married	72	78.2
	Separated	2	2.2
<i>Employment status</i>	Business	32	34.8
	Employed	9	9.8
	Not employed	51	55.4
<i>Level of education</i>	None	4	4.3
	Primary	10	10.9
	Secondary	52	56.5
	Tertiary	26	28.3
<i>Characteristics of the babies</i>			
	Detail	Frequency/Median	Percent (%) /IQR
<i>Sex of the baby</i>	Female	23	25.0
	Male	69	75.0
<i>Age in weeks</i>	Median	2.0	1.0, 3.0
<i>Place of birth</i>	KNH	52	56.5

<i>Mode of delivery</i>	Referral	40	43.5
	SVD	58	63.0
	CS	34	37.0

The caregivers who were not employed were the majority, 51/92 (55.4%) followed by those who were involved in business 32/92 (34.8%). Employed caregivers were 9/92 (9.8%). The majority, 52/92 (56.5%) of the caregivers had a secondary school education followed by 26/92 (28.3%) with tertiary education. Those with a primary school education were 10/92 (10.9%) while the rest had no formal education.

The majority, 69/92 (75.0%) of the children were males and the rest were females. The median age of the children was 2.0 weeks with an interquartile range of 1.0 to 3.0 weeks. Overall, 89/92 (96.7%) of these babies did not cry at birth. The majority, 52/92 (56.5%) of the babies were born at KNH and the rest were referrals from other hospitals. Children born via spontaneous vaginal delivery were 58/92 (63.0%) and the rest were born via caesarean section (table 2).

4.2 Pattern of ANC attendance

There were 10 (11%) participants with less than 4 ANC visits, 20 (22%) with 4 visits and 62 (67%) with more than 4 ANC visits. Of the 92 participants, 10 (11%) did not know the minimum required number of ANC visits, 33 (36%) said the required minimum number of ANC visits are 4 and 49 (53%) said more than 4 visits.

In actual practice, 8 (80%) of those who attended less than 4 ANC visits reported that the minimum required number of visits were 4 and 2 (20%) were those who said they did not know the minimum required number of visits. Of the 20 participants who made 4 ANC visits, 2 (10%) said they did not know the required number of visits, 14 (70%) said the minimum required number of visits are 4 and 4 (20%) said more than 4 visits were required. Out of the 62 participants who made more than 4 ANC visits, 6 (10%) said they did not know the required number of ANC visits, 11 (18%) said the required minimum ANC visits are 4 and 45 (72%) said that more than 4 visits are required (Table 3 & Figure 1).

Table 3: Association between prior knowledge of required ANC visit requirement and actual practice (attendance of participants)

Knowledge of required ANC visits	Number of ANC visits made			Total N=92	P-value
	Less than 4 N=10	4 times N=20	>4 times N=62		
Don't know	2 (20%)	2 (10%)	6 (10%)	10 (11%)	<0.001
Four	8 (80%)	14 (70%)	11 (18%)	33 (36%)	
More than 4 times	0	4 (20%)	45 (72%)	49 (53%)	

Relationship between knowledge of the required ANC visits and actual practice

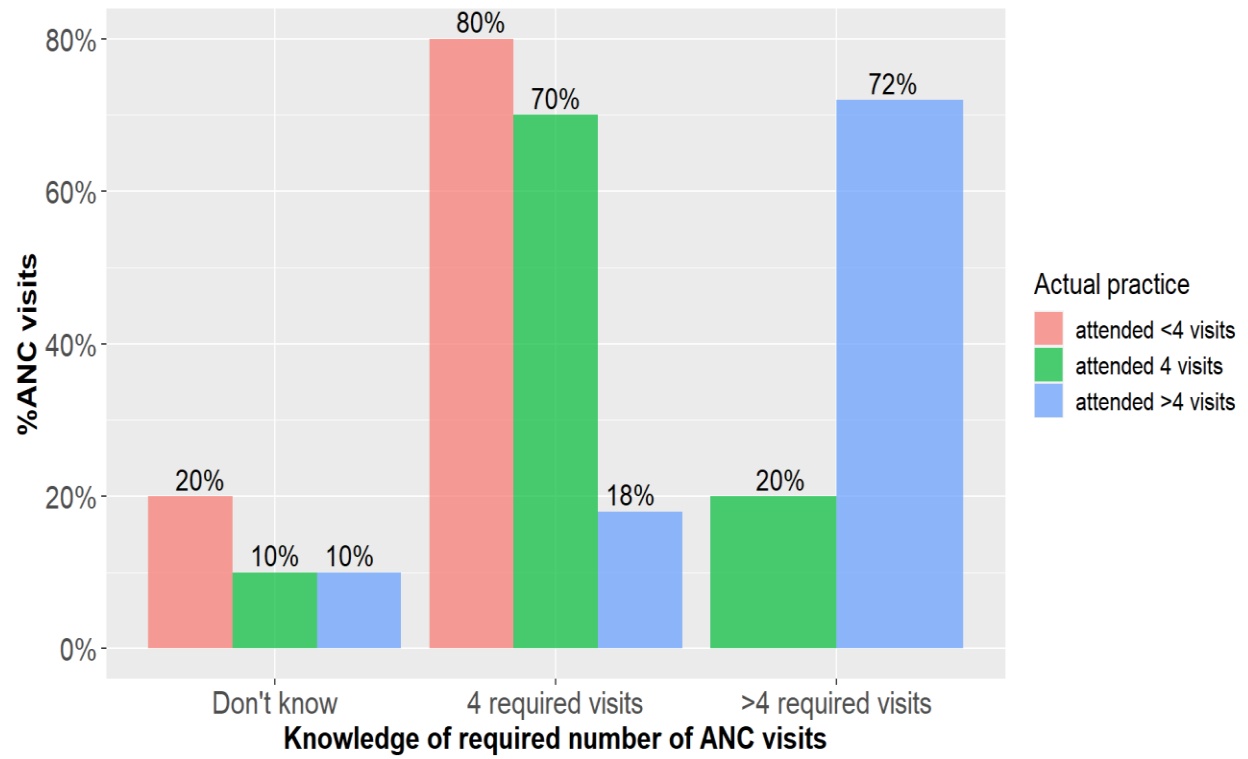


Figure 5: Relationship between knowledge of the required ANC visits and actual practice

4.3 Knowledge of perinatal asphyxia

Overall, only 29/92 (31.5%) had heard about perinatal asphyxia. The majority 89/92 (96.7%) of the caregivers said that their babies did not cry at birth.

When asked about long-term impact of perinatal asphyxia, 12 (13%) said the children will have delayed milestones, 8 (8.7%) chose intellectual disability and 2 (2.2%) chose hearing impairment. A total of 67 (72.8%) indicated that they did not know of the complications associated with perinatal asphyxia.

(Table 4 & Figure 6).

Table 4: Information on perinatal asphyxia and its potential long-term impact

Variable	Detail	Frequency N = 92	Percent (%)
Information on perinatal asphyxia			
Ever heard of perinatal asphyxia	Yes	29	31.5
	No	63	68.5
Did your baby cry	Yes	3	3.3
	No	89	96.7
Told why the baby did not cry	Yes	64	71.9
	No	25	28.1
Caused by lack of breathing	Yes	23	25.0
	No	32	34.8
	Don't know	37	40.2
The potential long-term impact of perinatal asphyxia			
Long-term impact of perinatal asphyxia	Vision abnormalities	1	1.1
	Delayed milestones	12	13.0
	Speech delay	2	2.2
	Intellectual disability	8	8.7
	Hearing impairment	2	2.2
	I don't know	67	72.8

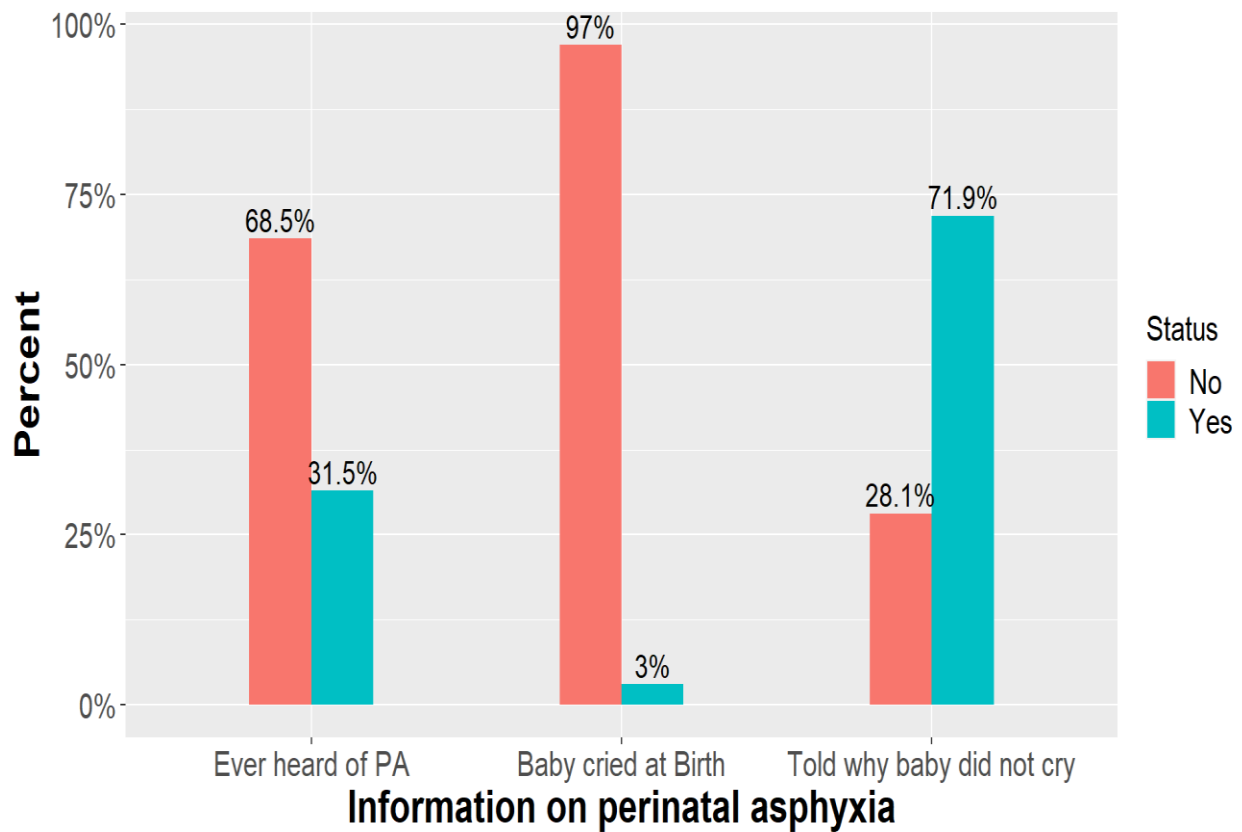


Figure 6: Information on perinatal asphyxia

Reasons given for babies not crying

Among the 89 caregivers who said their babies did not cry at birth, 64/89 (71.9%) were informed of the factors that contributed to their babies not crying which included; fatigue 30 (34%), prolonged labor 27 (29%) and the lack of oxygen 8 (9%). Those who were not told were 25 (28%) Figure 3.

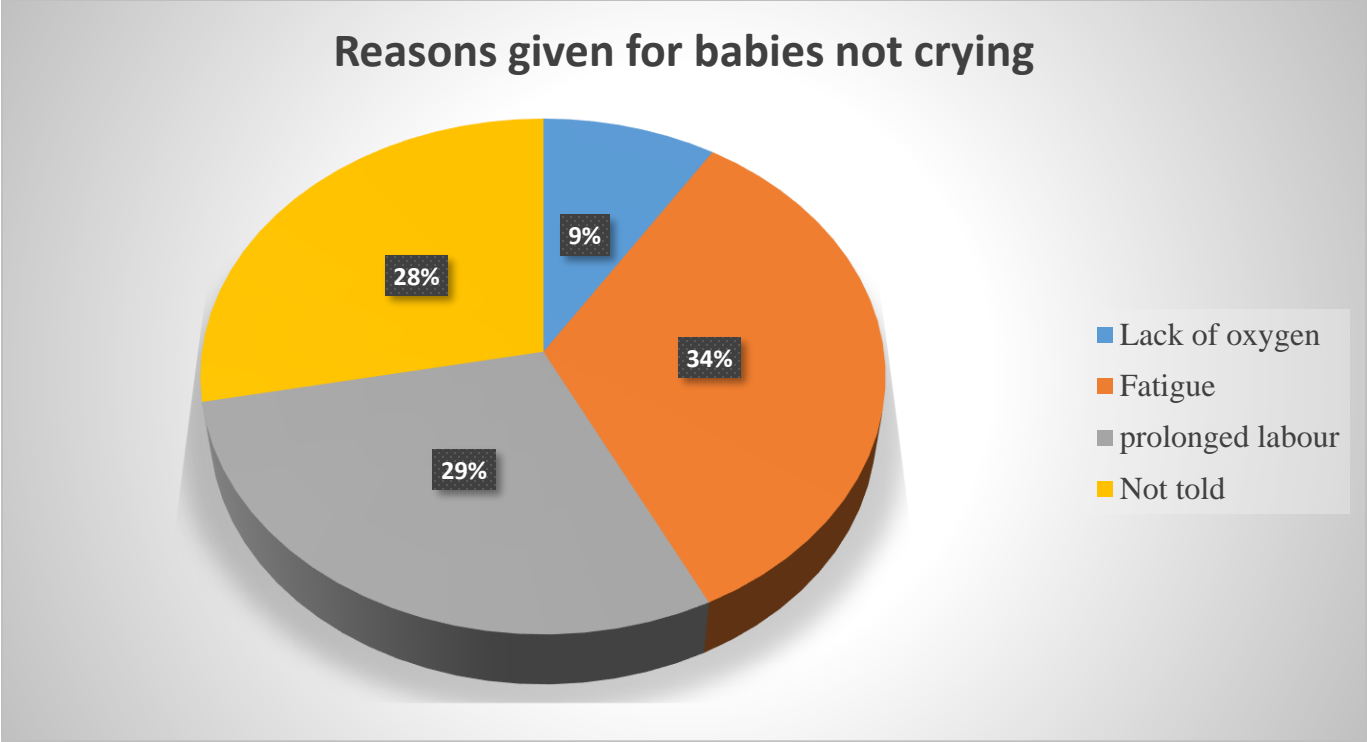


Figure 7: Reasons why the babies did not cry

4.3.1 Facility referral practice for early occupational therapy services

Of the 92 babies diagnosed with perinatal asphyxia, only 8% were referred for early occupation therapy, the majority 85 (92.4%) were not (Figure 4).

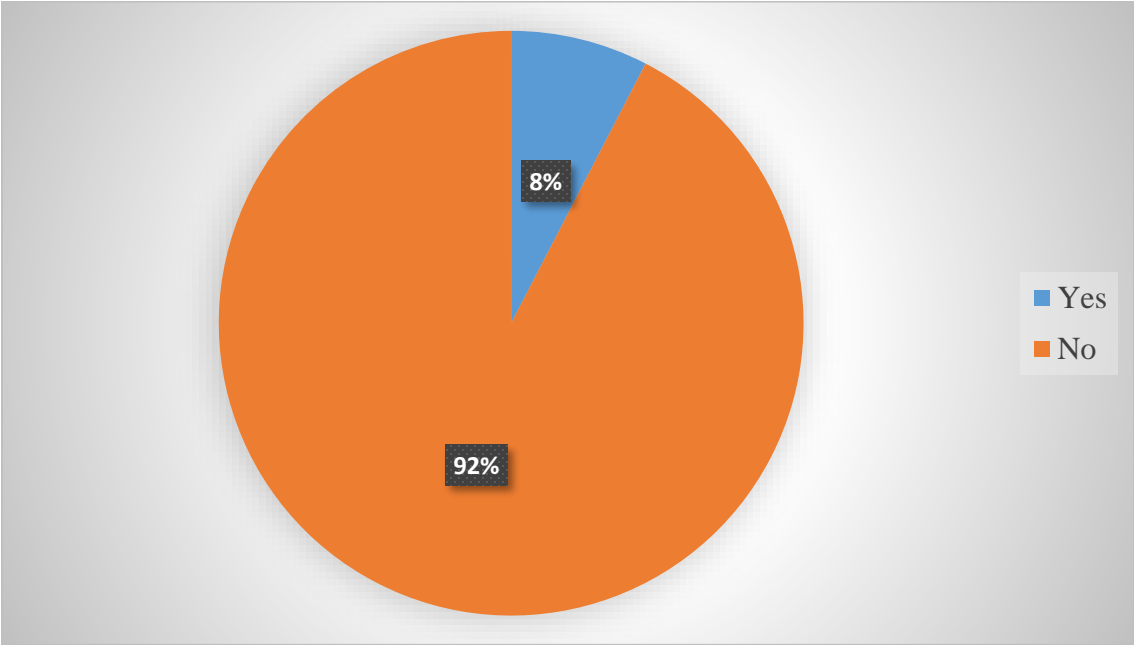


Figure 8: Referred for occupational therapy services

4.4 Promoting neurocognitive development for babies with perinatal asphyxia

When the caregivers were asked what they will do if the child convulsed at home, the majority 63/92 (68.5%) said they would seek help in the hospital which was the correct answer, 23/92 (25%) said they will buy drugs from a chemist and 6/92 (6.5%) said they will use herbal medicine. On ways of bonding at home, exclusive breastfeeding which was the correct answer was chosen by the majority 70/92 (76%) of the mothers while the remaining 22/92 (24%) said they would take their children to the grandparents.

When asked how they will stimulate the baby’s brain while at home, the majority 78/92 (84.8%) correctly said they will play with the baby and 14/92 (15.2%) said they will play loud music.

When asked whether they knew of any interventions that prevent delayed milestones in children with perinatal asphyxia, the majority 46/92 (50.0%) correctly said they will adhere to occupational therapy services and 44/92 (47.8%) said they will take the child to a physiotherapist. The remaining 2/92 (2.2%) said they will expose the child to the sun which was incorrect (Table 5).

Table 5: Promoting neurocognitive development for babies with perinatal asphyxia

Variable	Detail	Frequency N = 92	Percent (%)
What to do when the child convulses at home	Take the child to the hospital	63	68.5
	Buy drugs from the chemist	23	25.0
	Use herbal medicine	6	6.5
How to bond with baby at home	Exclusive breastfeeding	70	76
	Take the child to grandparents	22	24
Ways of stimulating baby’s brain at home	Playing with the baby	78	84.8
	Play music on the radio	14	15.2
	Occupational therapy	46	50

Interventions to prevent delayed milestones in children who had PA	Expose the child to the sun	2	2.2
	Physiotherapy services	44	47.8
Enhancement of language in children who had PA	Always talk to the child	74	80.4
	Play music on the radio	16	19.6

**shaded areas were the incorrect responses*

4.5 Knowledge of caregivers on early neurodevelopmental interventions among babies with perinatal asphyxia

A score for knowledge on neurodevelopmental interventions was computed based on five items. Each correct item was awarded one mark and then converted into a percentage score. The median knowledge score was 80% with an interquartile range of 60% to 100%. Figure 3 below shows the scatter plot of knowledge on neurodevelopmental interventions.

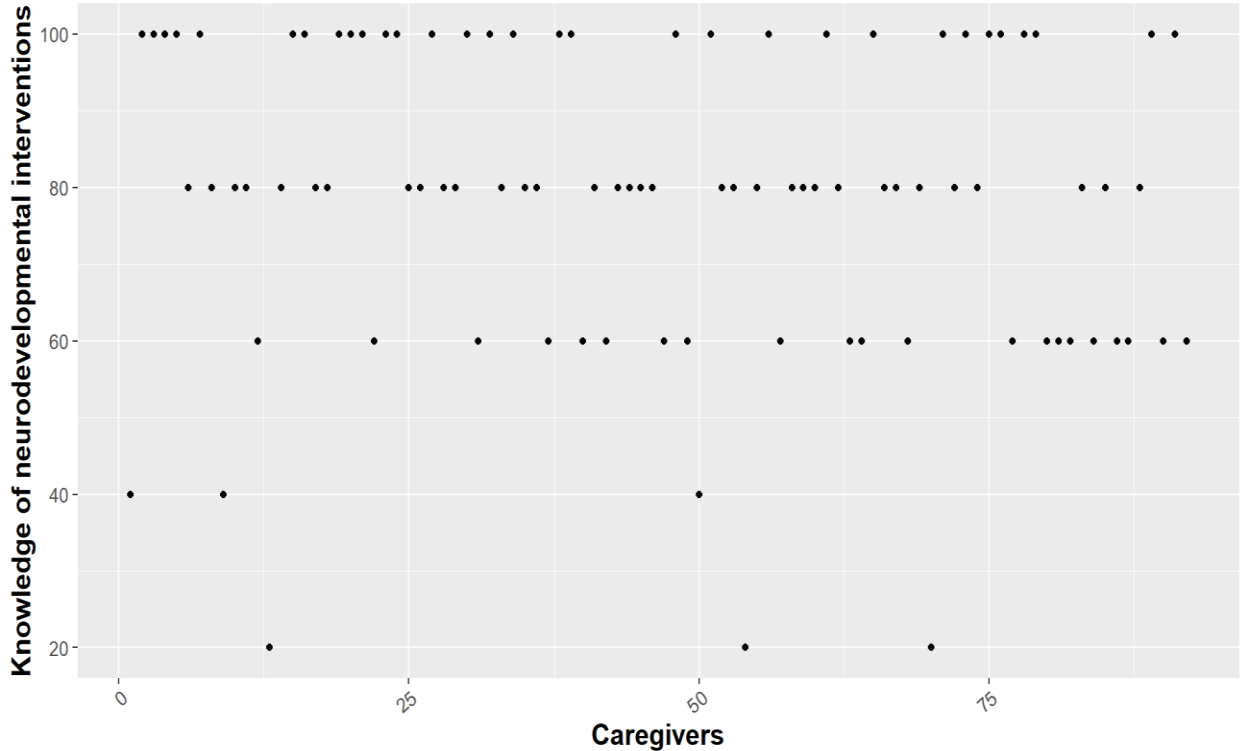


Figure 9: Distribution of knowledge of neurodevelopmental interventions among caregivers

Number of caregivers	Knowledge score of early neurodevelopmental interventions
3	1/5 (20%)
3	2/5 (40%)
21	3/5 (60%)
34	4/5 (80%)
31	5/5 (100%)

Table 6: Distribution of Knowledge scores among caregivers

4.6 Factors associated with caregivers' knowledge of early neurodevelopmental interventions among babies with perinatal asphyxia.

To determine the factors associated with caregiver’s knowledge of early neurodevelopmental interventions, we created a composite outcome of all the questions that addressed the interventions.

The total score was then converted into a percentage outcome.

Bivariate analysis

Association between the age of the parent and knowledge score

Figure 4 below shows the results of the correlation between the age of caregivers and the percentage knowledge score of early neurodevelopmental interventions among children with perinatal asphyxia. The p-value for the test is 0.12 and therefore there was no significant association between the age of the mother and knowledge of early neurodevelopmental interventions among children with perinatal asphyxia at 0.05 significance level.

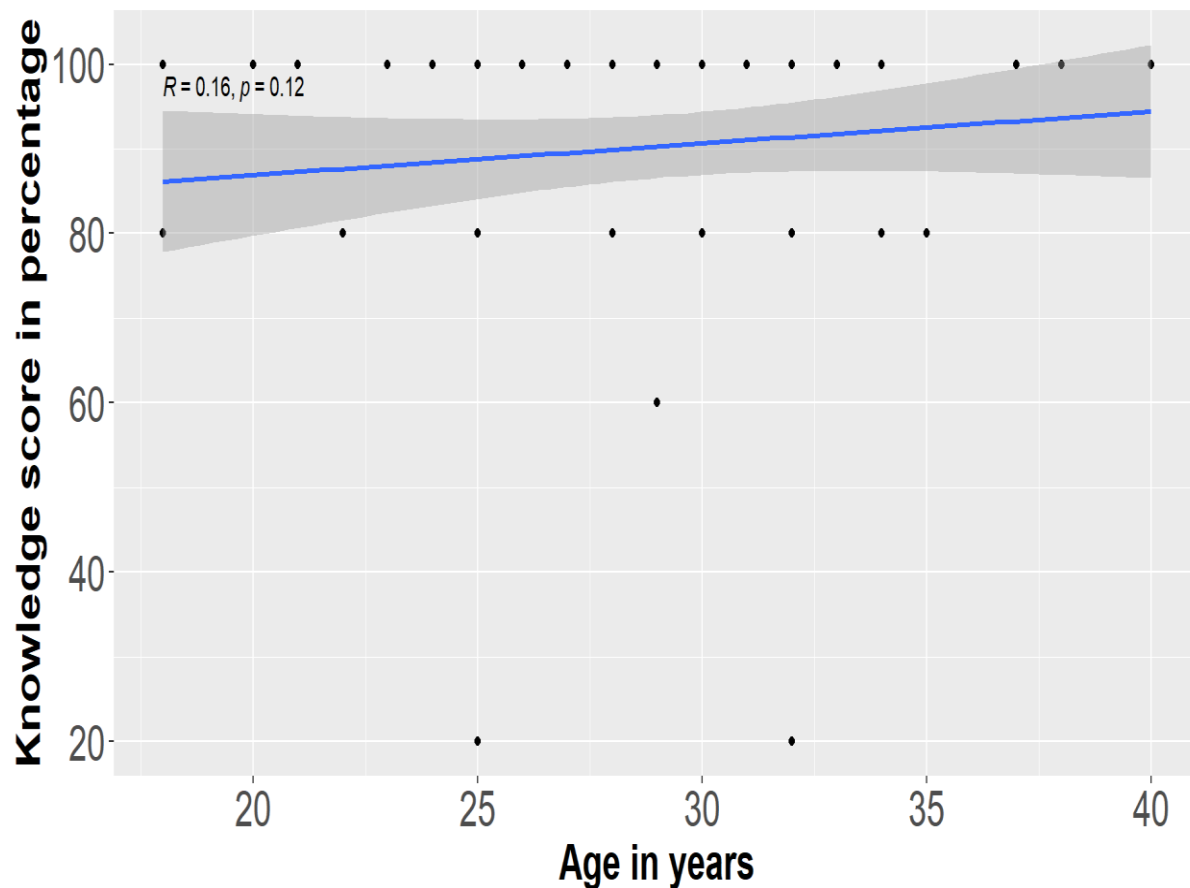


Figure 10: Association between the age of the caregivers and knowledge of early neurodevelopmental interventions among children with perinatal asphyxia

Table 7: Comparison of medians on knowledge of neurodevelopmental interventions among the various levels of caregivers

Variable	Detail	Median (IQR)	Test	P value
Age in years	<25	80 (60, 100)	Kruskal Wallis test	1.0
	25 to 30	80 (60, 80)		
	>30	80 (65, 100)		
Parity	Primigravida	80 (60, 80)	Mann-Whitney U test	0.02
	Multigravida	80 (80, 100)		

Marital status	Single	80 (65, 100)	Kruskal Wallis test	1.0
	Separated	90 (85, 95)		
	Married	80 (60, 100)		
Level of education	Primary	80 (60, 100)	Kruskal Wallis test	1.0
	Secondary	80 (60, 100)		
	Tertiary	80 (60, 100)		
Employment status	None	80 (60, 100)	Kruskal Wallis test	1.0
	Business	80 (60, 85)		
	Employed	80 (60,100)		
ANC visits	Less than 4	80 (60, 95)	Kruskal Wallis test	1.0
	Four	80 (60, 100)		
	More than four	80 (60, 100)		
Child referred for OT services	Yes	80 (70, 90)	Mann-Whitney U test	0.81
	No	80 (60, 100)		

Table 7 above shows a comparison of median scores on knowledge of early neurodevelopmental interventions among the various levels of caregivers. A statistically significant difference in median knowledge score was observed between the primigravida and multigravida women, p-value 0.02 at 5% significance level. There were no significant differences in median scores between the various levels of the other variables.

CHAPTER FIVE

DISCUSSION

This is a study conducted among mothers who had infants with a diagnosis of perinatal asphyxia at the point of discharge from the newborn unit to determine the mother's knowledge on early developmental interventions after perinatal asphyxia. Early interventions that are home based and caregiver initiated have been shown to be effective in infants with perinatal asphyxia in other low resource settings and as such the primary caregivers having this knowledge is essential to development of their children.

On characteristics of the asphyxiated neonates, majority (75%) were male compared to females at 25%. While this was quite a high number, other studies in similar settings found the majority of asphyxiated infants being male as well. Ugwu et al (62) in Nigeria in a study of Incidence of Birth Asphyxia as Seen in Central Hospital and GN Children's Clinic both in Warri Niger Delta of Nigeria: An Eight Year Retrospective Review, found the Incidence of birth Asphyxia to be 59% and 41% in male infants and female infants respectively, and a male to female ratio of 3:2.

In this study, caregivers who had better knowledge on the required number of ANC had good attendance demonstrating that knowledge and awareness influence utilization of health services. This compares to a study in India on knowledge, attitude and practice on antenatal care that found women with inadequate knowledge on early attendance of antenatal care had late bookings for their first trimester appointments(60)

This study found knowledge of early interventions or ways to promote neurocognitive development was good at a median of 80% with an IQR of 60 to 100% this finding could be attributed to good practices that are rooted in the tradition of child rearing practices and such the caregivers may have not been fully aware of their contribution to child development and it also compares to a study by Gaikwad et al in India (61) that looked at caregiver knowledge regarding early child development and found that 91% of participants knew that reading, storytelling and singing can contribute to child development but did not know that it should be started early or why they were important. This finding, offers a great opportunity that can be developed for

example in the formation of Mother to Mother support groups that give moral support to these caregivers while exchanging notes on appropriate supportive care for their infants.

Findings from this study showed that more than 80% of babies were not referred for early occupational therapy on discharge. This is a lost opportunity for these babies who may greatly benefit from this early intervention. A study done at KNH by Barasa on utilization of support services for children with cerebral palsy, found out in as much as the majority of the children were using occupational therapy services, initial visits were done much later when the children had already developed motor delays. (19) This highlights the missed opportunity for access to health services despite being at the hospital.

On caregiver's knowledge of perinatal asphyxia and its potential long-term outcomes, overall knowledge was insufficient/poor with 73% of caregivers having no knowledge of long-term outcomes. This means only one in four mothers of children who have experienced birth asphyxia are aware of the long-term sequelae at the point of discharge from the newborn unit. This compares to a study in Niger by Ogunlesi et al 2013(63) in their study of Mother's knowledge about birth asphyxia; of the 354 mothers in the study, only 38.95% of mother infant pairs were aware of the long term sequelae of birth asphyxia

The study also found multiparity to be significantly associated with knowledge of early developmental interventions at $p=0.03$, this compares to a study in Saudi Arabia by Alqurashi et al (64) on assessing mother's knowledge with regards to child developmental milestones where parity was significantly associated with knowledge on child development. This could be due to the high number of healthcare worker interactions as well as experience gained in child rearing.

This study also highlighted poor early occupational Therapy referral practice, as only 7.6% of infants were referred for occupational therapy services at discharge. The Kenya National Newborn Guidelines for Hospitals 2018 cite early occupational therapy as a supportive management measure for neonates with perinatal asphyxia and as such these infants should be started on early occupational therapy at the point of discharge from the newborn unit. The Kenya Ministry of Health Mother Child Handbook (MCH) has outlined care for child development that highlights play and ways to communicate with the child, it however does not have standing guidelines on

children at risk of adverse neurodevelopmental outcomes. The MCH handbook still offers a way parents can be educated on early interventions due to its simple illustrations and its wide use.

STUDY STRENGTHS

The discharge interviews were conducted to mothers of children with a clear diagnosis of perinatal asphyxia having been admitted with the same in the NBU and some treated with cooling.

Mothers were interviewed after discharge and before going home so this study accurately documents the current practice.

STUDY LIMITATIONS

This was a Single site study (public referral hospital) and may not have comprehensively answered the many factors associated with caregiver knowledge patterns.

A neurological exam was not carried out on the babies at the time of interviewing the mother's at discharge as well as we did not ask the mother's specifically whether a health care worker had spoken to them about how to care for the baby after discharge.

Currently there is no standing National guidelines on Early Developmental Interventions for perinatal asphyxia or children at risk of adverse neurodevelopmental outcomes, so the study tool was based on literature.

CONCLUSIONS

This study demonstrated overall poor knowledge on perinatal asphyxia and its potential long-term impact. It however found caregivers had sufficient knowledge on early developmental interventions and ways to promote neurocognitive developmental and that parity was significantly associated with the knowledge on early developmental interventions.

RECOMMENDATIONS

- Further studies to assess barriers on education of caregivers on long-term outcomes of Perinatal Asphyxia and barriers of implementation of early Occupation Therapy services.
- Although this study found sufficient knowledge on early developmental interventions, further emphasis on education of caregivers should be done at discharge on the contribution of these interventions on a baby with perinatal asphyxia.

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APPENDIX I: CONSENT FORMS

INFORMED CONSENT-ENGLISH VERSION

Study Title: Caregiver knowledge on early developmental interventions after perinatal asphyxia at the Kenyatta National Hospital New Born Unit

The informed consent has two parts:

- I. Information sheet
- II. Consent form

PART 1: INFORMATION SHEET

Introduction: I am Dr. Kinya Muthoni Gatimbu, a postgraduate student at the University of Nairobi Department of Pediatrics and Child health. I am conducting a study to find out the Maternal (Caregiver's) knowledge on early developmental interventions after perinatal asphyxia at the Kenyatta National Hospital. This is part of the requirements for the postgraduate degree in Master of medicine in Pediatrics and child health.

Purpose of the study: The study will be conducted to assess the caregiver's knowledge of early developmental interventions after perinatal asphyxia and its associated factors at the Kenyatta National hospital.

Perinatal asphyxia (lack of breathing at birth) exposes babies to the risk of adverse neurodevelopmental outcomes. Early developmental intervention activities are aimed at equipping parents with knowledge and skills of activities to be done at home to stimulate their child. This helps the baby's brain to grow and develop normally despite the brain injury that occurred at birth.

Study Procedure: Caregivers will be interviewed at the point of discharge. Those that meet the inclusion criteria and consent to the study will be administered a questionnaire

This study is voluntary and if you decline to participate, you will not be victimized in any way. Your baby will still receive the required care at the hospital.

Benefits: There will be no direct benefits to the participant but data collected will help inform

clinical practice and guideline formulations. Once data collection is complete, caregivers will be taken through the importance of early developmental interventions.

Risks: There are no significant risks associated with participation in the study. Time inconvenience will be reduced by administering the questionnaire within the shortest time possible.

Caregivers who may have emotional breakdown shall be linked with a psychologist within the hospital for counselling as well as a social worker to follow up with the caregiver and child pair at home.

Confidentiality: The information recorded is confidential, your name or that of the child will not be included on the forms and only a number will be used to identify you. The principal investigator and the data analyst will have access to the research data and any publication will not be having any identifiers.

You can ask any question at this point

Contact information:

For any information regarding your rights as a study participant you can contact:

1. Prof. Ruth Nduati (MBChB, MMED, MPH)

Department of Paediatrics and Child Health

Email: ruth_nduati2000@yahoo.com

Mobile No: 0722235323

2. Dr. Florence Murila

Department of Paediatrics and Child Health

Email: fmurila@gmail.com

Mobile No: 0729430022

The chairperson,
Kenyatta National Hospital/University of Nairobi Ethics and Research Committee
P.O Box 19676 -00202, Nairobi, Kenya
Tel: (254- 020) 2726300-9 Ext 44355
Email: uonknh_erc@uonbi.ac.ke

For any clarification or questions regarding this study contact the principal investigator:

Dr. Kinya Muthoni Gatimbu
Mobile no: 0733254192
Email: kinya.gatimbu@gmail.com

PART II: Consent Form

1. I confirm that I have read and understood the information sheet for the above study.
I have had a chance to ask questions and have had these answered satisfactorily.
2. I understand that my participation is voluntary and that I am free to withdraw at any given time without giving any reason.
3. I understand that I can at any time ask for access to the information I provide and can request for the destruction of that information if I do so wish.

Participant's signature

Date

Researcher's statement.

I, the undersigned, have fully explained the relevant details of this research study to the participant named above and believe that the participant has understood and has willingly and freely given his/ her consent

Researcher's name.....

Signature and date.....

SWAHILI CONSENT FORM

UKUBALI WA TAARIFA

Kichwa cha Somo: Maarifa ya mama juu ya jukumu la hatua za mapema za maendeleo baada ya ugonjwa wa kupumua kwa mtoto katika Hospitali ya Kitaifa ya Kenyatta

Idhini ya habari ina sehemu mbili:

- Karatasi ya habari
- Fomu ya idhini

SEHEMU YA 1: KARATASI YA HABARI

Utangulizi: Mimi ni Dk Kinya Muthoni Gatimbu, mwanafunzi wa shahada ya uzamili katika Chuo Kikuu cha Idara ya watoto na afya ya watoto Nairobi. Ninafanya utafiti ili kujua

Ujuzi wa mama juu ya hatua za mapema za maendeleo baada ya ugonjwa wa kupumua kwa mtoto katika Hospitali ya kitaifa ya Kenyatta. Hii ni kama sehemu ya mahitaji ya

shahada ya uzamili katika Uzamili wa dawa katika Pediatrics na afya ya mtoto.

Kusudi la utafiti: Utafiti huo utafanywa ili kujua maarifa ya mama juu ya jukumu la hatua za mapema za ukuaji baada ya ugonjwa wa kupumua kwa pumzi na sababu zake zinazohusiana katika hospitali ya kitaifa ya Kenyatta.

Ukosefu wa kupumua wakati wa kuzaliwa huweka watoto katika hatari ya kupata athari mbaya za maendeleo ya neva. Shughuli za uingiliaji wa ukuaji wa mapema zinalenga kuwapa wazazi ujuzi na ujuzi wa shughuli zinazopaswa kufanywa nyumbani ili kuchochea mtoto wao. Hii husaidia ubongo wa mtoto kukua na kukua kawaida licha ya jeraha la ubongo lililotokea wakati wa kuzaliwa.

Utaratibu wa Utafiti: Mchunguzi mkuu atakagua rekodi za watoto walioachiliwa walio na ugonjwa wa kupumua kwa mwili katika Hospitali ya kitaifa ya Kenyatta. Wale ambao wanakidhi vigezo vya kuingizwa na idhini ya utafiti watajaza dodoso kwa msaada wa mpelelezi mkuu.

Utafiti huu ni wa hiari na ikiwa utakataa kushiriki, hautadhulumiwa kwa njia yoyote. Mtoto wako bado atapata huduma inayohitajika hospitalini.

Faida: Hakutakuwa na faida ya moja kwa moja kwa mshiriki lakini data iliyokusanywa itasaidia kuarifu mazoezi ya kliniki na uundaji wa mwongozo. Baada ya kukusanya Habari, wazazi wataelezewa umuhimu wa mazoezi na mpango mzima wa kuwalewa Watoto wanaopata changamoto za kiakili wakiwa wachanga.

Hatari: Hakuna hatari zinazohusiana na ushiriki wa utafiti. Wazazi ambao watapata zozote za mawazo kuhusu wanao watapelekwa kwa mwansiakologia ili kupewa namna ya kuepuka mawazo hayo.

Usiri: Habari iliyorekodiwa ni ya siri, jina lako au la mtoto halitafanya hivyo ujumuishwe kwenye fomu na nambari tu itatumika kukutambulisha. Mkuu tu mpelelezi atapata data ya utafiti na chapisho lolote halitakuwa na yoyote vitambulisho.

Maelezo ya mawasiliano:

Kwa habari yoyote kuhusu haki zako kama mshiriki wa utafiti unaweza kuwasiliana na:

Mwenyekiti,

Hospitali ya Kitaifa ya Kenyatta / Kamati ya Maadili na Utafiti ya Chuo Kikuu cha Nairobi

P.O Box 19676 -00202, Nairobi, Kenya

Simu: (254- 020) 2726300-9 Ext 44355

Barua pepe: uonknh_erc@uonbi.ac.ke

Kwa ufafanuzi wowote au maswali kuhusu utafiti huu wasiliana na mchunguzi mkuu:

Dk Kinya Muthoni Gatimbu

Simu ya rununu: 0733254192

Barua pepe: kinya.gatimbu@gmail.com

SEHEMU YA II: Fomu ya Idhini

1. Ninathibitisha kuwa nimesoma na nimeelewa karatasi ya habari ya utafiti hapo juu.

Nimepata nafasi ya kuuliza maswali na nimejibiwa kwa kuridhisha.

2. Ninaelewa kuwa ushiriki wangu ni wa hiari na kwamba niko huru kujiondoa wakati wowote kupewa muda bila kutoa sababu yoyote.

3. Ninaelewa kuwa naweza wakati wowote kuomba ufikiaji wa habari ninayotoa na ninaweza ombi la kuharibiwa kwa habari hiyo ikiwa nitatamani.

Saini ya mshiriki

Tarehe

Kauli ya mtafiti.

Mimi, aliyesainiwa chini, nimeelezea kabisa maelezo yanayofaa ya utafiti huu kwa mshiriki aliyetajwa hapo juu na ninaamini kwamba mshiriki amelewa na kwa hiari na kwa hiari ametoa idhini yake

Jina la mtafiti Saini na tarehe

Wasimamizi wa utafiti

1. Prof. Ruth Nduati (MBchB, MMED, MPH)

University Of Nairobi

Department of Paediatrics and Child Health

Email:ruth_nduati2000@yahoo.com

Mobile No: 0722235323

2. Dr. Florence Murila

University of Nairobi

Department of Paediatrics and Child Health

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APPENDIX II: QUESTIONNAIRE

Caregiver knowledge on Early developmental interventions after perinatal asphyxia

PART A: SOCIO-DEMOGRAPHICS

Caregiver's information

1. Age of the caregiver.....
2. Marital status?
 - a. Single
 - b. Married
 - c. Separated
 - d. Divorced
 - e. Widowed
3. Employment status
 - a. Employed
 - b. Self-employed
 - c. Not employed
4. Caregiver's level of education
 - a. None
 - b. Primary
 - c. Secondary
 - d. College
 - e. University

Baby's information

5. Baby's age in weeks.....

6. Place of birth
 - a. KNH
 - b. Referral from outside
7. Mode of delivery?
 - a. SVD
 - b. C/S
8. Sex of the baby?
 - a. Male
 - b. Female
 - c. Others specify.....
9. What is the baby's birth order?.....

PART B: ANTENATAL CLINIC INFORMATION

10. Did you attend the antenatal clinic?
 - a. Yes
 - b. No
11. What is the minimum number of times that pregnant women are supposed to attend the antenatal clinic?
 - a. Less than 4 times
 - b. 4 times
 - c. More than 4 times
12. If yes in question 11 above, how many times did you attend antenatal clinics?
 - a. Less than 4 times
 - b. 4 times

- c. More than 4 times

PART C: KNOWLEDGE OF PERINATAL ASPHYXIA

- 13. Have you ever heard of perinatal asphyxia before giving birth to this baby?
 - a. Yes
 - b. No
- 14. Did your baby cry at birth?
 - a. Yes
 - b. No
- 15. If no in question 14 above, did the health worker tell you why the baby did not cry?
 - a. Yes
 - b. No
 - c. NA (for those whose babies cried at birth)
- 16. If yes to question 15 above, what reason was given for your baby’s failure to cry?.....
.....

PART D: KNOWLEDGE OF POTENTIAL LONG-TERM IMPACT OF PERINATAL ASPHYXIA

- 17. Does lack of breathing at birth have long-term effects on the child?
 - a. Yes
 - b. No
- 18. If yes to question 15 above, what are some of the long-term effects?

- a. Vision abnormalities **b.** Hearing abnormalities **c.** Intellectual disability **d.** Delayed speech
 - e. Delayed milestones **f.** Others specify.....
19. Has your child been assigned a return date for the clinic?
- a. Yes
 - b. No
20. Did the health care worker explain how to use the discharge medications at home?
- a. Yes
 - b. No
21. Has your baby been referred for occupational therapy services?
- a. Yes
 - b. No

PART E: KNOWLEDGE OF STRATEGIES TO PROMOTING NEUROCOGNITIVE DEVELOPMENT

22. What are some of the danger signs that the health care worker has told you to observe on your baby while at home?.....
23. In case your baby convulses at home, what will you do?
- a. Take the child to the hospital
 - b. Buy drugs from a chemist
 - c. Use herbal medicine
24. What will you do to bond with your baby while at home?
- a. Ensure exclusive breastfeeding
 - b. Take the baby to the grandparents

- c. Wean off the baby from breast milk
25. What will you do to stimulate your baby's brain while at home?
- a. Play with the baby/encourage the siblings to play with the baby
 - b. Play music
 - c. Allow the baby to sleep all the time
26. Since your baby may have delayed milestones, what will you not do to alleviate the situation?
- a. Let the baby walk by itself
 - b. Adhere to occupational therapy sessions
 - c. Learn and do physiotherapy at home/sitting/stretching
 - d. Expose the child to the sun
27. How do you enhance a child's language skills?
- a. Talk to the child even if it does not respond
 - b. Play music on the radio



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Ref: KNH-ERC/RR/20

6th January, 2023

Dr. Kinya Muthoni Gatimbu
Reg. No. H58/33016/2019
Dept. of Paediatrics and Child Health
Faculty of Health Sciences
University of Nairobi

Dear Dr. Gatimbu,

Research Proposal: Caregiver knowledge on the role of early developmental interventions after perinatal asphyxia at the Kenyatta National Hospital (P701/09/2022)

This is to acknowledge receipt of your revised research proposal and to inform you that upon review, the KNH- UoN Ethics and Research Committee made the following observations and suggestions:

Most of the issues raised in our previous letter (Ref: KNH-ERC/RR/945 dated 4th November, 2022) have been addressed. However, please recheck the following:

1. Abstract: Add a last subsection on 'Study Utility'.
2. Please check the suggested edits highlighted in the softcopy version of your revised research proposal (track changes) and incorporate in the document accordingly.

Recommendation

Revise and resubmit **two (2)** copies of the full proposal inclusive of the Application Form within a period of **two (2)** weeks with effect from the date of this letter. Include a cover letter that summarizes how you have addressed the comments and note the page number(s) where the changes have been made.

Yours sincerely,

DR. BEATRICE K.M. AMUGUNE
SECRETARY, KNH- UoN ERC

c.c. The Dean, Faculty of Health Sciences, UoN
The Senior Director, CS, KNH
The Chairperson, KNH- UoN ERC
The Chair, Dept. of Paediatrics and Child Health, UoN
Supervisors: Prof. Ruth Nduati, Dept. of Paediatrics and Child Health, UoN
Dr. Florence Munira, Dept. of Paediatrics and Child Health, UoN

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